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***SYMHEALTH 2017***  
***International Conference***  
***on***

***Healthcare in a Globalizing World***

***(Enriching Healthcare Delivery through an Interdisciplinary Approach)***

***(MMC & MNC Accredited)***

***May 4, 5 & 6, 2017***

***Faculty of Health & Biomedical Sciences***

***Symbiosis International University (SIU), Pune***

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# Foreword

Dear Readers,

Greetings from Symbiosis...

Globalization is a defining characteristic of the present times. It is explained by the World Health Organization (WHO) as a phenomenon of increasing interconnectedness and interdependence amongst countries which includes the opening of borders to facilitate flow of people, goods, finances, services and ideas across international borders and the changes in institutional and policy regimes at the international and national levels that facilitate or promote such flows.

Alongside, globalization is another phenomenon that has marked a paradigm shift: the emergence of 'knowledge' as the most important and true power of this century. It may be difficult to keep pace with this knowledge explosion; however this is required! One therefore needs to look at the knowledge in different disciplines and consider applying these pearls of wisdom to improve the services offered by one's discipline.

In this dual context of globalization and knowledge explosion, healthcare has assumed centre stage as an area that is becoming increasingly global and knowledge oriented. A key feature of this dynamically growing healthcare sector is its expansion, to include into its fold, many other disciplines such as Management, Information Technology, Law, Communication, Geospatial Applications and International Relations etc.

In consonance with these transformative forces in a globalized world, the Faculty of Health & Biomedical Sciences (FoHBS), Symbiosis International University (SIU) has organized SYMHEALTH 2017 an International Conference on Healthcare in a Globalizing World. The objective is to explore enriching healthcare delivery by application of knowledge from different disciplines and facilitate innovation and enterprise. It reflects our belief that healthcare is truly interdisciplinary and in order to facilitate available, affordable & accessible healthcare delivery, one needs to stay abreast with developments in other disciplines. SYMHEALTH 2017 is thus a step towards forging new dialogues with various stakeholders of the healthcare community beyond academia, both in India and Abroad, bringing in new insights and perspectives from other fields, offering a platform on which to foster intellectual fellowship amongst all stakeholders and most importantly, being the instrument of global advances in healthcare.

The keynote lectures, track sessions, roundtable discussions, workshops, and research and poster paper presentations are all designed to present to you a comprehensive collage of information and ideas. I invite you to peruse the ensuing pages, which highlight in great detail all the information related to delivery of healthcare in a globalizing world.

**Dr. Rajiv Yeravdekar**  
**MD, PhD**

Dean, Faculty of Health & Biomedical Sciences  
Symbiosis International University



## *From The Editor's Desk*

Dear Readers,

Greetings from Symbiosis!

I am extremely delighted to put before you the Symbiosis Health Times on the occasion of academic festivity of hosting SYMHEALTH 2017 – An International Conference on Healthcare in a Globalizing World (enriching healthcare delivery through an interdisciplinary approach) on May 4, 5 & 6, 2017 at Symbiosis, Lavale campus, Pune.

The Faculty of Health and Biomedical Sciences has made an attempt at addressing an impelling need for the application of interdisciplinary approach to the education and training of healthcare professionals. The conference has provided an opportunity for stakeholders beyond academia and industry, to exchange insights & present emerging opportunities under the various domains of healthcare delivery system.

The interactive panel discussions were divided across eight track sessions, each led by doyens of industry & academia. You have noticed that a rich variety in the subjects of the sessions, each as relevant to health care as the other, ranging from Healthcare law, Economics, International relations to Healthcare IT and Engineering. I am sure that the abstracts of research paper and poster presentations have enabled exchange of ideas and provided impetus to interdisciplinary approach across domains of healthcare.

The section on 'Knowledge Byte' showcases recent happenings in the healthcare system.

A brief collection of 'Wellness Quotes', will guide you to lead & enjoy a healthy life.

I am sure that this collection of pearls of wisdom, with an array of thoughts will firm up our bonding relationship.

I profoundly thank all those who have contributed their rich experience and expertise towards bringing out this issue.

**Dr (Brig). A. P. PANDIT**

**MD (HA) DNB (H&HA)**

Professor (SIHS)

Symbiosis International University

Editor



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# ***Abstracts***

# Track I: Healthcare Economics and Financing

## **Perception regarding pregnancy care among pregnant women attending antenatal care: An experience from a rural Primary Health Centre**

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Currently, pregnancy education is a part of the Reproductive and Child Health (RCH) programme, and imparted to women during Antenatal care (ANC). The magnitude of women's reproductive health problems in India is a serious matter of concern. Among the reproductive health parameters, ANC and safe delivery have important positions as these are directly related with maternal morbidity and mortality, loss of fetus etc. The purpose of this study is to determine knowledge, attitude and practice among pregnant women regarding pregnancy care for better birth outcomes. The study was conducted in a rural Primary Health Centre (PHC) of Pune district. Pregnant women in any trimester of pregnancy attending antenatal care were purposively selected for a two month period. Semi structured questionnaire collected information on knowledge, attitude and practice of healthy practices during pregnancy. Total women interviewed were 100, and all were housewives. Out of them, 60% had completed higher secondary education. 78% women were in their 3rd trimester, 20% were in 2nd trimester, whereas only 2% women were in their 1st trimester. Also, 32% women were primiparous whereas 68 % were multiparous. Only 16% of women had heard about iodine and among them only 5% knew about its significance. Similarly, only 10% had heard about multivitamin and only 7% knew about its significance during pregnancy. On the other hand, majority (60%) of them had heard about iron and folic acid tablets but only 12% knew about its significance. Many women (70%) had heard of birth defects but few of them (10%) knew about its causes. Although women had heard about components covered in this study but less was known about its significance. There was a statistically significant association between education and knowledge ( $p < 0.001$ ). The study provides data on opportunities to improve existing pregnancy education material aiming to improve the maternal health practices. Though various programmes and health education strategies have been implemented for many years, little is known about the information women need on pregnancy. This study highlights the information women need during pregnancy.

**Keywords:** Antenatal care, Knowledge, Pregnancy, Pregnant women

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## **A comparative study of various health insurance providers in relation to premium and various facilities provided**

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Health insurance expenditure in India is roughly 6% of Gross Domestic Product (GDP), much higher than most other countries with the same level of economic development. Of that, 4.7% is private and the rest is public. Understanding the potential of the health insurance sector many players are entering into the market. Life insurance companies of late too have plunged into the health segment, which till recently was dominated by general

insurance companies. Among others, ICICI Prudential has launched Hospital Care and Crisis Cover and Bajaj Allianz, the Care First plan. Life Insurance Corporation, too plans to enter the race. This study is a comparative analysis of top companies with its bestselling products / policy. Health insurance is against the risk of incurring medical expenses among individuals. The aim of this study is to have a comparative study of various health insurance providers on basis of their services delivered to the policy holders and to analyze and evaluate the data and provide suggestions for the same. There was comparative qualitative analysis of the various health insurers on the basis of the service and facilities provided to the insured person under the bestselling products / policy. Secondary data was obtained from the policy documents and the literature on the websites of the companies. Insurance providers are compared on the basis of 10 criteria's like type of plan, market share, claims ratio etc. representing the data in tables and the health insurance provider we compared for various services offered. Only major health insurance providers were selected and their most popular insurance products were considered under the study. Data collected from secondary sources and post purchase services under the study were considered for comparison. With this study one can analyze that which company have more share in market, why this product is better than another, and providing suggestions for providing products in improved way.

**Keywords:** Health care systems, Health insurance, Healthcare providers, Insurance companies, Insurance plan

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### **Urban health in India: Study of select cities**

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The urbanization in India as per 2011 census stood at 31% of the population and is poised to increase to 40% by 2030. Presently, the urban numbers stand at 429 million people in 2016, which is 32% of the total 1.3 billion people. As per the Insurance Institute for Highway Safety (IIHS) report in 2011, 8% of the urban population was concentrated in the top 10 cities accounting for just 0.1% of land and 15% of Gross Domestic Product (GDP). This concentration of population has led to increasing pressure on urban health care resources. The urban health studies that have been undertaken in recent times highlights that the deprivation factors related to urban health have largely been unidentified. Thus, it is important to analyze the health issue in major cities. An empirical study of secondary data from National Service Scheme (NSS) 71st round for select cities namely, Delhi, Mumbai, Kolkata, Chennai, Bangalore, Hyderabad, Ahmadabad, Pune, Surat, Jaipur is used to estimate various health indicator, expenditure and availability of infrastructure related to health like type of sanitation and source of drinking water. Expected outcome are morbidity rate, proportion (per 1000) of ailing persons during last 15 days in select cities, age wise morbidity rate, number of hospitalization (excluding childbirth) in different age group during 365 days by gender and age, hospitalization in public and private centres, total public and private expenditure in select cities, percentage distribution of person by coverage of health expenditure like insurance and availability of sanitation and drinking water to household. The paper aims to understand the health status in select cities. A comparative analysis of the indicator of public health with respect to the selected cities has not been evaluated / conducted using present 71st NSS round.

**Keywords:** Deprivation, Morbidity, Public health, Out of Pocket health expenditure, Urbanization

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## **Current health care condition in Yemen (Aden)**

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Patient safety is a serious global public health issue. In recent years the importance of improving patient safety has been a major concern all over the world. The government of Yemen, like governments of other developing countries has been providing a wide range of free healthcare services to its people over a long period of time. The increase in health related problems in Yemen is due to lifestyle changes and lack of adequate care by the hospitals. Accordingly, the Ministry of Public Health and Population (MoPHP) in Yemen realized that the public sector alone is no longer capable of providing necessary health care for the people of Yemen and therefore privatized the sector to a large extent. Patient safety is an important component of health care quality. It includes the measurement of patient safety aspects which is a top priority in developed countries today, however the patient safety aspects are not well appreciated in the developing countries such as Yemen. As a result, recently there has been a massive travel by Yemeni nationals in the form of medical tourism to other developing countries like India. This paper is aimed at focusing on the current health care situations available in Yemen. The secondary data of the health care related aspects will be presented and discussed retrospectively. In Aden, one of the largest cities in Yemen hospitals both public and private attracts patients from all over the country. The private sector as against the public sector shares over 30% of available hospital beds, 40-50% of the total number of patients. According to the government's annual health statistical report, there were approximately 181 private hospitals operating in Yemen and 9 in Aden. There are a number of Indian doctors and nurses working in the hospitals all over Yemen together with technicians and nurses. In addition, over 18,000 Yemen patients go to India for treatment in a year and over 60% of them preferred hospitals in Pune in the last two years (2013-15) for the treatment of their ailments. In this paper we present a review of current health care status in Yemen through a retrospective data with reference to Aden city and also discuss the possible measures need to be implemented in order to improve the situation. The paper discusses the evaluation of the health care situation in Yemen and also explores the reasons for medical tourism of Yemeni nationals to other countries like India.

**Keywords:** Aden, Health care situation, Medical tourism, Yemen

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## **Emotional intelligence and academic achievement of boys students studying at upper primary level**

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Many studies mainly focused on emotional skills and the effect of Emotional Intelligence (EI) on Academic Achievement (AA) of higher standard students. However, there is limited research focusing on EI and AA of primary and upper primary students. Research indicated that formations of emotional skills are much easier in formative year (birth to late teens). This study provides an opportunity to study an association between EI along with its four factors and AA students. This cross sectional study was carried out during 2010-11. We enrolled 327 boys studying in upper primary classes of 23 schools from six blocks of Aurangabad in Maharashtra. We collected data about EI and AA. Classroom Achievement test was used to assess AA. According to manual guidelines, sufficient time was given to students. The analysis was done by using descriptive statistics and Pearson correlation coefficient to measure the factor wise correlation between EI and AA of boys. The data was analyzed using Statistical Package

for the Social Sciences (SPSS), (V20.0 Texas). The mean score of identification of emotions was 202.98 {Standard Deviation (SD) 22.497}, assimilations of emotion 192.59 (SD 22.262), understanding of emotion 81.68 (SD 9.939), regulation of emotion 28.85 (SD 6.203) and the mean emotional intelligence was 506.09 (SD 44.472). The average academic achievement score was 64.29 (SD 11.405) with English 24.89 (SD 5.283), Science 21.39 (SD 5.544), Social sciences achievement 18.02 (SD 4.026). There is positive correlation of emotional intelligence and its factors with academic achievements and its factors ( $r=0.479$ ,  $p=0.0001$ ). The boys with high EI also hold good AA. The schools always had mission of socializing students and preparing them for life. Providing curriculum on Emotional Intelligence, life skills and creating school climate that fosters the development of emotional skills among students may help for their all round development. This is one of the few research, studied emotional intelligence, as well as academic achievements of students from Marathwada.

**Keywords:** Academic Achievement (AA), Emotional Intelligence (EI), Understanding of Emotions (UE)

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### **A retrospective study on cost analysis of a dialysis unit in a teaching hospital**

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Dialysis has become effective in prolonging the lives of patients with renal failure. So, systematic and comprehensive management of the dialysis unit including cost is an important aspect. The aim of the study is to analyze the cost involved in the procedures of hemodialysis unit in a teaching hospital in Pune. The objectives of this study are to estimate the direct and indirect costs of hemodialysis procedure in dialysis unit and to determine the profit / loss incurred by the unit during the study period. This is a retrospective study, conducted in dialysis unit of a teaching hospital in Pune, August 2015. Direct and indirect costs versus income generated by unit were included in the study. Out of the total cost incurred by the dialysis unit, direct cost amounted to 92.20% and indirect cost was 7.80%. The monthly total income of dialysis unit was Rs.9,10,000 and the cost incurred was Rs.15,46,788.3 i.e. a loss of Rs.6,36,788.3, reflected as per procedure cost (Rs.2379.67) versus amount charged (Rs. 1400) for the same. The dialysis unit in this teaching hospital is a loss making entity and necessary steps should be taken to optimize the procedures, resources etc. for its viability.

**Keywords:** Cost analysis, Dialysis unit, Loss

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### **Economic wellbeing and dimensions of living arrangements**

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Living longer is welcomed by everyone and everywhere in the world. In Maharashtra, elderly (age 60 years above) accounted for 9.9% of the total population. However, demographic transition has many implications on the economy of a country in terms of development and welfare. As the country is ageing, this will affect the economy, because the economic needs of the society will be different in an ageing society. The state-wise studies dealing with economic needs and living arrangement of elderly are scanty. The paper investigates effect of economic wellbeing on living arrangements of elderly and explores the relationship between income and assets with living arrangements. The data on socio-demographic and economic characteristics, living arrangement and wellbeing of 950 elderly individuals was collected from 100 unit frame sampling from urban Pune in 2013. Of 950 elderly (47% male, 53% female) 32% are widowed. About 68% were staying in familial system of joint family. Around 15% elderly lived with their spouse only. About 6% elderly living alone are currently working, 16% who are living with their spouses are

participating in work. The economic need is higher for the elderly living alone or living with spouses compared to other (52%). About 57% elderly men and 43% elderly women have accounts in the banks. Overall about 9% elderly get retirement benefits. Over 46% of the economically dependent elderly are supported by their children. Fixed deposits or Life Insurance Corporation (LIC) is the main economic support for elderly staying with spouse (57%). On regression analysis, the older elderly, without formal education, living alone and with no employment benefit have a higher probability of rating poor economic wellbeing compared with their counterparts. Elderly getting income from work or from pension are self-sufficient and financially less dependent and have saved for their old age. They seem to be living alone or living with spouse. This necessitates an in depth investigation on the income and expenditure.

**Keywords:** Economic wellbeing, Elderly, Living arrangements

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### **A study to determine economic order quantity of selected items in medical stores**

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Benefits of Economic Order Quantity (EOQ) are established worldwide. In India, limited studies on EOQ have been conducted in hospital setup. This study aimed to calculate benefits of EOQ and its applicability for A-class and AV-category items in hospital. A cross-sectional descriptive study was conducted in medical store of an apex tertiary care hospital in New Delhi, India. ABC analysis was conducted using EXCEL and AV-items identified based on expert opinion for consumptions and hospital formulary for Financial Year 2013-14. Traditional method of costing was used to determine carrying costs, ordering costs and EOQ levels for A-class and AV-items. Benefits of EOQ in reducing costs tied in inventory and opportunity costs were calculated. A, B and C class items were 12%, 16% and 72% of inventory and accounted for 71%, 20% and 9% of expenditure (335940604 INR) respectively. AV category drugs were 16 (3%). Adopting EOQ method can result in reductions of costs tied in inventory and opportunity costs up to 62% in various groups of inventory items. Without using EOQ method, costs tied in inventory and lost opportunity costs are high, there can be significant reductions in these if EOQ technique is used. Applicability of EOQ must be contemplated with caution with its assumptions fulfilled as a pre-requisite.

**Keywords:** ABC-VED, AV items, Carrying cost, EOQ, Opportunity costs

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### **Bedsore affecting hospital finance**

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Bedsore (also known as pressure sores, pressure ulcers or decubitus ulcers) are open wounds that develop on the skin which usually covers the bony areas of the body due to chronic pressure. They range from Stages 1 to 4 which goes from being noticed as redness on the skin to being bone deep wounds. These are seen to develop in patients who are unable to move themselves after a surgery. In addition to constant pressure another cause for bedsore could be due to the skin being compromised during the surgery due to cautery burns. The calculation of the rate of occurrence of bedsore in a hospital is often considered as a quality indicator for nursing care. The objective of the study was to conduct a cost study of how much bedsore occurrence costs the hospital annually by analysing the historic data and status of occurrence of bedsore. The project methodology was designed after closely studying the Standard Operating Procedures (SOP) and protocols already being followed in the hospital. Data was collected by studying the financial statements of the hospital and conducting a comparative study of the bills of patients who developed bedsore versus the patients who were discharged at a regular pace having undergone the same

surgery. For an average of 45 patients developing bedsores in this hospital every year, we see a range of Indian Rupee Rates (INR) 2,20,050/- to 1,24,11,000/- spent on bedsores by the hospital. This gives us an average of INR 63,15,525/- spent on bedsores per annum. Bedsores are a rampant problem in today's healthcare industry but with due diligence and taking proper precautionary measures it is possible to bring the rate of bedsores down to zero. A Grade 3 and Grade 4 bed sore should be considered as a "never event". Additionally, from a managerial point of view, bed sore events lead to unnecessary loss of revenue for the institution. Just working to reduce the number of occurrences of bedsores will save hospitals a lot of money.

**Keywords:** Bedsores, Cost reduction, Management of bedsores, Nursing, Pressure ulcers

### **Calculation of Cost Per Reportable Test (CPRT): A measure to reduce the purchase cost in a diagnostic centre**

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Diagnosis is the first step to disease management, as without accurate identification there is no possibility for accurate treatment. The Indian diagnostic market is growing rapidly at Compound Annual Growth Rate (CAGR) 20 per cent to \$32 billion between 2012-2022 and is expected to continue growing at 27.5% for next five years. Approximately 60% of the expenses for the diagnostic centres are on purchasing reagents, controls, calibrators, consumables etc. With rapid growth in the diagnostics industry, there is a proportional increase in the purchase cost. Therefore, to maintain a level of profitability, it is important to monitor the activities in these diagnostic centres and to keep the purchase cost at minimum. The main objective of the study is to minimize the purchase cost in a diagnostic centre by reducing the wastage of reagents, controls, calibrators and consumables. Calculation of Cost Per Reportable Test (CPRT) was chosen as the method of finding out the exact cost incurred to perform a particular test. From the study, parameters like tests rerun, controls and calibrators rerun and the cost associated with them was derived and was compared with the industry standards. The industry standard states that the CPRT should not be more than 20% of the Maximum Retail Price (MRP) of the test. The study indicated that around 65% of the biochemistry tests and 35% of the microbiological tests had CPRT above the industry standards. The possible reasons for high CPRT were identified and appropriate solutions were suggested. For tests with CPRT above 50% of the MRP, outsourcing of tests to another lab at a negotiated price was one possible solution. CPRT of similar tests across different diagnostic centres were compared and consolidation of samples to one centre was suggested for tests with CPRT between 30%-50% of the MRP. This helped in reducing the purchase cost of the diagnostic centre to a large extent. In the rapidly growing diagnostic industry, it is important for the diagnostic centres to understand the cause of the escalating costs and appropriate measures need to be taken keep reduce these costs to maintain profitability of the organization.

**Keywords:** Cost per Reportable Test, Diagnostic industry, Purchase costs

### **The checklist panacea for health insurance claims**

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The Third Party Administrators (TPA) were introduced by Insurance Regulatory Development Authority (IRDA) in 2001, to infuse new management system and to regulate health care services and costs. Their basic function is to act as an intermediary between the insurer and the insured and facilitate cashless service at the time of

hospitalization. A study was conducted in a TPA for three months. The samples were chosen from a population of claimants who had filed their claims during the period of three months by random sampling technique. A total of six hundred samples were collected by direct observation. Out of which, five hundred were re-imbursement claims and hundred cashless claims. After analysis of data the Turn Around Time (TAT) maintenance for claims was around 90% for both cashless and reimbursement claims. Though the TAT appeared satisfactory, the time spent on a single claim was higher due to the number of queries raised for the claims. On detailed analysis it was found that 46% of reimbursement claims had one query raised, 34% had two queries, 17% had three and 4% had queries raised. On analysis of cashless claims, it was found that 42% claims had one query, 12% had two queries and 2% had three queries raised. This lead to wastage of resources in terms of time, manpower and money. This was also associated with increase in indirect cost to the claimant. To reduce all these costs, an all inclusive checklist for all the stages of claim processing would be useful. This will save on the indirect costs which the insured bears. An all inclusive checklists will be welcomed by healthcare providers also, when they know clearly the required documents, enabling them to reduce their associated costs, especially for cashless claims.

**Key words:** Claim processing, Health insurance checklist, TPA, Turn Around Time for claim processing

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## **A Cross Sectional Study to Determine the Out-Of-Pocket (Oop) And Catastrophic Expenditure On Treatment of Illness of Children Under-Five Years of Age Residing in Urban Slums of Pune City**

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**Introduction:** Out of Pocket (OOP) healthcare expenditures are considered to add significant numbers of the global population into poverty, thus hindering the Sustainable Development Goals' target of elimination of extreme poverty.

**Purpose:** To estimate out-of-pocket and catastrophic health expenditures for illness episodes of children under-five years of age residing in urban slums of Pune city.

**Methodology:** One hundred and forty families with children aged between 0-5 years were randomly selected from 28 slums. Data on morbidity pattern was collected using a one-month recall for minor illness requiring outpatient medical services, and one-year recall for morbidities requiring hospitalization by means of a structured questionnaire. OOP expenditure and catastrophe was calculated using published methodology of Xu et al.

**Results:** The most common illness for accessing outpatient services (OPD) and hospital admissions (IPD) was acute respiratory infections. When OPD and IPD services were accessed, the median OOP expenditure incurred for treatment was highest for diarrheal diseases Rs.1900 (105-4910) and for other infectious diseases (malaria, dengue, measles) Rs.19735 (7740-42000) respectively. Comparison of payment for using public and private healthcare facilities revealed that families had to spend 1.5 times more for OPD consultation and 3 times more for IPD admission at private healthcare facilities as compared to public healthcare facilities. OOP expenditure on health was catastrophic for 12% respondents availing OPD services and 99% respondents availing IPD services.

**Research implications:** These findings will be useful for health administrators and policy makers to plan effective strategies for improving the quality of public healthcare services so that people are motivated to utilize these services which are available at subsidized rates.

**Originality:** Most of the studies on the health expenditure are unequally distributed among different regions, age - groups, diseases and households. Plus, there are limited studies on OOP healthcare expenditures in India.

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## Review of Community Based Healthcare Financing in India

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**Introduction:** The Indian healthcare industry by 2020 is estimated to be worth US\$ 275.6 billion. Currently, 8 per cent of India's GDP is spent on healthcare. India needs to spend at least US\$ 80 billion more in the next five years to meet targets, according to Mr. Pradipta K Mohapatra, Past Chairman, Confederation of Indian Industry. The Indian healthcare sector is expected to register a compound annual growth rate (CAGR) of 22.9 % during 2015-20 to US\$ 280 billion. Rising income level, greater health awareness, increased precedence of lifestyle diseases and improved access to insurance would be the key contributors to growth. The private sector has emerged as a vibrant force in India's healthcare industry, lending it both national and international repute which accounts for nearly 74% of the country's total healthcare expenditure. Telemedicine is a fast-emerging trend in India; major hospitals (Apollo, AIIMS, and Narayana Hrudayalaya) have adopted telemedicine services and entered into a number of public-private partnerships (PPP). Further, presence of world-class hospitals and skilled medical professionals has strengthened India's position as a preferred destination for medical tourism. Despite major improvements in recent years, life expectancy in India remains low as against countries at a similar level of development. Service provisions and health outcomes vary considerably across states and regions, with only a few providing access to wide-ranging basic health care services. Thus emergence of health economics has gained paramount importance which is primarily concerned with how financial resources are generated, allocated and used in health systems. Health economics and financing also play an important role in informing health policy and are a key element of the planning and evaluation process. In India people falling in the low income group bracket or those which are socially excluded are often not able to take advantage of the private or publicly promoted health care financing arrangements further rural Indian population is plagued with inadequate health access owing to socio-cultural and economic factors.

**Purpose:** India is a land full of opportunities for players in the medical devices industry. The country has also become one of the leading destinations for high-end diagnostic services with tremendous capital investment for advanced diagnostic facilities, thus catering to a greater proportion of population. Besides, Indian medical service consumers have become more conscious towards their healthcare upkeep however these are concentrated mainly in the urban areas and rural areas still remain untapped and excluded from these facilities. Secluded regions of India have been confronted with multiple challenges in health care including low investment in health, lack of health financing policies, limited financial access to health services, limited health insurance coverage, lack of government aid, weak mechanism for collaborative arrangements at rural levels in the health sector. For addressing some of the aforementioned challenges, countries are exploring alternate financing mechanism of which one is Community Based Health Care Financing. Over the year's community based health care financing issues had been of great interest to the academicians, government, development and policy circles whereby increasingly contributing towards the existing literature, thus this paper attempts to review the existing literature and discuss the developments in this area in Indian parlance.

Sound financial planning is essential to strengthening health systems and contributes directly to improving the impact of health care interventions. Health finance includes the mobilization of funds for health care, the allocation of funds to specific regions and population groups and for specific types of health care, and/or mechanisms for paying for health care, with this in mind the paper aims to study the following objectives:

- i) To identify the modalities of community based health care financing.
- ii) To analyses the structural determinants of community based health care financing in India.
- iii) To study the challenges or issues in community based health care financing
- iv) To assess the probable prospects of the community based health care financing on the stakeholders.

**Research Design / Methodology / Approach / Materials & methods / Experimental:** The paper is structured in three sections. Section I will study the modalities of community health care financing. Section II will discuss the determinants to be considered for social inclusion and financial protection. Section III will study the limiting factors for the implementation and growth of community based health care financing. The findings will be based on the literatures available from varied sources. The study will incorporate relevant literature both from national and international context. 50 published and unpublished reports and conference proceedings completed after 1990 will be selected for review. All studies will primary focus on the concept of community based health care and resource mobilization mechanisms within the socio demographic structure.

**Results & discussion/Findings & interpretation:** The Government of India aims to develop India as a global healthcare hub. It has created the National Health Mission (NHM) for providing effective healthcare to both the urban and rural population. The Government is also providing policy support in the form of reduced excise and customs duty, and exemption in service tax, to support growth in healthcare. Investment in healthcare infrastructure is set to rise, benefiting both 'hard' (hospitals) and 'soft' (R&D, education) infrastructure. Health care expenditure has an adverse impact on the poor households. They have to expend a large amount of money and resources on medical care but they are also unable to earn during the period of illness. Moreover, rural people have a relatively higher burden of indirect costs (such as expenses on transport, food and stay, opportunity cost of lost wages of the sick as well as the accompanying person, etc.) associated with an illness episode [Sodani 1997].

**Research implications:** Health care financing through community-based involvement can be perceived as:

- a) Renders financial resources to promote good health and to prevent and treat illness at the grass root levels of the society.
- b) It will facilitate in risk sharing and protect individuals from higher financial cost for health care.
- c) It will ensure social security and financial protection to the poor.

**Novelty/Originality:** The paper is review based which will discuss the framework of community health care financing will facilitate in reducing the social exclusion of availing health care facilities. The paper tries to relate a concept of community health care financing in Indian context and how the health care benefits can be reaped at the underprivileged sections of the society.

**Keywords:** Financial protection, Social inclusion, Health, Social security, Community Health care

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## **The role of CSO and village health workers (barefoot doctors) interventions in addressing the problem of malnutrition deaths in tribal Maharashtra**

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**Introduction:** A petitioner submission of right to information data to the Bombay High Court, in 2016 revealed that more than 17000 persons died due to malnutrition in tribal areas of Maharashtra. The court was also informed that 283 persons had died in Melghat region of Vidarbha during 2015-16 and additional 83 from January 2016 to July 2016. Many of those who died due to the lack of the availability of both primary and tertiary health care in the remote tribal areas of Maharashtra.

In 1998, when Ashish Satav and his wife Kavita arrived in Melghat, one of Maharashtra's most backward tribal areas, the infant mortality rates in that region were 100 deaths per 1,000 live births - almost twice the Indian average of 52 per 1,000. With no healthcare facilities infant malnutrition was 10 times more than the government statistics. Today, Ashish and Kavita, have managed to reduce the mortality rates to around 60 per 1,000. Severe malnutrition

cases have dropped by over 40%. Over the last 12 years, the doctor couple has treated over 38,000 patients across 36 poor villages in Melghat, saving many lives and treating people back to health.

In 1985, David Werner's book 'Where there is no Doctor' inspired Kolhe and his wife Smita Kolhe. Kolhe's professors, voiced three challenges of rural healthcare interventions - First, how to deliver a baby without the facility of sonography or blood transfusion, next how to diagnose pneumonia without an X-ray and lastly how to cure diarrhoea. Kolhe went to Mumbai to spend six months learning how to do all three, and then left for Bairagarh. Together, they have improved health outcomes in the area and helped the villagers gain access to electricity, roads and primary health centres.

The paper will look into current doctors' lead CSOs' interventions, with establishing forest hospitals as well training village women health workers to improve nutrition awareness as well aid in primary health improvement in the remotest tribal areas of Maharashtra. The paper will do an in-depth qualitative analysis of doctor couple Ashish Satav and Kavita Satav's Mahaan Trust and Ravindra Kolhe and Smita Kolhe's Bairagarh affordable health care experiment in the same area of Melghat Forests. It will act as a future primer for stakeholders working in healthcare delivery in rural/mofussil tribal areas as to how to structure a health program with little or no government help.

**Purpose:** The paper touches the rarely discussed topic of rural health intervention. The primary author of the paper Prof. Ketan Vaidya had the opportunity as a television journalist to visit the remote areas of Melghat and look closely at how barefoot doctor experiments altered the lives of many poor tribal. The objective of documenting the experiential learning into a full-fledged academic paper is to document best practices which will act as a primer of effective and efficient rural health care intervention and inspire the government to look more closely at the problems of these areas.

**Research Design:** The bulwark of the research will be around qualitative in-depth interviews with the people mentioned in the abstract like thinkers, journalists and social workers working in tribal Maharashtra. There will be also quantitative research that we will undertake to understand from a cross-section of respondents about how much effective have been government efforts have been and the areas where there is a crucial need of intervention.

**Research implications:** The research will serve as a new model to look at the malnutrition problem in Maharashtra. It will allow government to think beyond just scheme sanctions. It will enable the decision makers at the high tables to strengthen the human infrastructure of more 'barefoot doctors' rather than allocating money for physical infrastructure that lapses year after year.

**Novelty:** The novelty is that the topic is largely untapped. It is a new approach to an old problem. The value of the paper is for trained social workers, international aid workers and academics studying development issues and specifically malnutrition in Maharashtra's tribal hinterlands.

**Keywords:** Rural Health, Malnutrition, Barefoot Doctors, Tribal Healthcare

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## **Impact Analysis of Drug Pricing Policy and Access to Medicines with Special Reference to GlaxoSmithKline Pharmaceuticals Ltd**

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**Introduction:** Globally India is one of the largest producer of pharmaceutical products. GlaxoSmithKline Pharmaceuticals Ltd (GSK) is the pharma global giant with its presence in India. Considering these two data points, researchers aim to study the impact of the drug pricing policy on access to and resultant sales of medicines listed National List of Essential Medicines (NLEM) of India, with special reference to GSK.

**Purpose:** Original Drug Price Control Order (DPCO) 1995 underwent the major revamp in 2013. This mainly focuses on price decisions for essential medicines produced in India. Report of the Core – Committee for Revision



of National List of Essential Medicines During recent years, the Nationalist of Essential Medicines (NLEM) of India has assumed immense importance in minds of users and Government. This has mainly resulted from various policy initiatives of the Government to improve access to medicines in India. At present NLEM 2015 contains a total of 376 medicines. Researcher aims to understand the impact of DPCO amendments on access to and sales of medicines listed in NLEM.

**Research Design:** Sample of medicines listed in NLEM will be taken which are manufactured and sold by GSK. Based on the literature review the data to study will be decided. Then Discriminate Analysis followed by simple regression will be applied to gauge the impact of policy on sale and access to these medicines is analyzed.

**Results & Discussion:** Access to and sales of Medicines listed in NLEM pre and post DPCO amendments are studied.

**Research Implications:** It is beneficial to understand the impact of pricing on sales and accessibility to these essential medicines. The study provides the base for further decision making and policy formations.

**Novelty:** Considering the live data of GSK a pharma giant and application of discriminate analysis and simple regression to it results into scientific way of gauging the impact analysis.

**Keywords:** National Pharmaceuticals Pricing, National List of Essential Medicines (NLEM), THE DRUGS (PRICES CONTROL) ORDER, 2013, Impact Analysis with Discriminate Analysis followed by simple regression.

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## Capital Structure Decisions in the Indian Healthcare Industry

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**Introduction:** Healthcare in India is one of the fastest growing Industries with a CAGR of 22.9%. This sector attracts steady FDI inflows and government expenditure. Hence it is imperative to understand Healthcare financing in the Indian context, and study the capital structure decisions of firms in the industry.

**Purpose:** The study examines determinants of capital structure decisions of firms in the healthcare sector. The paper further analyses the trend in healthcare financing over a period of fifteen years, and draws out the transformation in healthcare financing pre and post financial crisis of 2008.

**Research Design:** An empirical analysis of short term and long term leverage of healthcare companies is undertaken. A panel regression model is used to incorporate factors that drive capital structure decisions of firms.

**Results & discussion:** It is established that capital structure depends on both internal and external factors and firms converge towards similar capital structures within the healthcare industry, except for deviations e.g. due to firm size.

**Research implications:** The research will provide insights into capital structure decisions of firms in the healthcare industry and what factors play a role in altering the financing strategy of firms.

**Novelty:** This paper analyses the impact of the financial Crisis of 2008 on the capital structure of healthcare firms. The research draws a trend in capital structure of firms across a period of fifteen years.

**Keywords:** Capital Structure, Financial Crisis, Financing, Healthcare, Leverage

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## Assessing The Cost-Effectiveness of Providing Preventive and Curative Services Through Mobile Health Units in Selected Districts of Gujarat

Archana Joshi\*, Akash kumar Lal, Harshada Bhalerao, Bimal Vyas

**Introduction:** India aims to achieve equitable and affordable medical care services for all under the Universal Health Coverage. Accessible, equitable, affordable, accountable and appropriate health services through public health facility at peripheral areas have always been a challenge to policy makers (1). Mobile health services are seen as one of the solutions to reach out to the unreached communities being offered to communities by the government and Companies through CSR initiatives. However, there is scant information available on its effect on reduction of out-of-pocket expenses on seeking primary health services. The present paper presents the

**Purpose:** The challenge to the successful implementation of primary healthcare services lies in finding the most cost effective form of care from the resources available. The study aims to evaluate the cost effectiveness in providing Mobile Health Units (MHUs) services. Deepak Foundation has been implementing mobile health services in the urban, rural and tribal areas for government and corporate partners since 2006 with an objective of facilitating last mile reach of medical care services to the poor. It is self-evident that the way services are designed to deliver care will determine their costs.

**Methodology:** Patient flow information, case report forms were collected from April 2015 – March 2016 and data was analysed using SPSS. Per visit cost was compared between mobile health teams and basic health centers. A synthesis of observational and patient feedback data collected through visits to MHUs was also conducted and was supplemented by comprehensive literature review. Data on cost and patient's visits was obtained from the department of health and family welfare portal.

**Results:** Among the 201,933 patient footfalls recorded during the year 2015-16, 72% sought curative services, 23% were provided health education and 5% received basic diagnostic services. More than 80% of the served population used MHUs services. 90% of the users travelled less than 0.5 km to get the services of MHUs.

The direct cost incurred by the Foundation in providing curative services and health education services for delivering services in the target population through MHUs was Rs.46.77 against Rs 44.7 through Govt. MMU and Rs. 74.84 which is incurred at the PHC level. The analysis took into consideration only the operational cost of providing the services. The average waiting time spent in accessing and waiting for physician consultation was observed to be 5 to 10 minutes for patients seeking care through MHUs while those who sought care through primary health centre, the average time to access the services was 25 to 40 minutes (2) for the nearest health facility. Thus, the average opportunity cost lost because of time loss in service accessibility was around Rs. 66 to Rs. 75 as compared to accessing similar services through MHUs. The economic benefit to the beneficiary through savings in out-of-pocket expenditure on direct and indirect costs is observed to be Rs.36 against utilizing similar services at primary public health facility. Also, considering that 6-8 service delivery points, replacing mobile health teams with basic health centers may require establishing one health clinic in each service delivery point; this will result in an increase of almost 6-8 times in the cost and an inefficient utilization of the resources (3).

**Interpretation:** MHUs effectively address the barriers in health seeking behaviour by enabling access to affordable services particularly for remote, underserved areas. Timely medical care made available through MHUs enables savings in the out-of-pocket expenditure incurred on treatment and also prevents the intangible costs such as anxiety caused due management of illnesses, emotional stress which may otherwise lead to deterioration in the quality of life of patients and their families. Mobile Health services thus support the existing health system through provision of doorstep health services and assuring services where patient volume and geographic location does not warrant investment in fixed infrastructure.

**Novelty:** Since a very small knowledge has been generated in the past regarding the cost effectiveness of mobile health services the present study aims to highlight the cost and benefits of delivering primary health through different models of service delivery.

**Keywords:** Mobile Health Services, Cost of healthcare, Healthcare Economics, Mobile Health Units, Health services accessibility

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**Impact Evaluation of Doodh Sanjivani Yojana on Nutritional Status of School Going Children in Selected**

## Tribal Blocks of Gujarat

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**Introduction/Background:** Nutritional status during infancy and childhood are major determinants of nutritional status during adolescence and adult life. In order to improve the nutritional status of primary school going children, the Tribal Development Department, Govt. of Gujarat, launched an ambitious Doodh Sanjivani Yojana (DSY) in year 2006-07, providing 200 ml of fortified flavoured milk daily to primary school children.

**Purpose:** The study evaluates the impact of the school based –DSY scheme in improving nutritional and health indicators thereby establishing its relevance and effectiveness in addressing malnutrition in primary school children. The study specifically aims to assess the nutrition parameters (height for age, weight for height, weight for age) and morbidity status of primary school children.

**Methodology:** Study design: A quasi-experimental study design was undertaken. Two districts (Banaskantha and Tapi) of Gujarat were selected and one taluka was randomly selected from each district where the scheme was implemented for at least one year. This served as the experimental group.

**Study population:** The study population included of primary school going children in the age group of 6-10 years.

**Sampling and data collection:** The primary sampling units of the study were the primary schools. 1800 school children aged 6-10 years were surveyed. The survey comprised of assessment of nutritional, intake of MDM, anthropometric and clinical assessment.

**Results & discussion:** Significant improvement observed in experimental group with reference to daily dietary intake of protein, fat and calcium in both Tapi and Banaskantha districts. No significant difference observed in percentage of underweight children between the two groups with reference to weight for age. In Banaskantha percentage of stunted children were marginally higher in control group than the control group ( $\chi^2(2, n=902) = 10.723, p=0.005$ ) and proportion of children having normal BMI was higher in control group against those in experimental group ( $\chi^2(1, n=902) = 38.9 p=0.000$ ). In Tapi district, percentage of children in normal category was marginally higher in experimental and the BMI of children in experimental group was better than the control group.

**Interpretation:** DSY shows marginal improvement in nutritional status of school going children in Tapi but not in Banaskantha. DSY may not give consistent outcome in various districts considering the social economic profile of beneficiaries.

**Novelty:** Impact analysis of public health interventions provides evidence for scalability of the program in various demographic and resource settings. The present study highlights the effect of supplementation and fortification program in reducing the malnutrition and disease burden of primary school children and the interplay of socio-economic factors on the intervention impact on which currently limited evidence is available.

**Keywords:** Doodh Sanjivani Yojana, Nutritional Status, Malnutrition in School Going Children, Nutritional Impact Evaluation

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## Track II: Healthcare Communications

### Assessment of physical activity amongst students of Symbiosis

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Healthy lifestyles are one of the most important tools for combating non-communicable diseases. Physical activity (PA) has shown to improve the quality of life in university students. A total of 60 minutes of physical activity is recommended every day for healthy Asian Indians in view of the high predisposition to develop type 2 diabetes mellitus and coronary heart disease. The purpose of this paper is to assess and measure PA behaviours in newly admitted students at an educational institute and to recommend appropriate interventional measures. The PA subscale is part of the study conducted for assessing the Health Promoting Lifestyle Profile among newly admitted students at the time of induction programme. The PA subscale data of 3964 students was collected during year 2015-16. In subscale of PA, following health promoting practices were observed: Performing exercise during usual daily activities (74%), exercises such as brisk walking, bicycling, aerobic dancing, using a stair climber (69%) going for morning or evening walk (56%), playing outdoor games (52%), and walking or cycling while going to college (51%). The mean PA score was 18.2 (SD±4.1). It was more in boys as compared to girls (18.8 vs. 17.5,  $p<0.0001$ ). Higher age was associated with lower average score ( $r=-0.048$ ,  $p=0.003$ ). Undergraduate students had higher average score compared to post graduate students (18.6 vs. 17.9,  $p<0.0001$ ). The findings are useful for academic institutions of developing countries to design various interventions. Promotion of PA for girl students and for postgraduate students needs to be emphasized. This action research was conducted at a university from India which is marching towards being a Health Promoting University, amongst its own students. This validated scale is important in accessing the health promoting behaviors of students and this is one of the largest studies from India. Hence, these recommendations can be implemented and also disseminated through various stakeholders responsible for the wellness of the university students.

**Keywords:** College students, Health promoting lifestyle profile, Physical activity

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### Knowledge and attitude regarding ill effects of smokeless tobacco among patients with habit of tobacco reporting to dental Out Patient Department (OPD)

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Oral cancer is a common and foremost health dilemma worldwide. Tobacco habit is one of the main etiological factor for the occurrence of cancer. Many individuals get habituated to tobacco due to multiple factors leading to tobacco related diseases. Hence the present cross-sectional study is undertaken to assess the knowledge, and attitude towards smokeless tobacco chewing among dental patients visiting dental hospital. The objective of the present study is to assess the knowledge, and attitude towards smokeless tobacco chewing among dental patients visiting dental hospital. Self-designed, pre-tested pro-forma is prepared to collect required and relevant information pertaining to this study and distributed to the patients. After informed consent proforma is distributed to the subjects. The response is pointed out using 5 point Likert scale. The obtained data is tabulated and subjected to statistical



analysis using Statistical Package for the Social Sciences (SPSS) 16.0. This study demonstrated significantly higher knowledge scores about harmful effect of tobacco among users and poor knowledge about the prevention of the cancer. This study demonstrates the habit of tobacco attributed to the focus during work. Majority of them had a good knowledge about oral health effects of tobacco, but they were ignorant about their detrimental functional changes, concerned only about their esthetics. Irrespective of having good knowledge their attitude towards quitting did not change. Hence a determined effort has to be made to increase the awareness of the harmful effects of tobacco chewing.

**Keywords:** Habit, Oral cancer, Oral precancer, Smokeless tobacco

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## **Healthcare branding: an effective way of marketing healthcare organizations**

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In Indian healthcare organizations are facing tough marketing challenges. Patients today have a better understanding of their options, and are not likely to spend money without a great deal of thought and research behind the purchase. In healthcare marketing we have to walk the line between expertise and emotion. People will be attracted towards healthcare facility for expertise, reputation, outcomes, physicians and technology. Patients are more involved in their healthcare than ever before and they want to find the best healthcare at the best price. Hospitals and health systems must build a strong brand and position it over time to survive and flourish in a changing healthcare landscape. The objectives of the research are to find effective ways of branding healthcare and benefits of branding to healthcare systems and to study challenges involved in branding a healthcare facility. We have tried to attain the objective by doing secondary research (by collecting the existing data). The data is retrieved from different sources which involves the summary, collation and / or synthesis of existing research on healthcare branding. For health care organizations, the rewards of branding can be great as it provides an opportunity to truly assess the needs of their members, develop capabilities to meet those needs, and more effectively communicate the ability to meet those needs. In healthcare, branding can be done by creating a strategic website, by creating content that educates your audience, by focus on search engine optimization, by mapping patients journey, empathy, developing communications strategies that resonate and build trust, by word of mouth marketing, by creating better patients experiences, by doing continuous campaigning, by improving accessibility, by giving digital experience to find online quickly what they need, through transparency so that people can trust the brand, by generating reviews by user. Finding of this paper will be useful to healthcare professionals to brand healthcare and hospitals to generate more awareness and help to establish relationship with customers and thereby more customers having an orientation to buy the product. This paper is sufficiently original. It is valuable for healthcare professionals and hospitals.

**Keywords:** Branding, Healthcare, Healthcare organizations, Marketing

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## **Assessment of the knowledge, attitude and practice of cervical cancer screening among women accessing antenatal care in Nnamdi Azikiwe University Teaching Hospital, Nnewi**

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Cervical cancer is a major public health problem worldwide. In Nigeria, it is second most common cancer. Cervical cancer remains preventable. However, one of the methods for the prevention is cervical screening; thus, the assessment of the knowledge, attitude and practice of cervical screening among women becomes crucial. This study sought to assess the knowledge of, attitude to and practice to cervical cancer screening among women accessing ante natal care in Nnamdi Azikiwe University Teaching Hospital (NAUTH), Nnewi, Nigeria. Data was collected from 150 respondents using semi-structured interviewer-administered questionnaire and analyzed using descriptive statistics. The study revealed poor knowledge of cervical cancer screening, though a significant number have positive attitude toward the screening as they indicated interest in doing the screening if provided with the opportunity. Despite this apparent positive attitude, the practice of cervical screening remained abysmally poor. This has been attributed to many factors: lack of awareness of the service, inadequate prodding to do the screening by the physicians, etc. This study is of benefit to gynecologists. However, as the study is based on only 150 willing respondents compared to the huge number of women who attend antenatal at NAUTH and elsewhere, the findings may not be widely generalized.

**Keywords:** Attitude, Cervical cancer, Knowledge, Practice, Screening

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## **A content analysis of most popular health and fitness pages on Facebook authors**

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As per the statistics provided by Statista, Facebook holds 18% market share in the space of online and social media and has over 1,590 million active users worldwide. This statistic is interesting to analyze in the Indian context where the total internet penetration is about 28% which means 375 million active internet users, according to the 2016 report by We Are Social. The same report states that 48% of the Indian population uses the internet every day and Facebook is the most active social media platform with 13% of the total users. In this group, users in the age group of 20-29 years comprise 51% of the total users, with a further bifurcation of 38% male users and 13% female users. The aforementioned statistics build a very crucial context for investigating social media behaviours of Indian youth in general. This is also significant to explore the most important topics or subjects that this group engages with on a social media platform like Facebook. This study is crucial since Facebook attracts a large number of young users, who may be develop very limited notions of health and fitness. The aim of the research study is to find if the discourse on health and fitness is actually serious and informative or is just restricted to notions of attractive body and cosmetic benefits. This research paper will review the most popular Indian health and fitness pages on Facebook and analyze the content that is posted about health and fitness. The research paper will use a mixed methodology framework to conduct a content analysis of the discourse of these Facebook pages.

**Keywords:** Content analysis, Health and fitness messages, Social media, Young users

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## **Biological effects of cell phone radiation exposure: A review**

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The biological effects and health implications of electromagnetic radiation (EMR) associated with cellular / mobile phones have become a focus of intense debate. Various experimental studies have demonstrated that exogenous electric and magnetic field exposures can induce in situ electric fields in the biological tissue leading to nerve and muscle depolarization, enhanced production of free radicals, various cellular and physiological changes such as changes in gene expression, cell growth, and ultimately cell death. This review summarizes the current state of existing evidences concerning the effects of cell phone radiations on human health. The relevant studies were identified via systematic searches of the databases PubMed, Medline and Institute for Scientific Information (ISI) web of science using the key words: 'electromagnetic radiation', 'health', and 'biological effects'. Health issues associated with cell phone radiations include childhood leukemia, brain tumours, genotoxic / neurological effects, immune system deregulation, allergic and inflammatory responses, breast cancer, and some cardiovascular effects. Various experimental studies have observed effects but these are within normal physiological range and thus it is difficult to interpret with respect to an increased risk to health. Few studies have investigated the effect of long-term exposure however most of these reports conclude a reasonable suspicion of risk that exists based on clear evidence of bio-effects with prolonged exposures to mobile phone radiation and may be presumed to result in health impacts. The review concludes that there is controversial and fragmentary scientific data and hence knowledge base is too limited to draw final conclusions on the health risk from exposure and more experimental evidence is required to understand their long term exposure effects. The present review discusses the current debatable scientific findings of the impact of cell phone radiations on human health.

**Keywords:** Biological effects, Health, Mobile phone, Radiations

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## **Effect of healthcare communication education on menstrual hygiene management in adolescent girls at Alandi**

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Menstrual hygiene management (MHM) is a problem for adolescent girls in developing countries, particularly when attending school. Poor water, sanitation and hygiene facilities in schools, inadequate puberty education and lack of hygienic MHM items (absorbents) cause girls to experience menstruation as shameful and uncomfortable. The women should be educated about the significance of menstruation, selection of a sanitary menstrual absorbent and its proper disposal. Differing approaches to menstrual hygiene management have been associated with a wide range of health and psycho-social outcomes in adolescents of lower economic settings. This study aims to find the knowledge, attitude and practices regarding menstrual hygiene in adolescent girls and bring about a positive effect through healthcare communication education towards better menstrual care. A structured interview was conducted among adolescent girls in Alandi visiting a Non Governmental Organization (NGO), who were enrolled in the study having given a consent form. An intervention based study was conducted on adolescent girls encompassing pre and post audio visual healthcare communication education. After a week, an interview was again conducted. Data was collected pre and post interview and analyzed by Statistical Package for the Social Sciences (SPSS) version 23.0 Software. It was observed that the intervention did bring about a positive change in the attitude and knowledge of menstrual hygiene in adolescent girls at Alandi. Findings reveal that structured education is an effective audio-



visual communication method in educating adolescent girls for better menstrual hygiene management.

**Keywords:** Adolescent girls, Menstrual hygiene, Reproductive tract infections, Sanitary pads

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## **Exploring the effectiveness of health related issues on millennial for the consumption of Fast Moving Consumer Goods (FMCG) products**

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India is an ever growing market for consumer goods. With the way the demand is shaping, the market for consumption is expected to grow even further in the coming years. In the year 2015, FMCG in India has generated revenues worth US Dollar (USD) 47.3 billion. Overall, in the span of next four years, which is during 2016F to 2020F, the market for FMCG is expected to rise at a Compound Annual Growth Rate (CAGR) of 20.6 per cent. It will expand to USD 103 billion. In the next decade, from 2015F to 2025F, the consumption in the rural market is expected to grow at CAGR 18.1 per cent. In 2015, the FMCG in rural market was at USD 18.92 billion and by 2025F it is expected to stand at USD 100 billion. Concerns regarding health issues like obesity, chronic heart diseases, hypertension and diabetes have tremendously influenced people to make a shift in their consumption preferences. This research paper will try to understand purchase implications of health messages on products. Qualitative methodology is used to explore deeper in terms of consumer buying behavior of the product which have health messages. In depth interview would be conducted with the participants with the help of semi-structured discussion guide. The participants would be the millennial and data would be generated till theoretical saturation. The study would suggest whether the health messages in the product lead to higher sales in terms of the product and raises the question whether Indian millennial consumers have become health conscious to drive sales. Suggesting the level of consciousness among modern consumers regarding health related message and the need for such message and research therefore. Explicit understanding of whether a novel category of health conscious consumer is evolving to accept or reject products based on health concerns.

**Keywords:** Consumption, Diseases, FMCG, Health, Messages

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## **Mobile phone usage and effect of cell phone radiations: Student's awareness**

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The basic cellular device for communication has evolved as a source of camera, music, internet, news, navigation and beyond. However, the exponential increase in cell phone usage has raised an alarm towards the detrimental effects of cell phone radiations. Review suggests that the potential health hazards associated with prolonged cell phone usage include headache, heat sensation, dizziness and local irritation and burning. This research aims to assess the awareness about effects of cell phone radiations amongst students of Engineering and Biomedical Sciences at Symbiosis International University hill base campus. This was a cross sectional descriptive study conducted by Google forms and distributed "perception questionnaire". Descriptive statistics were derived using Microsoft (MS) Excel 2007. Of the 352 students enrolled, 70.5 and 29.5 percent were boys and girls respectively. On an average, 59.7 percent students spent less than 4 hours, 20.8 percent students spent around 4 to 8 hours and

19.5 percent students spent more than 8 hours in a day on calls, messaging, games / camera / music and internet surfing combined. Of the 19.5 percent students, 33.5 percent spent more hours on internet surfing than games / camera / music (19.6%), messaging (17.9%) and calls (7.1%). Though 82 percent of students were aware of Specific Absorption Rate (SAR), only 62 and 58 percent of students considered using blue tooth / wired headsets and speaker mode respectively, to reduce exposure to phone radiations. Of all the students, only 47 percent of the students kept their mobile phones at a distance of less than 30 cm while sleeping. During long duration calls 32.1% of students experienced heat sensation, 13.07% headache, 1.7 % fatigue, 1.42% dizziness and 0.28% felt euphoric. Overall, this research would impart insight into the addictive world of technology and the impacts cell phone has on student's behaviour. This study provides an aerial view of the field reality and contributes in spotting an underlying trend. The present study reflects the comparative opinions on issues ranging from choice of handsets, triggers and apprehensions in relation to use of cellular phones.

**Keywords:** Mobile phone, Perception questionnaire, SAR

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### **A study on knowledge of preventive practices about vector borne diseases in Pune district**

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Pune district is known for endemic of vector borne diseases like malaria, dengue and chikungunya. Assessment of knowledge of preventive practices of rural community about vector borne diseases is important for designing community-based interventions. A community-based cross-sectional study was conducted among 100 adults selected by random sampling method in two villages of Pune district (village1 and village 2). Data was collected using pre-validated semi-structured questionnaire. Data was analyzed using Statistical Package for the Social Sciences (SPSS) version 20. Out of 100 samples 54% samples were taken from village1 whereas 46% samples were from village 2. 36% were male and 64 % were females. 80% were married while 20% were unmarried. Overall knowledge score of the sample was 36.5 (60.83%). 88% of the sample expressed that they do not have closed drainage system. Mosquito breeding sites found more in village2 (54%) than village1, which was statistically significant at  $p=0.01$ . Knowledge of practices about prevention of vector borne diseases was significantly associated with education status of the samples in both the villages. Potential breeding sites were significantly more in village2 (68%). Similarly actual breeding of mosquitoes was found significantly more in houses of village2 ( $n=55$ , 55%), which was statistically significant ( $p=0.01$ ). Creating awareness among rural population using diverse methods is required to control and prevent vector borne diseases.

**Keywords:** Knowledge, Preventive practices, Vector borne diseases

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### **Impact of non-verbal communication on HR performance**

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An effective leader's job is to create a group of productive employees and make the organization grow. Non-verbal communication plays a much larger role than verbal communication due to the spontaneous nature of this type of communication. The purpose of this paper is to assess the impact of non-verbal communication on the HR performance. Participants (male=89; female=121) were drawn from a specific governmental organization. The participants are well trained professionals posted under similar type working environment and work protocols.

Sampling was simple randomized by picking the participants from different work units of teaching institute and hospital i.e. teaching faculty, clerical staff, clinicians from different wards of the hospital and junior administrative staff. Participants were provided with the 'Non-verbal Immediacy Scale-observer Report (NIS-O) and three videos were also shown to them-one of three videos depicting a leader presenting a positive message to followers. After viewing the video, the participant completed the Nonverbal Immediacy Scale-Observer Report (NIS-O). The participants were given adequate explanation about the tool and were asked to indicate their workplace leaders' non-verbal communication as an observer's report. The instrument uses a 5 point Likert scale, ranging from never (1) to very often (5) as responses and total scores ranging from -52 to 52. Positive hand gestures group reported significantly higher NIS-O scores (positive gestures M=2.4, no gestures M=-21.6, defensive gestures=-19.2). The NIS-O showed excellent reliability ( $\alpha=.93$ ). Non-verbal communication could help the employer in enhancement of workplace relationships, and performance. The leaders can groom themselves to improve workplace relationship and performance.

**Keywords:** Non-verbal communication, Human Resource, Performance

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### **Polycystic Ovarian Syndrome(PCOS) is real**

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Polycystic Ovarian Syndrome commonly known as PCOS, is a very prevalent reproductive disorder in women and the leading cause of infertility among women and also causes facial hair, thinning of the scalp, acne, irregular or scanty periods, recurrent pregnancy loss, cancer of the uterus, cardiac disease and type 2 diabetes. The purpose of this paper is to understand how best to tackle the issue of PCOS in India and provide robust implementation plan for the same. This is a secondary research where in-depth literature review simple content analysis will be undertaken to understand the problem and provide inferences for solution and implementation. Despite high prevalence among Indian women, there is very little awareness about PCOS. So the first step is to raise awareness about the disease and provide feasible solutions and implementation plans for the same. Highlighting the alarming fact that 1 in 5 women suffer from PCOS will enable communication experts to develop strategies for raising awareness about the disease and suggesting plans for effective implementation. Digging deeper into theoretical understanding of the concepts to find appropriate solutions. The poster depiction also suggests novelty in terms of graphical representation where the fact of '1 in 5 women' is represented in a stark manner, with five fingers, each marked by a different hairdo which denotes women.

**Keywords:** Acne, infertility, PCOS

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### **Awareness and adaptive practices regarding factors of climate change among urban residents of Pune city**

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Global warming and climate change is expected to increase the frequency of extreme events. Individuals must take actions to reduce their own contributions to climate change and protect themselves and environment from its impacts. A cross sectional study was conducted to assess the awareness and practices regarding global warming and climate change among the urban residents of Pune city. The study was conducted on 116 residents selected by simple random methods from two different urban settings of Pune city. Validated structured questionnaire was prepared and data was collected. 30 items were included in awareness assessment and 15 items in practice

checklist. Based on the score of awareness level and adaptive practice level is classified as poor, average and good. Reliability of the tool was 84% ( $r=0.8438$ ). The sample consists of 92 (79.3%) female and 24 (20.7%) male. 38 (33%) respondents were from age group of 25-30 yrs., 31-35 yrs. 36(31.03%) 36-40, 30 (25.86%) 41-45, 12 (10.34%) Graduates were 47 (40%), 58% respondents were aware about climate change with mean 17.38 and mean adaptive practice score was 8.6 (53.89%). About 93 (80%) respondents responded that climate is changing. Out of 116, 64 (74%) respondents still using bio-mass to heat water. Only 60 (69%) respondents were aware of nonpolluting Compressed Natural Gas (CNG) vehicles. There is positive correlation between awareness level and adaptive practices ( $r=0.678$ ). It revealed that awareness level is average but adaptive practices among urban population is poor which is far below expected level. It is further concluded that there is a need to spread mass awareness among general population to reduce the impact of climate change. Mass awareness campaign is required to provide information to the public regarding global warming and climate change and its adaptive measures. Paper is significant to the health educators, social activists and mass media personnel to organize mass campaign regarding global warming and climate change.

**Keywords:** Adaptive practices, Awareness, Climate change, Community

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### **Skewed child sex ratio and its sociodemographic determinants: A comparative study**

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Sex ratio is an important social indicator to measure the extent of prevailing equity between males and females in a society. The objective of this study is to find Child Sex Ratio (CSR) in the urban area and its socio-demographic factors. This cross-sectional study involved house to house interview of mothers of 0-6 year children. Information regarding their socio demographic condition, number of pregnancies and their outcome was noted. Overall child sex ratio of study area was 853. We consider CSR 960 as average and depending upon their CSR, the study area was divided in two categories as CSR above average wards and CSR below average wards for internal comparison. At birth order 2, there were 13 abortions in below average wards as compared to 3 abortions in above average ward. In below average wards, there were 5 abortions at birth order 1. This part has lower CSR than national average. There are some demographic factors which influence CSR. There are more abortions at birth order 2, this indirectly point towards sex selective induced abortion in subsequent pregnancies.

**Keywords :** Abortions, Child sex ratio, India, Urban

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### **Developing a family version of the cultural formulation interview**

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The Cultural Formulation Interview (CFI) in Diagnostic and Statistical Manual (DSM)-5 focuses on the cultural identity (CI) and illness explanatory models of individual patients. In India, clinicians frequently see patients with their family. A family version of the CFI is needed, especially in such family-centric societies like India. Plan development and testing of a family version of the CFI (CFI-F) based on the framework that has been validated internationally with a field site in Pune. Review topical themes identified in the CFI Pune validation study and a

follow-up study of cultural identity. Field-trial data of the CFI (n=36), and narratives of 460 clinic and community participants from study of cultural identity (CI) and its impact were reviewed. Experience from these studies guided development of proposed items and plans to validate the proposed CFI-F. The draft interview focuses on presenting problems of an index person in a family assessment, and it is designed to elicit consistent and divergent views among family members regarding illness explanatory models, cultural identity and the role of family in shaping problems, support and solutions. Experience with the CFI and study of cultural identity indicate the relevance of concepts of Hindu philosophy, changing cultural concepts of family and the influence of global values. The roles and responsibilities of various family members further explain their practical significance. This report presents the structure of the proposed CFI-F and plans for validating and using it for clinical care and community mental health. Symptom based diagnostic assessment may fail to account for significant effects of cultural and family contexts that affect vulnerabilities and resilience to mental health problems. Development of the CFI-F provides a strategy that builds on achievements of the CFI by acknowledging the relevance of family relationships, which is particularly important in family-centric societies.

**Keywords:** Community mental health, Cultural competence, Cultural formulation interview, Cultural identity, Family assessment

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### **Patient waiting time as a driver of overall patient satisfaction for Total Quality Management (TQM) in a specialized ocular inflammation practice in a tertiary care hospital in Western India**

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A patient waiting time study to find out the “Turn around Time” for a specialized Ocular Inflammation Practice in western India. The time of “check in” was determined from the registration slip with the patient. The time of “check out” was noted by the ophthalmologist. The “Turn around Time” (TAT) was the difference between the two times. Of the total 56 patients in the study, the 24 general checkup patients had an average TAT of 79 minutes with a minimum 20 minutes and a maximum of 177 minutes. The 32 Ocular Inflammation and Neuro-Ophthalmology patients had an average TAT of 83 minutes with minimum 30 minutes and maximum of 190 minutes. Knowledge of the “Turn around Time” and communication of the same to the patient lets a more realistic expectation about the waiting time be set in the mind of the patient at the time of scheduling an appointment with the doctor by the receptionist.

**Keywords:** Ocular inflammation practice, Patient waiting time, Total quality management, Turn around Time

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### **A study to assess the parental satisfaction about pediatric Out Patient Department (OPD) services in a selected tertiary care hospital**

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A patient friendly atmosphere with skilled, approachable professionals spending quality time to discuss the treatment options and outcome and involvement of parents in decision making will help reducing the anxiety of the parents of sick children. It is very important to assess parent's satisfaction as an outcome indicator of quality of health care services. A descriptive study was carried out to find out the parental satisfaction about paediatric OPD experiences in a selected tertiary care hospital. The study is exploratory and descriptive. The paediatric OPDs of a tertiary care hospital at Pune were selected. Sample taken are of thirty (30) parents of the children attending paediatric OPD. Majority i.e., 73% and 83% parents were satisfied with the services provided by the doctors and nurses respectively. 40% found OPD waiting period long, 53.3% found it difficult to find OPD and seating



arrangement needs to be improved in the OPD. OPD was clean and has play and entertainment facility, reported by 63% parents. Mothers' education level and father's occupation status were found to have significant relationship with their satisfaction level. The study indicates a very high level of satisfaction regarding communication and services offered by doctors, nurses, pharmacy staff. However, 33.3% parents suggested improvement in physical facilities.

**Keywords:** Outpatient services, Parent, Satisfaction

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## **Systematic literature review of negative social and psychological factors affecting mobile phone users**

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This systematic literature review aims at identifying social and psychological factors affecting mobile phone user. In specific reference, it studies negative social and psychological effects on mental health and behavior of mobile users. This study is a systematic literature review of negative social and psychological effects of mobile usage on phone users. Relevant literature on the topic is classified for its relevance, citation counts, and chronology of publications using SCOPUS bibliographic database. 39 relevant research articles on negative social and psychological effects of mobile phone are shortlisted from initial count of 2,225. Later these articles are reorganized to thematically group emerging factors. The study classifies four negative social and psychological factors affecting mobile phone users as social anxiety, depression and stress, addiction, object and romantic attachment. Social anxiety relates to loneliness, psychological dependency, bulimia of contact, fear of separation, and feeling of solitude. Depression and stress is about work-related stress, mental health, information overload, and techno-stress. Addiction to mobile phone is reported as social extraversion, higher expenditure, and negative emotions. Lastly, literature discusses object and romantic attachment of mobile users as sexting behavior, leisure, social engagement, media behavior, and lowering of anxiety. Mobile phone being pervasive in usage, understanding negative social and psychological effects on users is a relevant cause. Four identified factors could be furthered using statistical testing. This is an important study for its efforts in summarizing the extensive literature, and identifying social and psychological factors affecting health of mobile users.

**Keywords:** Addiction, Depression, Mobile phone, Object attachment, Romantic attachment

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## **Comparing family as a feature of cultural Identity in clinic and community settings of Pune, India**

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Expression of cultural identity (CI) reflects personal and family values, which may have positive and/or negative associations. In clinical field trials of the Cultural Formulation Interview for Diagnostic and Statistical Manual (DSM)-5 Cultural Formulation Interview (CFI) in Pune, respondents' difficulty understanding, and clinicians' difficulty assessing CI indicated need for improved assessment. The purpose of this paper is to assess key features of CI and perceived positive and / or negative impact with a particular focus on the role of family, and compare accounts of CI among outpatient psychiatry patients and non-patient community residents. A semi-structured interview was used to examine 12 domains of CI. Prominence of each domain-ranging from 0 (not mentioned) to 2 (definite feature)-was analyzed based on respondent accounts. Positive and negative impact of CI was also analyzed. Thematic

analysis was used for qualitative elaboration and comparison. Family was the most prominent domain of CI for clinic (n=302) and community (n=163) respondents. Themes of family identity focussed on the family name, respondent roles with reference to key relationships and responsibilities. Community respondents regarded the impact of the family more positively, though violence and deprivation were also acknowledged. Clinic patients had less positive views of family relationships, elaborated in accounts of criticism, neglect and exploitation. Family is the most prominent feature of CI, and in depth assessment of CI helps both patients and community respondents understand and express features of cultural identity that are otherwise difficult to articulate spontaneously. Findings indicate that assessment and consideration of the role of CI and its impact are relevant for clinical care and for community mental health planning. Both assessing CI and considering implications for inking culturally competent clinical psychiatric services to culturally sensitive community mental health planning has been challenging goals. The approach to assessment and the clinic-community comparative design are unique contributions of this study.

**Keywords:** Community mental health, Cultural competence, Cultural identity, Cultural formulation interview, Family values

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### **Cybercivility guidelines of social media in schools of nursing in the United States (US)**

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Despite the universally recognized benefits of the internet, new challenges for users in cyber environments have emerged, of particular concern cyber incivility. This phenomenon is evident daily on social networking sites (SNSs). The purpose of this study was to explore key features of the guidelines in selected programs in order to inform nurse educators and administrators about how best to maintain a culture of cyber civility in nursing education and practice. A descriptive, cross-sectional, non-experimental search design was used. Data was collected in nursing schools offering master's programs and online graduate programs listed in the 2017 edition of U.S. News in 2016. Content analysis was used to identify common elements of existing protocols. Of the 230 school websites reviewed, 80 (34.8%) programs had SNSs use guidelines. References specific to Health Insurance Portability and Accountability Act (HIPAA) compliance occurred in 66.3% (n=53) of the documents. References related to professionalism, ethics, and civility (62.5%, n=50) was another predominant feature. The next feature most often cited was civility or lack thereof and more specifically forbidden behaviors (61.3%, n=49). Establishing and implementing policies / guidelines regarding cyber civility is a vital step to promote its culture. It is especially important to do so in health-related programs where standards should reflect the values of the profession. The limitation of this study is that we only included policies / guidelines that were available online. Cyber incivility is of great concern to educators given that students' uncivil behaviors interfere with academic achievement, as well as the teaching-learning process. This study is of value to health professions educators since it provides a basis for understanding the current state of policies / guidelines regarding cyber civility in nursing education while raising awareness of policy development and implementation in nursing education.

**Keywords:** Cybercivility, Incivility, Nursing education, Social medium

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## **Estimating problem of undernutrition among under five children of urban slum area using World Health Organization (WHO) child growth standards**

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Nutrition of under five children is of paramount importance because the foundation of life time health and intellectual vitality is laid during this period. Childhood undernutrition is a global public health problem with serious consequences for both individual and society. The purpose of this paper is to estimate the prevalence of undernutrition among under five children in an urban slum and study some factors associated with it. This community based cross-sectional study was conducted in an urban slum area of tertiary care institute in central India during 2014. Study subjects were under five children. Data collection was done by conducting house to house survey and information was recorded in pre-designed pre-tested survey tool. Weight and height were measured with standard techniques. Study subjects were classified as underweight, stunted and wasted according to WHO child growth standards 2006. Data was analyzed using STATA 10.1 statistical software. Under nutrition was measured by WHO child growth standards 2006. Prevalence of underweight, stunting and wasting among under five children was found to be 45.31%, 34.77% and 15.23% respectively. In multiple logistic regression analysis, factors found to be significantly associated with underweight were lower socio-economic status {Odds Ratios (OR) 11.65}, pre lacteal feeding (OR 3.37) and low birth weight (OR 2.57). Factors found to be significantly associated with stunting were lower socio-economic status (OR 8.56), birth order  $\geq 3$  (OR 3.88) and pre lacteal feeding (OR 2.48). Wasting was found to be significantly associated with lower socio-economic status (OR 8.14) and working mother (OR 3.70). Problem of undernutrition has social implications. Study has all the inherent limitations of a cross-sectional study like inaccurate recall of information, limited possibility of determining causal relationship between epidemiological factors and under nutrition.

**Key words:** Stunting, Urban slum, Under five, Underweight, WHO child growth standards

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## **The effects of the structured teaching program on HIV/AIDS knowledge and attitudes among Asian Indian women in India**

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HIV / AIDS is one of the recognized public health problems in the world, and its effect is multifocal. A number of factors contribute to the delayed diagnosis of HIV / AIDS among women as it is a sensitive topic to discuss. Moreover, AIDS affected individuals may not offer information voluntarily due to stigma, embarrassment, and fear of abandonment. India remains second in the number of persons living with HIV / AIDS. Eighty-six percent of transmissions of HIV / AIDS in India are caused by sexual activity. Filling in knowledge gaps, particularly among women, is considered key to preventing future infections and in reducing female vulnerabilities to the disease. One group pre-test and post-test quasi experimental design was used to assess the effectiveness of the Structured Teaching Program (STP) on young women's knowledge and attitude regarding HIV / AIDS. The knowledge of young women on HIV / AIDS was significantly increased in post-test after intervening with the STP. Significant correlation was found between knowledge and attitude levels of young women with regard to HIV / AIDS. In developing



countries like India, there are limited resources for overcoming HIV / AIDS. Hence, major emphasis should be laid on prevention, as this is the best and the least costly approach to control HIV infection. Nurse educators have to take lead in organizing and conducting health education campaigns and research studies related to HIV / AIDS. School health nurses, occupational health nurses should take active role in HIV screening, educating preventive strategies on HIV / AIDS, and encouraging family and individual counselling. Nurse administrators have to encourage nurses to participate in HIV / AIDS campaign and research studies while updating their knowledge and skills in HIV / AIDS prevention strategies by attending continuing education sessions and conducting research studies and quality improvement projects. This is the original research study. It is conducted in three settings of Chittoor District, Andhra Pradesh in rural, urban and tribal settings.

**Keywords:** HIV/AIDS stigma among Indian women, Indian Women HIV / AIDS preventive strategies

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## **Role of media in menstrual healthcare**

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Menstruation is a less talked about topic. Most girls prefer to hide it. Men, even after knowing about it feel uncomfortable to discuss it. This taboo exists even in urban areas. Even for people located in urban areas and belonging to the upper-middle class of the society, menstruation is still a taboo. Females tackle this hard time which occurs every month for around 5-7 days, feeling uncomfortable, lacking confidence and unhygienic. Still, they cannot share it with anyone due to the taboo that is widely spread in the society. This study focuses on the influence of media on the awareness of menstrual hygiene on girls of age group 17-23 and does a comparative analysis with females of age 10-14. Through the data, the analysis will be done to understand the personal experience of girls in terms of their knowledge, awareness, and level of comfort with a focus on the influence of media on these factors. The research methodology used in the research was qualitative primary data collection through structured open-ended interviews. The responses given by the interviewees was be used to draw meaning from the data. The interviewee will be college girls of age group 17-23. And to gain a better view and compare the conditions today with those prevailing with 17-23 years girls, female students of age 10-14 years were also interviewed. Most literature on this issue has been centred around rural women. Studies which have been done on urban women and their awareness of menstrual hygiene have not focused on media channels or have simply noted the lack in their awareness levels. The study done in Nigeria focused on the menstrual abnormalities experienced by female college students, their awareness and health seeking behavior. A study conducted in Uttrakhand, India focused on the knowledge and source of information regarding menstruation among the adolescent girl students and to find out the practices of menstrual hygiene among them. The study attempts to find out the existing social and cultural practices regarding menstruation, awareness levels, and the behavioural changes that come about in adolescent girls during menstruation, their perception about menarche, how do they treat it, and the various taboos, norms, and cultural practices associated with menarche. Whereas this study, in addition to identifying the level of awareness, tries to bring up strategies on how to bring about increased awareness through the effect use of media.

**Keywords:** Awareness, Hygiene, Menstrual, Middle class

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# E-waste management challenges to human health and environment: A perspective study of user's awareness of Pune City towards health and sustainability

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Electronic devices supported by the dynamic modern age technology play an important role in the society to bridge the digital divide. These devices can be seen across all the sectors of the society from the common households to the space technology. Life without these devices is not imaginable as they have become irreplaceable part of our lives as they provide affordable, reasonable and quality access to information and communication technology. The remarkable growth in use of Information and Communication Technology (ICT) devices and services, innovations and frequent changes in the technology has allowed the users to disown the existing devices which are in many cases found in workable conditions and in few cases, not in workable conditions. These disowned devices in part or full find their way to the solid waste stream and make the management of the waste more challenging. The landfilling of these End of Life (EOL) electronic devices referred as e- wastes are a serious concern as they lead to deterioration of environment and human health. E-waste is complex in nature due to the presence of plastic, glass, toxic and precious metals which pose a challenge for managing it in environmentally friendly and sustainable manner. The increasing "market penetration" in developing countries, "replacement market" in developed countries and "high obsolescence rate" of the electronic devices make Waste Electrical and Electronic Equipment (WEEE) / e-waste, one of the fastest waste streams and has emerged as a critical global environmental health issue. In spite of several initiatives by governments and voluntary organizations there is lack of implementation of policies due to the massive production volume and lack of awareness among the stakeholders. The metals and Persistent Organic Pollutants (POPs) in e-waste are treated in scientific manner in developed countries and hence have a less impact on human health and environment but the inappropriate recycling processes followed by informal sector in developing countries result in the release of these toxicants into the environment. Children and women are employed in the informal e-waste processing as they get employment opportunities and a living to support their families. Developing countries adopt the informal recycling processes as they provide lucrative business opportunities with least investment and no liability and helps informal e-waste sector to flourish. For more than a decade now the workforce involved in the informal sector are getting exposed to high toxicant but there are few insignificant attempts taken to study this issue and intervene in order reduce exposures in the local communities. Serious health concerns arise from the primitive recycling activities and affect the environment and health but the research in the e-waste area does not address these issues at large. Authors in this paper attempt to address the issue of e-waste and related impacts on human health and environment. The study is conducted in the Pune city to understand the awareness of the users about the health issues and sustainability using a primary survey method with a structured questionnaire. A sample of 400 users was considered for the study and a response of 80% was achieved. The study reveals that the user's awareness about e-waste is very good but the awareness related to impacts of health and environment is less. There is a need to educate the users about the e-waste disposal channels, effects of informal recycling and the long lasting negative impacts on health and environment.

**Keywords:** E-waste, Informal sector, Health issues, Sustainability

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## **An epidemiological study of Acute Respiratory Infections (ARIs) among under-five children in two slum areas of Pune**

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Acute respiratory infections (ARIs) comprise a large chunk of the infectious disease problem and present clinically as Upper Respiratory Tract Infections (URTIs) and Lower Respiratory Tract Infections (LRTIs) annually. ARIs are responsible for ~3.9 million deaths worldwide, disease burden being 94 million Disability Adjusted Life Years (DALY). Pneumonia alone kills more than 1.4 million under-5 children annually>AIDS, malaria, TB combined. Risk factors involved are malnutrition, non-exclusive breastfeeding and low birth weight, improper ventilation, high smoking chulhas, cramped living conditions, use of solid fuels especially in slums. Under-5s may suffer 2 to 6 episodes of ARI per child per year. ARIs cause 30–50% visits to health facilities, 20–40% hospital admissions. <50% of afflicted children in developing countries went to health care providers. The objectives of this study is determining magnitude of ARIs among under-5s, treatment seeking behavior at household level and suggesting measures to prevent recurrence. It is cross-sectional, questionnaire and community based Knowledge, Attitude and Practice (KAP) study. Sample size is 50. After obtaining parental consent, this study was conducted in Wanwadi, Fatimanagar slum areas. A questionnaire testing knowledge of mode of transmission, symptoms and hazard of ARIs, attitudes and practices in relation to the sick child, morbidity among under-5s and healthcare sought was administered. The data was analyzed and interpreted using statistical software for Social Science (SPSS). Of 50 children studied, 31 were affected by ARIs within last 6 months, 12 sought healthcare, 14 received traditional remedies, 2 died because of neglect and 3 recovered without medication. Of them, 12 had had another episode of ARI within 6 months, none died. Of this group, all parents had sought medical help. 3 had been admitted to a Coronary Care Unit (CCU) on 2nd episode and 2 on 1st episode. Treatment seeking behavior in parents=40%, mortality rate=6.6%, morbidity (last 6 months)=62% (p value<0.05). In India, ARIs constitute a major cause of morbidity and mortality in under-fives but remain neglected. Moreover, treatment seeking behavior remains abysmally low. This study will help the authorities of Pune Cantonment / PSM Department, Armed Forces Medical College (AFMC), Pune to initiate suitable Information, Education and Communication (IEC) activities to educate and spread ARI awareness among the parents / guardians.

**Key Words:** ARIs, Morbidity, Questionnaire, Slum, Treatment

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### **From habits of attrition to modes of inclusion: Enhancing the role of private practitioners in routine disease surveillance**

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Rising burden of non-communicable diseases (NCDs) constitutes a major public health challenge in India. Given the Quality Adjusted Life Years lost and the long-term costs of chronic care NCDs pose a serious threat to economic and social development. Nonetheless, there is no comprehensive functional NCD surveillance system in the country to date. Further, private and alternate medicine practitioners are inadequately involved in disease surveillance despite their prominent role in providing health care especially in the urban areas. Taking this as a point of departure, the study aimed to investigate the barriers and facilitators of including private sector in routine NCD

surveillance in Pune city, India. First, 299 clinics of private allopathic, ayurvedic and homeopathic general practitioners and physicians in three administrative areas of Pune were mapped. A Knowledge-Attitude-Practice (KAP) survey on public health surveillance amongst was conducted with these practitioners (response rate 86.3%). Finally, a prototype for select NCD surveillance (12 diseases) was designed, implemented and tested for six months among 127 participating private practitioners. The KAP study revealed that knowledge among private practitioners on public health surveillance is rather limited and varied by system of medicine and level of qualification. Preliminary results from the pilot study suggest that private practitioners are an important source for NCD care in Pune and that involvement in regular surveillance is possible albeit difficult. Major barriers included poor infrastructure (computers and internet), lack of time and attitude of the practitioner. A clear legal framework, regular interaction and simple reporting formats may help improve private sector reporting. Allocation of Continuing Medical Education (CME) points as incentive for participation in routine surveillance is a viable option and should be piloted. This is first prototype of urban disease surveillance system for private practitioners to the best of our knowledge. If scaled to city this will be the first comprehensive data on prevalence of NCDs amongst private outpatient consultations in a tier two city of the country. Limitations of the study include non-distribution of NCD case definitions and reliance on practitioners decision on presumptive and lab confirmed diagnosis of cases. Selection bias cannot be ruled out due to purposive sampling of the study areas for different stages of urban development. Some key respondents such as gynaecologists and radiologists were excluded from the sample. Social desirability and recall biases cannot be completely ruled out from the study findings. Given that there is no systematic collection of NCD prevalence or incidence data in Pune the study makes an important contribution to the disease burden estimation. Second exclusion of private sector especially alternate medicine practitioners who are the preferred first point of care in urban areas in India leads to underestimation of NCD burden in the country. The “proof of principle” study demonstrates that active involvement of private practitioners is feasible although resource intensive.

**Keywords:** Disease surveillance, India, NCD, Urban

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### **Communication barrier in health care setting as perceived by health care professionals and patient**

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Communication and Inter Personal Relationship (IPR) are considered to be multi-dimensional, multi-factorial and a dynamic, complex process, closely related to the environment in which an individual's experiences are shared. Since 19th century until today, health care providers and nurses have put their great efforts to optimize the communication and interaction strategies in nursing. Effective communication is an important aspect of patient care, which not only improves nurse-patient relationship but also has a profound effect on the client's perceptions of health care quality and treatment outcomes. Effective communication between nurses and patients is the key element in providing high-quality nursing care and results in patient satisfaction. Health care providers with effective communication skills with patient can have positive outcomes including minimize patient's anxiety, guilt, pain, and overall recovery. Effective communication skills can increase patient satisfaction, acceptance, compliance and cooperation with the medical team and improve physiological and functional status of the patient. However, most studies have reported poor nurse-patient relationships and poor personal satisfaction because poor communication skills between nurse-patient affect the quality care and patient satisfaction. The results of previous studies have shown that nurses have been trained to establish an effective communication in health care settings and they do not use these skills to interact with their patients in clinical environments. Similarly, the results of other studies have shown that nursing personals have not put their effort for establishing positive interactions with the patients. Communication gaps are 5-15% in general population and more than 20% in hospital settings. Hospitalized patients in all ages experience mobility, sensory, cognitive needs as well as language barriers in communication with nurses and other health care personals during their stay. Effective communication and talk with

nurses minimizes stressful and unpleasant hospital experiences for patients and their families. Also, through communication, nurses can provide high quality of health care services and become familiar with the needs of their patients. Patients with communication disability were three times more likely to experience medical or clinical complications compared to other patients. The objectives of this research are to assess the barriers in communication between nurses and patient and to find out the association between barriers related factors with the socio demographical variables of health care professionals. The study was cross sectional, descriptive study. This study was conducted on nurses and patients of two private hospitals affiliated to National Accreditation Board for Hospitals and Healthcare (NABH) in Pune, Maharashtra. Simple random sampling method was used. Data were collected through two separate questionnaires for nurses and patients. The reliability of the tool was assessed by split half method and validity was assessed by the opinion of experts in the field of nursing. Content validity was approved by experts from nursing field from 2 different nursing colleges and hospital of Pune. Pearson's correlation coefficient between the two halves was calculated and reliability of patient ( $r'=0.74$ ) and nurse ( $r'=0.80$ ) were obtained and hence the tool was found to be reliable. The questionnaires consisted of two sections. The first part included demographic questions and the second part was concerned with the present barriers to nurses' use of communication skills. The nurse questionnaire contained 44 items and patient questionnaire consisted of 30 items each item included 5 options: none, little, average, high, and not included. The subject has to choose one of the options with regard to the importance of each barrier. The barriers were divided to four categories: common barriers between patient and nurse, nurse-related barriers, patient-related barriers and environmental barriers. After obtaining the consent from nurses and patients in the two hospitals, the data were collected. In order to collect the data, the investigator visited regularly in the wards during different shifts. The questionnaires were given to the patients and nurses, after completion, the questionnaires were collected by the researchers. The nurses from medical, surgical, Intensive Care Unit / Coronary Care Unit (ICU / CCU) and emergency wards were selected by random sampling for the data collection. The sample size was calculated by power analysis. The questionnaire was given to the patient after explaining the objectives of the study and after obtaining an informed consent. The patient sample was randomly selected from medical, surgical, and emergency wards. For data analysis, descriptive (mean, mean percentage, standard deviation) and inferential statistics (Binomial, Mann-Whitney, and Friedman tests) were used and Statistical Package for Social Science (SPSS) version 16 was utilized. A p-value less than or equal to 0.05 was considered statistically significant. The tool was divided into 3 categories client related factors, nurses' related factors and common factors between nurses and client. In both groups of nurses and client (mean scores of 2.45 and 2.18, respectively) and common factors between nurses and patients (mean scores of 1.87 and 1.90, respectively) were considered the most and least significant factors. Also, patient-related ( $p=0.001$ ), nurse-related ( $p=0.012$ ), and environmental factors ( $p=0.019$ ) were found to be most significant. Some barriers were also observed during the study like, language barrier, environmental barrier, cultural barriers, overload of work schedule of nurses etc. which affects the nursing care services. These barriers can be overcome by raising the awareness of nurses and patients along with creating a desirable environment. We recommend that nurses be effectively trained in communication skills and be encouraged by constant monitoring of the obtained skills. The purpose of health care system is to provide quality services and communication is a best way to gain patients' satisfaction. The results of the present study can be implemented in health care settings to make effective communication and IPR among the health care professionals and patients. The content of the present study is generated by reviewing the previous studies on communication and barriers among health care professionals and patients and the credit goes to all the nurses and the patients who contribute in the data collection procedure. Without them it would not be possible to know the present barriers in the communication between health care professionals and the patients.

**Keywords:** Barriers, Communication, Nurses, Patient

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## Exploring communication metaphors in preventive products: A critical discourse analysis on the portrayal trends of condom advertisements

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Among preventive products, communication of condom usage through diverse advertisements has always occupied the centre stage targeting male audience majorly. The critical observation at the communication trends of these advertisement put forward, the portrayal of condom advertisements has undergone significant changes in the last one decade with the globalization and feminist movements being stronger than before. According to the report "Condom Market", U.S. demand for condoms is expected to reach US Dollar (USD) 1,563.95 million in 2020, growing at Compound Annual Growth Rate (CAGR) of 3.5% between 2015 and 2020. This will lead to more such advertisements. However, few studies have tried to gain insight on changing trends and its relation with changing outlook among individuals. The research focuses on the critical analysis of the changing discourses in condom advertisements and understanding its effectiveness with respect to today's evolved audience. The purpose is to identify whether the condom advertisements have been dynamic enough to capture the changing mind-set of the consumer and measure the extent of impact. Qualitative methodology is used to explore important parameters from condom communication research and evaluate the changing discourses of condom advertisements present in youtube in the last one decade. The five parameters that this paper would undertake are: preparatory behavior, portrayal of gender, textual discourses, visual discourses and target audience. The study would suggest which parameters have undergone change over the last one decade and which parameters have remained constant, inferring the implication of the same. Comprehensive study will lead to advertisers in effective methods of communicating condom advertisements to audiences. Medical practitioners and health researchers will be benefitted in persuading people with meaningful communication of the preventive products. Understanding changing portrayal trends in condom advertisements and analysing its relevance to capture the changing consumer mind-set in such a sensitive category.

**Keywords:** Advertisement, Audience, Condom, Discourse, Gender

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## Rhetoric and reality of nutrition promotion through entertainment education-A review of research from last six decades

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India faces a strange paradox of growth of new media communication technology alongside lack of public health awareness. Despite several nutrition programmes, the nutrition scenario continues to be grim. One of the major lacunas is effective nutrition communication. Its importance is well documented in public health nutrition policies of India. Combining education with entertainment education (E-E) methods could enhance the learners' motivation and help moving them to healthy eating habits. Studies examined competency of Environmental Education (EE) approach for nutrition education with an aim to understand its effectiveness for nutrition promotion. A systematic review was conducted by using suitable key-words and sourcing published literature from select search engines like PubMed, Google Scholar, Elton B. Stephens Company (EBSCO) host and Google. The inclusion criterion was predefined to include Indian studies that used audio-visual aids, multimedia games, internet, television and radio for education of community / health workers / stakeholders on maternal, child and adolescent nutrition. 40 studies using

E-E approach for health promotion were identified further 20 studies specifically incorporated E-E for nutrition promotion. The traditional modes of nutrition and health education have been talks, lectures, flash-cards, face-to-face interaction, role-plays and street-plays. The studies used EE approach, however, the typical phases of E-E projects -formative, process and summative research were not adequately followed in some. The appealing E-E model led to nutrition knowledge acquisition in target populations however did not serve as a standalone approach to bring about behaviour change. There is a need to periodically assess EE strategies at the individual, collective and system level for targeted interventions. Given the fact that there is a dearth of literature on the use of EE approach for nutrition education. Considering there is a dearth of literature on the use of E-E, this study attempted to examine the potential of E-E as a tool for behaviour change communication with nutritional content.

**Keywords:** Community nutrition, Education in India, Health promotion in India, Multimedia, Nutrition Apps

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### **Communicating with skill: Developing a caring relationship with patients**

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Research has indicated that a successful physician needs several additional qualities than purely medical skills. One such quality is to communicate effectively with patients, their relatives, colleagues and the general public regarding public health issues. The aim of the research was to survey, research done of medical communication and assemble it in an authoritative text book. Essentially, the research was desk research, supplemented by a survey conducted at two well-known medical centres, interviews with senior medical practitioners in the city of Pune and on-the-spot observation of some medical interviews. The main objective was to identify main areas of medical communication on the basis of the data collected using the approach described above. How are the objectives attained? What is the approach to the topic and what is the theoretical or subject scope of the paper? On the basis of the data collected, the following main components of medical communication were identified: What is the need for effective medical communication, especially between the doctor and the patient?, What are the main features of the contemporary approaches to doctor-patient relationship?, Which type of communication process is most relevant to medical communication?, What are the reasons the medical practitioner should develop skills of listening?, What are the communication barriers a medical practitioner is likely to face while communicating with patients, their relatives and colleagues?, What are the sensitive situations in which a medical practitioner is expected to communicate effectively?, What are the components of a good medical presentation? and What are the writing tasks a medical practitioner is required to perform during the course of his normal duties and as a researcher?. It was clearly found that most medical practitioners, especially those between the ages of 30 and 40, were not aware of the extra dimensions of the personality of successful medical practitioners. Most thought that possession of good medical knowledge and skills was a sufficient precondition for success in medical practice. However, during the interviews, especially with highly successful senior medical practitioners, it was emphasized that any doctor had to have additional attributes and effective communication skills were the most important. It was clear that effective doctor-patient interaction was central to doctor-patient satisfaction and to the health outcomes of the patients. Findings of the research have major implications for the curriculum of medical schools in India. The Medical Council of India has given a hint that a competency based approach is necessary in medical education. The research identifies a major competency that present-day doctors need to possess, not only for their own success for the well-being and medical health of the patient. The main limitation of the research is that its implications have been expressed in English. Language is the main tool of communication between patients and doctors. The results of the research need to be understood in the context of the Indian languages and applied to them. Most of the recommendations about effective communication are subjective and of an anecdotal nature. This research surveys international research and then confirms its findings through formal data collection in the Indian context. The paper should be of value to curriculum developers, instructors, existing practitioners for whom refresher activities can be held and for medical students.

**Keywords:** Communication skills, Medical communication, Soft skills

## **Effect of community level communication on community participation in public health research**

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Communication with the community for various purposes includes different modes ranging from traditional community meetings to technology based communication such as films and social media. Appropriate communication informs, inspires and motivates individuals / community thus widening the scope of application of communication in general for the health of the public and public health research. Assessing the impact of communication would give insights on strategizing use of communication for community awareness and community participation in public health research. Vadu Rural Health Program, Kem Hospital Research Centre (KEMHRC), Pune Vadu Rural Health Program (VRHP) has been on a forefront of community health research since early 1970s with special focus on maternal and child health. The mission of the organization is to 'provide evidence-based, sustainable and rational health care solutions for the rural population using globally relevant community-based ethical research' thus emphasizing on the need of awareness and community participation in the research activities. VRHP primarily engages the community in its research through the community based volunteers or field research assistants (FRA) by building their capacity to approach the community and conduct research. This strategy has been of prime importance when establishing trust of the participants in the research and community empowerment by providing employment and promoting further education of the FRA. VRHP regularly conducts community meetings in the villages to interact with the population for understanding their perspective on research and update them about the research process and practices. VRHP has also produced short film and some documentaries for easy and effective communication with the population. The films are circulated using electronic media like WhatsApp and projected during the community meetings. The use of various communication modes in the community has resulted in engagement and continued support of population in various research studies. It has built capacities of volunteers and participants in terms of technology usage and knowledge. A mutual contribution to research in the form of community empowerment and participation would help in streamlining communication strategies.

**Keywords:** Community communication, Public health research, Research participants

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## **Shouldn't Competence and Compassion coexist in Medical Professionals? Study of Psychological Androgyny in doctors**

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**Introduction:** Several studies have clearly shown that doctors and patients have different views on what makes good and effective communication. These differences influence the quality of interactions between doctors and patients, as well as compliance, patient education, and health outcomes (Sanchez-Menegay, Stalder, 1994; Laine, Davidoff, Lewis, Nelson, Kessler 1996; Roter, Steward, Putnam, Lipkin, Stiles & Inui, 1997). As Schuman (2005) pointed out, the practice of medicine is fraught with challenges to a doctor's sense of mastery and competence. The rapid advances in knowledge regarding illnesses can be overwhelming, leading to anticipation of the possibility of humiliation and rejection if a doctor feels that he/she is failing to fulfill expectations. However, paradoxically, most complaints by patients about doctors are about problems of 'communication' and not 'clinical competence'. The most common complaint by patients is that 'doctors do not listen'. Past research has shown that 'Medicine' is usually seen as a 'Masculine' profession requiring rationality, authority, objectivity, decisiveness, physical and mental



strength, competitiveness and individualism. However, the 'caring listening feminine' component of Medicine is seen more as part of 'Nursing'. Hence, it is important to explore if socially prescribed gender behavioural expectations are applicable to doctors too? Or are both male and female doctors capable of showing both masculine and feminine behavior patterns required for caring and curing in the course of doctor - patient interaction? Psychological androgyny suggests the possibility that both masculine and feminine behaviours can reside in varying degrees in every human being irrespective of the biological gender. The individual then expresses these behaviours in a manner responsive to the situation irrespective of the biological gender. This can lead to blending of compassion with competence due to the greater flexibility of the androgynous individual in interpersonal interaction. However, Karl Jung (1959) had suggested that this androgyny develops only in the second half of life, in our middle age.

**Purpose:** Although medical care is based on interpersonal interaction between the doctor and patient, detachment is perceived as a prerequisite for retaining objectivity for acting in a competent manner. However, are competence and compassion essentially mutually exclusive? Patients today have greater access to information and expect greater participation and involvement in treatment. Moreover, violence against doctors is also on the rise. Hence, doctors today have to let go of their paternalistic approach and blend care and cure in their therapeutic approach. In this context, psychological androgynous behavioural expectations are equal from resident doctors who form the first line of interaction between patients and health care system as from experienced specialists. However, Jung (1959) said that androgynous behavior would emerge only in middle age. This study explored the concept of androgyny with respect to the medical professionals by looking at the comparative scores on psychological androgyny of postgraduates and experienced professionals to establish if there is any difference between the scores due to age and experience. Since androgyny is expected to develop as we approach middle age, experienced specialists should score higher in androgyny than young post graduates.

**Research Design:** This study was conducted at large tertiary hospitals that have postgraduate training facilities in the city of Pune, India. The sample includes 30 specialist doctors from across various specializations and 30 medical postgraduate students from across various specializations both medical and surgical. All specialists had at least 5 years' experience after relevant post-graduation after their basic under graduation in MBBS. Specialists and postgraduate students from various specializations were approached at their place of work and provided preliminary information about the study. After obtaining their informed consent, they were asked to complete Bem's Sex Role Inventory (BSRI) questionnaire. BSRI is the most widely used and validated 'Gender Role' measure in publication reporting scale reliability coefficients from 0.75 to 0.9. It consists of a list of sixty attributes and behaviours; twenty of which were verified to be more socially desirable when demonstrated by men, twenty deemed more appropriate for women and twenty of no gender-affiliation. Participants rate the characteristics on a Likert type scale ranging from 1-7 as to how applicable these characteristics are to themselves.

**Results & discussion:** The mean age of the postgraduate sample 26.76 years (SD 2.6) while the mean age of the specialists' sample was 43.33 years (SD 5.5). The mean experience of specialists was 16.2 years (SD 6.0). There was no significant difference observed in an independent T tests comparing Bem's masculine ( $p = 0.26$ ) and feminine scale scores ( $p = .35$ ) of postgraduates and specialists. Chi-square test also did not reveal any difference ( $p = .62$ ) in psychological androgyny between the postgraduates and experienced specialists although androgyny is supposed to evolve with age. Modernity comes about with the shift from social integration through family and religion to integration through membership of occupational groups and the interdependence of these groups, as well as through educational meritocracy. Fracturing and weakening of traditional identities accompany changes in work, politics, and popular culture; especially those associated with established masculine and feminine roles (Pakulski, 2009). Therefore, traditional gender specific role behavior may not be the norm. This could explain androgyny seen in 40% postgraduates as compared with androgyny seen in 50% of the specialist sample. However, what is more worrying is that if androgyny develops with age, only 50% of the specialist sample was androgynous. So, are specialists more comfortable with traditional gender congruent male- masculine female-feminine roles?

**Research implications:** The Medical Council of India has released a vision document (2015) where they aim to develop clinicians, who understand and provide preventive, curative, palliative and holistic care with compassion. This comfort with androgynous behavior in postgraduates (40% of postgraduate sample) is almost equal to the level of androgynous behavior in the specialists' sample (50% of specialists). This will help in training postgraduates in

the 'art of caring' along with the 'science of curing'. Future research should look at reasons for preference for traditional gender roles in experienced specialists and its implication on doctor – patient interaction. This study was conducted on a limited sample of 60 doctors in one city of India while India is a country of various cultures across different parts of the country. Hence it is important to repeat this study across India on a bigger sample to explore variables, which influence development of androgyny.

**Originality:** The late George Engel believed that to understand and respond adequately to patients' suffering, and, to give them a sense of being understood, clinicians must attend simultaneously to the biological (competence component) and psychosocial (compassion) dimensions of illness. (Engel, 1980). Hence, androgynous behavioral approach towards patients will encourage a situation - responsive balance between socially perceived masculine component of competence and feminine component of compassion and care. This will help address the various doctor-patient interaction and communication issues facing health care sector. This therefore will also help address some aspects of violence towards doctors.

**Keywords:** Androgyny, compassion, competence feminine, masculine

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## **Systematic Review of RCT's in Mhealth interventions focusing on Maternal and Child Health**

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**Background:** Ratzan and Parker (2010) define Health Literacy as "the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions". Johri et al (2015) have suggested that improving the health literacy among young mothers will benefit the child. Mhealth has the scope to play an important role in healthcare communication. But not enough research has been done to study about Mhealth interventions.

**Purpose:** Purpose of this study is to find out about the most successful mhealth interventions for Maternal and Child Health (MCH) which helps in spreading health literacy.

**Objective:** This Systematic review will review the RCT's done in the field of mhealth with a focus on MCH. There is no geographical boundary for this study. Target population would be pregnant women, women in post-natal care and infants. The general pattern of the mhealth interventions, their reach, success or failure would be studied. The most frequently occurring areas of mhealth research in MCH would be identified. This SR would also help in finding the gaps in mhealth research interventions. A comparative study of the RCT's will give great insights for future research.

**Research Approach:** Databases like Pubmed, Cochrane, Scopus etc. will be scrutinized with keywords like 'mhealth, RCT, Pregnancy, Neonatal, Maternal, Child Health, mobile, text messages, voice over calls and many more combinations. Grey literature will also be studied. The period of study is up to November 2016. In cases where there isn't enough RCT's but in depth analysis are done, they would also be considered for the SR.

Research Implication: The SR should help in finding

- a) suitable mhealth interventions for pregnant women and infants.
- b) Help in making policy decisions.
- c) Find the gaps in mhealth research.

**Novelty:** There aren't any studies focusing on the RCT's in mhealth. This study will be helpful in identifying the factors contributing to a successful RCT and make a comparative analysis of the existing RCT's.

**Keywords:** Maternal and child health, mhealth, RCT, systematic review.

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## Consumption of Fast Food and Global Incidence of Non Communicable Disease: A Review

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**Introduction:** Industrialisation and modernisation has not only affected the economy, but has a huge impact on the society in terms of culture and food habits. In the Indian scenario, changes in life style induced by work culture have given a roaring boost to the fast food chains industry. However, this has resulted in adverse effects on the health of individuals in terms of increasing risk for non-communicable diseases.

**Purpose:** This review describes various factors which contribute towards fast food consumption and the factors contributing to the onset of diseases

**Research Design:** Review based on the existing research i.e. the literature (abstracts and full text) available by means of extensive search with Google scholar and PUBMED.

**Results & discussion/Findings &interpretation:** Fast food consumption as a lifestyle change is a threat for the health of individuals. One of the possible remedy is the moderation of fast food intake and inclusion of traditional foods in our diet to enrich the omega 3 fatty acid levels.

**Research implications:** Need for more stringent policies in the food sector pertaining to fast food and their timely execution to avoid health threats to the different strata of the population. The awareness about the components of fast food will help to modify food safety standards in India and other countries. Further research in this area shall be useful in reinforcing the findings of this review.

**Novelty:** This review has addressed the components of the fast food and their consequences in the advent of non-communicable diseases. It shall be useful for the community as a whole to address to the issue. It would also help stake holders and the governmental agencies in understanding the context in designing new policies.

**Keywords:** Fast food, Health, Non communicable disease, Omega 3 fatty acid, polyunsaturated fatty acid.

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## Factors Influencing Patient Satisfaction in A Tertiary Care Hospital in Rural Area at Pune City.

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**Novelty:** This is an original research work of the presenter

**Keywords:** patient satisfaction, hospital, feedback

**Introduction:** Patients are the Centre of all healthcare operations. In today's challenging era, patients have multiple options to choose their service provider. Quality of care is best judged by the patients and they give a true reflection of their experience. Patient satisfaction feedback is a tool used by healthcare providers to know the expectations of patients. With the help of this one can analyse the patients' satisfaction & also rate the quality of the services provided by each department. Therefore, the study was undertaken to assess the factors influencing

patient satisfaction in a tertiary care hospital in rural area at Pune.

**Objectives:** To quantify the service care delivery as perceived by patient satisfaction among discharged patients

**Methodology, Tool & Technique:** The researcher used a descriptive analytical approach to conduct the study using one group. The tool for present study consisted of two parts namely demographic variables & structured questionnaire to assess the patient satisfaction feedback. The validity of the tool was established with the help of experts & reliability of the tool was obtained using inter-rater reliability. The valid & reliable tool was then used for conducting pilot study on 10 patients by using non probability convenience sampling technique.

Setting: A 100 bedded tertiary care rural hospital at Maval Taluka. Participants: 126 patients discharged from the hospital

**The major findings of the study are as follows:** Majority i.e. 42.6% of the were in the age group of 31-50, 56% were male patients admitted in the department of medicine (73.02%) & majority i.e. (68) 53.97% of the patients were from general ward and (52.38%) of the patients were cash patients. 99.9% (125) were fully satisfied with overall services. Billing department 68 (53.97%) & discharge procedure 80 (63.49%) scored relatively low with satisfaction level. There was no significant difference between patient satisfaction based on age differences, different departments, type of bill payment i.e. cash or TPA, however there was a highly significant difference between patient satisfaction depending on the type of ward with P value of <0.0001. Though 54.76% did not give any suggestions for further improvement. most of the suggestion were about improvement in the facility like provision of AC & TV in the rooms, followed by explanations given by doctors, quality of food was another major area of concern & time for admission, billing, discharge was among the most valued suggestions. Majority (52%) of the patients reverted saying that they will Strongly recommend the study hospital.

**Conclusion:** From the above study, it can be concluded that majority of the patients in this hospital had very high satisfaction level as there was a commitment from top management which was seen by the presence of Chief Managing Director at all times.

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## **Rural Healthcare Services in India: A Study of Pune's Neglected Hamlets**

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**Introduction:** Notwithstanding seven decades of Independence, India is yet to attain the goal of 'Health for All'. Human development indices are still below acceptable marks. India has been ranked 130 out of 188 countries in the United Nations Development program's 2016 Human Development Index. The country has not shown any significant results in the improvement of healthcare services, especially in rural areas. And Maharashtra is no exception.

**Purpose:** The aim and objectives of this paper is to study the state of rural healthcare services in the country and stress the need for necessary course corrections in the larger public interest.

**Research Methodology:** The methodology adopted in this research paper is primarily descriptive and exploratory. The researcher seeks to analyse the healthcare services in rural India with primary focus on the state of affairs in a few villages near Pune.

**Results & Discussion/Findings & Interpretation:** There is a dearth of healthcare facilities in villages such as Pavananagar, Ambegaon, Nande and Mann. For instance, the water available from the Pavana river is hardly potable for daily use. Indeed, the researcher found that the two villages are the microcosm of rural health condition in India. Though the National Rural Health Mission (NRHM) has been implemented in these villages, the near-absence of transportation facilities has augmented health problems in the villages that lie on either side of the Pavana Dam. The paper will discuss at length the current problems of rural healthcare and sanitation in these villages, including the performance of programs such as the NRHM and the Janani Shishu Suraksha Yojana and

suggest ways and means to improve the facilities.

**Research Implications:** The implications of the current research work are immense: they will make a signal contribution to the nation. These are expected to not only influence the decision-making process at the highest level in the Government of Maharashtra and Government of India but also help improve the healthcare services in Pune's neglected hamlets.

**Novelty/Originality:** This paper is unique in its nature and scope and represents original research. No study has been undertaken to improve the health services in the villages covered in the paper. These villages have become victims of official apathy. The paper seeks to fill in the missing gaps in research and contribute to knowledge and development.

**Key words:** Health for All, NRHM, Primary Focus, Rural Healthcare, Victims of Apathy

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## **Stewardship of Local Health system in West Bengal**

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**Background:** Health for all is a global strategy which gave high priority to community participation (WHO 1978). Participatory health development process involved relevant partners for health at all levels – individuals/community/service providers etc and promotes joint decision-making, implementation and accountability. Basic Health Care Support (BHCS) Programme traces the development of stewardship through effective engagement and participation of local people/groups, especially in planning/designing and long term stewardship of their community. They are performing as a watchdog, providing constructive feedback to the health system and can respond to recognized community needs.

Stewardship may stimulate community to participate in decision-making process. It is an effective management of resources by all stakeholders involved in their utilization.

**Research Design:** This article focuses on the role of shared/distributed stewardship in BHCS programme. The potential success of health promotion in practice is closely associated with a comprehensive approach which relates to problem identification, decision-making, collaboration in planning for health care delivery and active participation in implementation of healthcare programmes – essentially local control of services to improve health of individuals/communities and can demand their health rights.

Participatory process was used for assessing their own knowledge; investigating environmental situation; visualizing a different future; analysing constraints to change; planning for change; implementing change and also to engage and empower local communities in their stewardship.

BHCS team has been actively shaping the evolving policy framework on decentralization of decision-making to local level actors by engaging community leaders and building extensive partnerships at Panchayat/Block levels and able to build a network of CBOs/CSOs champions.

**Results & discussion:** Stewardship requires clear and consistent strategic direction and provides a successful model of health policy making. Consideration is given to the relative strengths and weaknesses of stewardship in health sector and suggestions are made as to how the discussion on stewardship might be moved forward.

**Novelty:** Stewardship in local health system.

**Keywords:** Community participation, Decision-making, Local Health System, Stewardship, West Bengal

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## Evaluation of effectiveness of the Printed Educational Material (brochure and pamphlets) for Cardio Vascular Diseases for use among patients

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**Abstract:** Online platforms and educational printed materials on health issues are creating an informed patient who actively participate in decision making, prevention and management of cardio vascular diseases. Yet the degree in which these educational printed materials create an awareness and understanding among the people is not well known. The purpose of this paper is to validate the educational materials such as brochures, pamphlets given by different hospitals like government, private, specialty, professional and charity. The objective of this paper is to understand the effectiveness of the educational materials and to evaluate if these material help the population are able to effectively make use of these materials in understanding and comprehending the content of it. The research methods adapted was mixed method using both qualitative and quantitative techniques for the qualitative method the educational materials distributed in the five kind of hospitals 1. Government 2. Private 3. Specialty, 4. Professional and 5. Charity meeting the following criteria were sought for inclusion in the study: print format, content addressing behavioural management of cardiovascular disease (CVD) or CVD risk in individuals with diabetes, material written for an adult audience, and English language (Smith, 2008) and evaluated for ease of reading, understanding and comprehending using the Gunning fogs index. Following it up with a survey questionnaire for a sample of 100 using non probability purposive sampling method to respondents above 21 age group and those of them who have visited the hospitals for these ailments in three months. The data collected were analysed using SPSS and the Gunning Fogs Index.

**Key Words:** Comprehension, Educational Materials, Gunning Fog's Index, Hospitals, Understanding

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## Track III: Healthcare Laws

### **Ethical considerations in research with vulnerable population of female sex workers (FSWs) - A study among brothel based FSWs of red light area, Pune city, India**

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Female sex workers (FSWs) are homogenous population, vulnerable towards getting infected with HIV. HIV prevention intervention research focuses FSWs recurrently to plan context specific strategies. Evidence reflects socio-cultural, legal, human rights challenges in doing research with FSWs. It is imperative to adopt appropriate ethical approaches to protect the sensitivity and confidentiality of FSWs to ensure non-exploitative studies. A doctoral research on brothel based FSWs studied practice of male condom use / non-use with clients in the red light area of Pune city. The study followed essential ethical procedures. The purpose is to understand the ethical considerations in research studies with FSWs. Mixed methods with equal weight sequential design was used to understand holistic context of condom use / non-use among FSWs. From the calculated sample size of 80 FSWs for quantitative study, 20 FSWs was selected purposively for qualitative study. Key informant in depth interviews was also taken. The study was approved by ethics committee of Savitribai Phule Pune University. Written informed consent was (signature / thumb impression) taken. Field strategies were grounded in participant centred approach. Those who could write have signed the consent, while those who could not read and write have given thumb impression with impartial witness (witness to the consent process). The health workers, brothel owners as impartial witness have signed the consent under the thumb impressions of the respondents. The study recommends of protecting sensitivity and correct ethical processes to be considered in research with FSWs to researchers, policy makers.

**Key words:** Ethics, Female sex workers

### **Reproductive rights in India: A beginning**

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India accounts for 17 percent maternal deaths in the world according to the United Nations. Though, healthcare as a right has been interpreted by the Indian judiciary to be guaranteed under Article 21 of the Indian Constitution as a fundamental right, yet rights relating to maternity and reproductive health are not specifically asserted in the legislations. The present paper focuses on the issue of reproductive rights in India as available under the current legal system. It further discusses various judgements of the Indian Supreme Court and analyzed their role in determining the direction for reproductive rights in the country. The paper argues that India falls short of adhering to its global commitment towards adequate healthcare provisions for women. It concludes that to fulfill its Millennium Development Goals, India needs rights based legislative provisions immediately. The paper further explores a future course of action for an inclusive approach towards maternal health in India.

**Keywords:** Maternal health, Reproductive rights, Right to health, Right to maternal healthcare in India

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## **Rights of children in surrogacy and Assisted Reproductive Technology (ART): Debating challenges to healthcare justice**

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Assisted Reproductive Technology (ART) has become a viable alternative for many infertile couples longing for children. Surrogacy is one of these methods used for procreation where a woman agrees to gestate a child on behalf of intending parent(s), desiring to be legal parents. The application of the traditional law in determining parenthood of children born out of surrogacy raises many challenges to justice per se and healthcare justice in particular. These include child's parentage, legitimacy, inheritance, citizenship etc. The authors propose to highlight here only those legal issues which may arise in determining parenthood of the child born to a surrogate through surrogacy arrangement. It will be predominantly doctrinal with primary data from various legal texts. Drawing on Sen and Nussbaum's theory of justice as capability in *Frontiers of Justice* and John Rawls' justice as fairness, the authors would dwell on how the legislations of various countries have tackled the problem of determining the parenthood of the child born out of surrogacy arrangement. Further, the authors discuss the personal laws prevailing in India and the status of the child born to a surrogate along with judicial pronouncements of different courts of India and other countries. In India, the Assisted Reproductive Technology Bill, 2010 and the current Surrogacy Bill are still a topic of discussion. The authors will critically evaluate these attempts and recommend reforms.

**Keywords:** ART, Children's rights, Determining parenthood, Healthcare justice, Surrogacy

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## **Globalization and Intellectual Property Rights: A case based critique on access to medicines in a Trade Related Aspects of Intellectual Property Rights (TRIPS) Plus World**

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The modern knowledge based economy thrives on innovation which requires strong intellectual property protection. These intellectual property regimes differ across nations due to colonial history and differing stages of development. In the Free Trade Agreements between countries, the intellectual property components can conflict with the local laws, the multilateral framework of TRIPS and affect access to health, innovation etc. These agreements, known as TRIPS Plus, entail extending the patent term beyond 20 years, limiting compulsory licenses, data exclusivity, restricting generics etc. Also in the globalized era we see a phenomenon of a power shift from the government to transnational corporations capable of influencing policy. Implementation of such agreements in developing countries like India, wherein a significant section of the population lives below a dollar a day, can drastically impact their right to health and run contrary to the government policies of poverty reduction, access to health and the United Nation goal of sustainable development. The purpose of this paper is assessing the impact of TRIPS Plus provisions on access to medicine and impact of TRIPS Plus on human rights of patients. The research would a mix of empirical and doctrinal approaches. Empirical data would be taken via stakeholder (pharmaceutical companies, innovators, lawyers, experts) survey and interview. The research will assess the impact of TRIPS Plus on access to health with an all inclusive scheme of human rights and sustainability. Developing countries like India that are net importers of intellectual property have to assess the impact of provisions that go beyond the current

multilateral framework. Moving towards a strong intellectual property rights regime seen along with a power shift to companies has implications for health, human rights of people. Research in this aspect is essential for lawyers, medical professionals, stakeholders.

**Keywords:** Access to health, Globalization, Human rights, TRIPS Plus

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### **The medicalization of disability: A human rights critique with respect to India**

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Notions of disability were rooted in notions that were contradistinguished with ability. These notions are rapidly changing with the emergence of the rights based paradigm in the disability discourse the world over. This article examines whether this trend is reflected in India. India is a signatory to the United Nations Convention on the Rights of Persons with Disabilities (UNCRPD) and has had in place legislation that precedes the Convention. The Convention is a charter of rights for persons with disabilities. Domestic legislation which promises affirmative action in the areas like public employment for the disabled is entrenched in the biomedical model. There is prima facie, simmering discontent between the two approaches. The biomedical model can at times deny rights. This article, citing instances from the domestic legislation, looks at how the fixation with the medical model has impinged on the rights of persons with disability. The author argues that disability is a perceived life condition, the medicalisation of which does more harm than good, both at the individual and the macro level. The article is a doctrinal study of how the medical model and the rights based approaches to disability differ at even fundamental levels. The analysis focuses on the UNCRPD provisions, the World Health Organization (WHO) perspective and the International Classification of Functioning (ICF) juxtaposed with provisions in the persons with disabilities Act, 1995. The article also looks at provisions in the rights of persons with disabilities bill with specific reference to the new concept of “benchmark” disabilities. An attempt is also made to examine the judicial approach with reference to the issues raised in the article.

**Keywords:** Disability, Health, Law, Medical model, Rights

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### **Nanotechnology and healthcare: Legal and ethical issues**

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Considerable advancements have been made in the application of nanotechnology in healthcare. For instance, delivering drugs more effectively, diagnosing diseases more rapidly and sensitively, and delivering vaccines via aerosols and patches etc. These advancements have raised various legal and ethical issues involved in the field. The purpose of this paper is to study legal and ethical issues involved in nanotechnology and health care and provide a better understanding as to the nature of problem and possible way forward. The study is doctrinal and comparative. Legal and ethical problems related to nanotechnology in healthcare developments have not been adequately discussed anywhere. Lawyers have not paid attention to them and there are no clear legal and ethical rules in any country. Rich countries are investing heavily in nanotechnology for health. The first generation of cancer drugs delivered via nanoparticles, for example, has already been approved by the United States Food and Drug Administration (FDA). It is still early days for nanotechnology in healthcare and whether it will be of value to resource-poor countries is still hotly debated. Experts are concerned that the toxicity of nanoparticles to human health and the environment has not been studied extensively. For instance, a 2004 report by the United Kingdom

Royal Society and Royal Academy of Engineering recommended that nanoparticles and nanotubes- cylindrical carbon molecules that are better conductors than normal carbon molecules be treated as hazardous waste. There are several uses for nanotechnology in health like diagnosing a disease and screening, drug delivery systems, health monitoring etc. While poor countries have an ongoing responsibility to strengthen healthcare systems and provide wider access to medicine, nanotechnology could, in the long run, save lives by making diagnosis much more accurate and treatment far more effective and affordable.

**Keywords:** Ethical, Healthcare, Legal issues, Nanotechnology

### **An effort towards achieving watertight compensation system for clinical trial injuries in India**

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Clinical trial of any drug, device or vaccine whether new or already marketed, is associated with risks and burdens. There is need to protect participants who volunteer in trials, by way of medical treatment and compensation for trial related injuries. Clinical trial participants help advance medical science knowledge, but face the risk discomforts and risks for which there should be regulatory provisions by which they are reimbursed for expenses and compensated. In this era of globally respected medical ethics, India has taken an aggressive and responsible step towards clinical trial participants' protection by introducing Rule 122DAB, D and C Rule 1945, Schedule Y which still exhibits some loopholes to be dealt with. An attempt is made to be more logical and rational with in depth consideration of regulatory and ethical oversight, consideration of critical media and public perception to reconsider the existing compensation rule. Some of the readily modifiable factors are regulatory procedures, medical reimbursement and compensation rules. This paper analyzed the rationale behind compensation guidelines for clinical research from the countries leading in clinical trials such as United States of America and European countries like Germany taking into consideration the views of all stakeholders in clinical research, (i.e. sponsors, investigators, government, patients, ethics committees, lawyers and ethicists) uniform, harmonious, highly ethical yet robust compensation guidelines are proposed. The present study addresses the critical issue of compensation to clinical trial participants' injuries more logically and aptly by adhering to the very basic principles of ethics namely beneficence and justice. The above study proposes watertight, most ethical, uniform, harmonious yet robust compensation system for clinical research industry.

**Keywords:** Clinical research, Compensation rule, Ethics, Injuries

### **Regulations for authentic Ayurvedic healthcare establishment**

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Clinical Establishment Act was passed by parliament in 2010. Objective of this act is to prescribe basic minimum standards for different categories of clinical establishments for ensuring provision of proper healthcare. Ayurvedic practitioners are also contributing in Indian health care system. It is important to bring uniformity and validity in the structure of Ayurvedic hospitals. Implementation of instructions relevant to 21st century can be done rather than following texts blindly. This can be done by formulating a structure considering references from different ancient



texts which are relevant to today's era. The objectives of this paper is to collect references for setting up an authentic Ayurvedic hospital with special reference to space requirement and human resources and to analyzed those references to determine their validity and feasibility with current scenario. References were collected from ancient Ayurvedic texts and analyzed for implementation in current scenario. Space requirement are designed for according to the purposes and emphasis on quality of human resources like doctor and nurse. Drafts which are available for ayurvedic clinical setups give more emphasis on quantity of infrastructure rather than the quality of it. So this is an effort towards the improvement of quality.

**Keywords:** Ayurveda, Clinical establishment Act, Human resources, Space requirement

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### **Corporate crime in pharmaceutical companies**

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Manufacture, sale and distribution of medicines by pharmaceutical companies is worldwide, however, the scrutiny of operations carried out in these companies often stand neglected. Commercializing in falsified medicines pose not only a threat to the society but also adversely affect the growth of the country. Corporate crime committed primarily for financial gain in pharmaceutical sector is considered the most dreaded crime for it directly affects the health of public at large. The law governing corporate crime is vague and utterly weak and the damage caused by pharmaceutical companies is irreparable. The research paper aims to pursue the law relating to corporate criminal liability, crime committed by pharmaceutical companies and its effect on the society, execution as well as implementation of law and thereby intending to find an amicable solution to this ever increasing issue. The objectives of this research is to examine the role of corporate and concept of corporate criminal liability, to understand what type of crimes can pharmaceutical companies commit and to examine the laws that governs and control corporate criminality of such pharmaceutical companies. The methodology adopted for research is doctrinal as well as non doctrinal. It is concluded that laws governing corporate criminality is inadequate and ineffective. Non implementation of law is another hurdle for combating corporate crime in pharmaceutical sector. This research may aid in reformulation of more stringent laws. Research paper highlights the neglected subject of corporate criminality in pharmaceutical companies adversely affecting the society. It strives to create awareness regarding the ambiguity in law and the need for change in law.

**Keywords:** Corporate crimes, Criminality, Law, Pharmaceutical companies, Stringent

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### **Emerging challenges and accountability in surgery mix-up in Asia, Africa and beyond**

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The right to health is one of the basic human rights of human being. It is embodied in domestic/municipal laws as well as International instruments. In general, no one is spared in the court of law directly or indirectly who are indulged in medical negligence. First example, in 1980, when doctors operated and removed the healthy eye from a two-year-old girl, Nasreen Banu, instead of the cancerous one, blinding her for life in Sarojini Devi Eye Hospital, Hyderabad, India. Compensation may not fill the gap of organ loss. In second example the year 2007 (in Tanzania, East Africa), a man who was diagnosed and found to have a brain tumour was mistakenly had a knee operation instead of brain surgery. He died two weeks later due to late treatment of his brain disorder. No one was held liable. In third example/ incident in January, 2012, Bimla Nayyar (in Oakwood, Detroit) was wrongly had a brain surgery

instead of an operation to pop up her jawbone and died two months later after the wrong operation she had undergone. Who would be accountable to pay the damages? This paper is interested in investigating the magnitude of the surgery mix-up problems in Asia, Africa and beyond. The aim of the paper is to find out how does the both international instrument plus national laws plays an important role in solving these kinds of problem. Again, the paper will investigate and find out what is the best legal practice in dealing with both the victims of the incident, doctors and their assistants, the hospital and the government as a whole in as far as the issue of professional accountability is concerned. As per the first, second and third referred incident above, the questions are who will “pay” for the organ damage/injury or death caused out of reckless health officials? The issue is whether the fiduciary compensation is equivalent to human organs or lives? The methodology followed in this paper is based on primary, secondary and tertiary source which is appropriate to accomplish international conference paper.

**Keywords:** Accountability, Health problems, Legal remedies, Surgery mix up

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### **Emulating odontolegal practice: A paradigm shift in the dental practice with more emphasis on dental records, a perspective and contemporary study with a reality check**

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The changing doctor patient relationship and commercialization of dental practice has affected the practice of dental professionals. The ethical values of dentistry insist that the dentist should be aware about various odontolegal issues and should help in proper recording of management details which in turn leads to maintaining of records. While the ethical rules for dentists prescribed by the Dental Council of India do not mandate record keeping, it would be good practice to maintain detailed treatment records. On the other hand, Medical Council of India authorizes record maintenance for three years from the date of commencement of treatment, and encourages maintenance of computerized records for quick retrieval; this can be deemed as a healthy exercise and should extend to dental practice. Dental records may well be the only permanent evidence if/when questions of litigation arise. Therefore, it must be stressed that one of the most important factors in self-protection is the maintenance of accurate, full, and up-to-date records of all treatments provided. Record maintenance is legally mandatory in the American and European countries, but the rules are not clear in India and there is ignorance regarding the same among the dentists in our country with most of the dentists maintaining a poor quality or no dental record at all. The purpose of this paper is to assess the awareness regarding the dental record maintenance among dentists in India and deduce the quality of average dental records kept by them and to evaluate the potential use of their maintained records, in any of forensic or odontolegal cases. A cross-sectional survey will be conducted among 100 dental practitioners of different states in India. The following were evaluated from those subjects who are practising dental clinicians: knowledge and practice regarding maintaining dental records, awareness regarding dental jurisprudence and awareness regarding ethical dentistry. Study is still going on and results are yet to be discussed with proper findings. Nowadays, patients have become more aware of their rights supplemented by modern legislation that has made the society increasingly compensation oriented. Consumer Protection Act has been formulated to be customer friendly, as there is no court fee payment. Person can plead their own case, and the decision is taken within 3–6 months. After all, life is not always straightforward and things can go wrong. But if you are fully equipped and well prepared to deal with the unexpected, you can minimize the disruption of any legal issues that will harm you or your practice.

**Keywords:** Consumer Protection Act, Dental records, Malpractice, Medicolegal, Odontolegal

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## Emerging Global Health Care: Issues and Challenges

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**Introduction/Background:** *Without health life is not life; it is only a state of languor and suffering - an image of death -Buddha* The changing globalised world affairs have brought several issues onto the international stage that are perceived as threats to human community, like -smuggling, organized criminal activities, money laundering, human trafficking, cyber offences etc. However, health care issues have largely escaped attention of the international community. Consequently, they lack adequate universal consensus and standards and continue to struggle with legal hurdles. Health defines the basic means of a dignified human life and State, the primary institution that bears the responsibility of securing human dignity, is thus obliged to secure conditions that bolster right to healthy life and medical care.

The present international framework provides a few rights relating to health care. Article 25 of the UDHR, 1948 declares that “everyone has a right to standard of living adequate for the health and well-being of himself and his family, including . . . medical care and . . . the right to security in the event of . . . sickness, disability . . . or other lack of livelihood in circumstances beyond his control”. In 1966, twin covenants on civil and political rights and economic, social, and cultural rights were promulgated. Article 12 of the ICESCR explicitly sets out right to health.

Apart from above WHO, UNDP and UNEP are playing only a limited role in the arena of health care services. The above instruments and organizations do not meet with challenges of emerging global health care. Global health care poses multiple problems. It includes protection and enforcement of right of privacy and integrity of data, responsibility of state under international law, remedies against medicine manufactures, availability and affordability of medical and drug services. The paper is intended to analyse global health issues, legal framework and provide appropriate suggestions.

**Purpose:** Following are the objectives of the paper:

To examine and comment on issues and challenges relating to emerging global healthcare.

To scrutinize and comment on the role of the state vis-à-vis emerging global healthcare.

To analyze international legal framework on emerging global healthcare.

To evaluate role of WHO, UNDP and UNEP with regard to emerging global healthcare.

To recommend appropriate changes in the role of the state, legal framework, role of international organization relating to global healthcare.

**Methodology:** In this paper doctrinal methodology will be followed. Approaches of research include interpretative and analytical approach. The inferences would be deduced from logical examination of existing data and literature. The legal framework and working of organizations will be scrutinized based on the rules of interpretation, logical analysis and existing literature. Induction and deduction methods would be used for arriving at findings.

**Results & discussion/Findings & interpretation:** The authors in this paper would discuss current health care problems at global level vis-à-vis accountability of the State. The authors also will discuss analysis, interpretation and findings on present international legal framework. The paper is intended to identify issues and provide appropriate suggestions. Findings would be useful in amending existing international legal framework, policies and programs.

**Research implications:** The present paper would be useful to understand issues and problems relating to global health care. The findings will be useful in interpreting, framing and implementing conventions, policies and programmes relating to global health care. This ultimately will lead to protection of health care at global level. The analysis would be limited to theoretical framework only.

**Novelty/Originality:** The existing literature does not exhaustively analyse issues and challenges relating to global

health care international legal framework and accountability of state. The existing literature does not furnish details of comprehensive international legal framework, policies and programmes that can help protect global health. The paper is intended to provide suggestions to existing issues and problems. The paper would be useful to scholars working on above issues, international community, international organs, academicians and students of law.

**Keywords:** Accountability of the state, Global Health Care, International legal framework, Role of international organization.

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## **Post Mortem Sperm Retrieval: Legal and Ethical Concerns**

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**Introduction:** The idea of this paper stemmed from a recent news item where a renowned hospital in India turned down the request of wife for Post Mortem Sperm Retrieval (PMSR) of her deceased husband due to lack of adequate guidelines (Jha, 2016). PMSR involves a “situation where a wife or life partner requests sperm retrieval from a dead, near dead or dying husband or partner” which can then be preserved and later used to produce his genetic offspring (Cruise, Helen, 2012).

**Purpose:** While several countries have explicitly prohibited PMSR, there are some countries which have allowed it on a case-by-case basis (Epker, De Groot, & Kompanje, 2012). This paper attempts to raise pertinent legal and ethical concerns regarding PMSR and urges the legislature to come up with guidelines addressing the same.

**Research Design:** For this paper, the Researchers have adopted a doctrinal approach. They will be undertaking a comparative study of laws, policies and landmark judgments of other countries and analyse them in Indian context. Additionally, the Researchers will also rely on opinions by medical practitioners and guidelines issued by hospitals to support their arguments on ethical concerns of PMSR.

**Results & discussion/Findings & interpretation:** The Researchers have identified two key legal issues concerning PMSR: consent of the deceased (Ethics Committee ASRM, 2013) and rights of the yet un-conceived child Kindregan Jr., C.P., 2015). Is the deceased’s consent necessary for PMSR? In the absence of consent of the deceased, can his wife unilaterally proceed with PMSR? In a rights based legal framework, where do we place the yet unconceived child?

**Research implications:** The issues raised in this paper will have a far reaching impact as the concept of PMSR gains popularity. It may even prompt the legislature to address the ethical and legal concerns of PMSR by issuing a formal guideline and initiate an in-depth study of the socio-cultural implication of PMSR.

**Novelty:** PMSR is fairly novel concept in India and the legal concerns regarding it have not been yet addressed from an Indian context which this paper attempts to do.

**Keywords:** ethical, legal, Post Mortem Sperm Retrieval, posthumous, sperm

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## **Medical negligence – should doctors define the limit?**

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**Introduction:** ‘Bolam test’ and ‘Bolitho test’ refer to the judicial developments in the field of medical negligence.

**Purpose:** To find out the extent to which the legal system should give deference to the opinion of doctors to determine the liability of doctors for medical negligence

**Proposition:** The English Courts, in Bolam v. Friern Hospital Management Committee, formulated the concept of an ordinary skilful doctor, which defines the scope of negligence. The underlying logic in the legal system being deferential to the views of the medical profession is that sufficient freedom has to be given to the medical professional, and the concern that 'a surgeon with shaky hands under fear of legal action cannot perform a successful operation and a quivering physician cannot administer the end-dose of medicine to his patient'. However, these judgments were faced with severe criticism stating that medical profession should not be permitted to dictate whether a particular act is negligent. However, a paradigm shift occurred by the decision of the House of Lords in Bolitho v. Hackney Health Authority. The court while declining the claim, took recourse to Bolam test, and found that the surgeon had a responsible support. In India, the judiciary follows the Bolam test. It has been accepted by the Apex Court that Bolam test is applicable in India also, and that there are no circumstances warranting a deviation from the same.

**Conclusion:** It is undoubtedly true that deference to medical opinion provides for some protection to the profession. If such a protection is not granted to the profession, it would have an inhibitive effect on the progress of the profession, and ultimately prove to be counterproductive in the long run. Moreover, the doctors would not be willing to take up risks, would do more harm than good.

**Keywords:** Medical Negligence, Bolam, Bolitho, Standard of Care

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## **Health Insurance Contracts from the lens of an Insurance agent**

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**Background:** Across the Insurance sector, health insurance takes the center stage as an alternative funding mechanism to keep up with the escalating costs of health care to the large pool of needy population in India. In the ecosystem of health insurance, insurance agents are the primary connect between the insured and the company. Their multifarious role entails them to offer sound advice and continuous support to the client while soliciting business for the insurance company. As an important intermediary in the health insurance sector, insurance agents are also an important tool for increasing market penetration.

**Research Design:** The present study critically reviews the role and responsibilities of agents in the health insurance sector in light of the code of conduct prescribed by the Insurance regulator, the IRDA. The nature of the study is qualitative. The legal principles underlying the health insurance contracts and the fiduciary role of agent are critically reviewed. By drawing upon responses captured through in-depth interviews of select agents chosen on the basis of a purposive sample with respect to 800 insurance contracts, it critically analyses the nature of the health insurance contracts from the perspective of the insurance agent.

**Results & discussion:** The study is underway. The proposed findings will be interpreted to identify areas where policy holders may need more awareness and protection. The findings will also help review the existing regulations governing the health insurance contracts and identify challenges with respect to policy related issues, hospital related issues and the information gaps between the entities in the health insurance contract.

**Research implications:** The findings of the study will help shape the research agenda towards improving the health insurance segment in India.

**Novelty:** The study will capture the perspectives of the insurance agents which were hitherto missing. The study will add value to consumers of health insurance products, the agents offering such services, the policy makers and the health insurance sector at large

**Keywords:** Health Insurance contracts, code of conduct, IRDA regulations, Agents roles and responsibilities.

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# **Barriers for Recuperating Patient Safety and Quality Care in Primary Health Care System in India: Need for Compliance and Comprehensive Health Care Act**

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The goal of any health care Institution is to provide safe, high quality health care service to the patients. Patient safety is the fundamental principle and cornerstone of high-quality health care. The low and middle income groups in India, depends on government clinics for their health needs where misdiagnosis, counterfeit pharmaceuticals or unsafe injection practices, and irresponsibility of the health care staff is reported vividly. Today, policymakers, public health officials, and researchers interested in improving health outcomes in low- and middle-income groups have incessantly focused on developing multiple interventions to improve patient safety. Patient safety paradigm is looking at the system of care delivery which prevents errors, and is built on a culture of safety that involves health care professionals, organizations, and patients. Patient safety practices are expected to reduce the risk of adverse events related to exposure to medical care across a range of diagnoses or conditions. It also includes the behavior of health care providers in mitigating risk of unsafe care. An analysis of the existing legislations for health care, reflects that health care legislations today in India are very few compared to the size and problems in the health care sector. As there is insufficient information on the existing challenges of patient safety measures and the precipitating factors of unsafe medical practice at primary health care levels in India, this study is conducted to redesign the multiple interventions in ensuring patient safety, and an alternative patient oriented health care model, which is crucial in policy, legal and procedural change which facilitate patient safety. In-depth interviews and focused groups discussions were conducted in primary health care centers in western Maharashtra. Each discussion was initiated with the main question: "To what degree do you think patient safety is a problem in your hospital?" Follow-up questions were categorized under three groups including:

1. Participants' opinion of existing and ideal responses to unsafe care,
2. Participants' beliefs about current and ideal responsibilities for patient safety,
3. Participants' attitudes about possible areas for improvement of patient safety.

Data were analysed using qualitative research methods by adopting the "health system approach and thematic analysis". A comparative analysis of patient safety measures and procedures used in UK is carried out to suggest recommendation. 23 doctors and 30 nurses participated in the six focus group discussions in 5 institutions. The analysis reflects around 40 unique mentions of barriers to patient safety, which is categorized into five major themes. The themes identified are 1) lack of patient safety training, 2) patients' knowledge levels, 3) Lack of professionalism and ethics, 4) Limited resources and 5) fragmentation of the health care delivery system. The paper comes with an alternative patient safety models and new health care design and a Comprehensive Health Care Act to ensure patient safety measures in medical practise and quality process in primary health care in public sector hospitals in India.

The research analysis demands for a comprehensive health care Act in order to gear the entire health care sector to the objectives laid down in health policy in India. The research findings in terms of identification of barriers to the patient safety, along with the new patient safety models and health care design is useful to frame a comprehensive health care Act, which is enlightening for policy makers, health care officials, academicians, NGOs and other civil society organisations and to patients themselves to intervene and bringing policy change and ensure and implementing patient safety initiatives which is crucial In guaranteeing right to life to the disadvantaged sections of the society. The research analysis demands for a comprehensive health care Act in order to gear the entire health care sector to the objectives laid down in health policy in India. The research findings in terms of identification of barriers to the patient safety, along with the new patient safety models and health care design is useful to frame a comprehensive health care Act, which is enlightening for policy makers, health care officials, academicians, NGOs and other civil society organisations and to patients themselves to intervene and bringing policy change and ensure

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**Introduction:** The goal of any health care Institution is to provide safe, high quality health care service to the patients. Patient safety is the fundamental principle and cornerstone of high-quality health care. The low and middle income groups in India, depends on government clinics for their health needs where misdiagnosis, counterfeit pharmaceuticals or unsafe injection practices, and irresponsibility of the health care staff is reported vividly. Today, policymakers, public health officials, and researchers interested in improving health outcomes in low- and middle-income groups have incessantly focused on developing multiple interventions to improve patient safety. Patient safety paradigm is looking at the system of care delivery which prevents errors, and is built on a culture of safety that involves health care professionals, organizations, and patients. Patient safety practices are expected to reduce the risk of adverse events related to exposure to medical care across a range of diagnoses or conditions. It also includes the behavior of health care providers in mitigating risk of unsafe care. An analysis of the existing legislations for health care reflects that health care legislations today in India are very few compared to the size and problems in the health care sector.

**Purpose:** As there is insufficient information on the existing challenges of patient safety measures and the precipitating factors of unsafe medical practice at primary health care levels in India, this study is conducted to redesign the multiple interventions in ensuring patient safety, and an alternative patient oriented health care model, which is crucial in policy, legal and procedural change which facilitate patient safety.

**Research Design:** In-depth interviews and focused groups discussions were conducted in primary health care centers in western Maharashtra. Each discussion was initiated with the main question:” To what degree do you think patient safety is a problem in your hospital?” Follow-up questions were categorized under three groups including:

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Data were analyzed using qualitative research methods by adopting the “health system approach and thematic analysis”. A comparative analysis of patient safety measures and procedures used in UK is carried out to suggest recommendation.

**Results & discussion:** 23 doctors and 30 nurses participated in the six focus group discussions in 5 institutions. The analysis reflects around 40 unique mentions of barriers to patient safety, which is categorized into five major themes. The themes identified are 1) lack of patient safety training, 2) patients’ knowledge levels, 3) Lack of professionalism and ethics, 4) Limited resources and 5) fragmentation of the health care delivery system. The paper comes with an alternative patient safety models and new health care design and a Comprehensive Health Care Act to ensure patient safety measures in medical practice and quality process in primary health care in public sector hospitals in India.

**Research implications:** The research analysis demands for a comprehensive health care Act in order to gear the entire health care sector to the objectives laid down in health policy in India. The research findings in terms of identification of barriers to the patient safety, along with the new patient safety models and health care design is useful to frame a comprehensive health care Act, which is enlightening for policy makers, health care officials, academicians, NGOs and other civil society organizations and to patients themselves to intervene and bringing policy change and ensure and implementing patient safety initiatives which is crucial In guaranteeing right to life to the disadvantaged sections of the society.

**Novelty:** The focused group discussions and in depth interviews conducted in this study is original and useful in identifying 40 barriers to the patient safety measures in primary health care centers. The identifications of the gaps in the existing health care systems through this research led to the conception of alternative health care model and comprehensive health care Act to ensure patient safety.

**Keywords:** Patient safety, primary health care, medical practice, Quality care, standard procedures, Accountability.

## Community Development and Patient safety

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Health has shifted both its disciplinary base and its traditional boundaries and is now viewed in the contemporary era as: a global public good; a core component of collective human security; a key factor of good global governance; responsible business practice and social responsibility; and global citizenship and human rights (Kickbusch, 2004). The WHO (2016) recognising that patient safety issues extend beyond the clinic (and the tertiary sector) into the primary health care sector through, for example, iatrogenic harm amongst other things, are developing a new framework for integrated primary care. Amongst the international organisations of health a growing consensus on the need to strengthen health systems upstream by making them more resilient though providing strong integrated primary health care is apparent (Vancouver Statement, 2016). Part of this strategy involves working with and in communities. All this attention reflects a new imperative for patient safety but we must beware of thinking that this is anything new as many of us who remember Alma Ata attest! Many countries, such as India for example, have a strong history of community led grassroots organisations leading the way for advocating and providing people centred primary health care initiatives. The People's Health Movement (PHM) and the Community of Practitioners on Accountability and Social Action (COPASAH) are examples of global social movements campaigning for health systems focused around citizen's voices and demands for the Right to Health. My paper will examine these movements and what it means for patient safety in the Global South but also posit what the countries of the Global North might learn through such movements.

These new movements for the right to health reflect a model of working together that is focused on partnership, participation and a recognition of, and a challenge to, the power relations that structure or limit such activities. These voices challenge continued policies and institutions that exert 'structural violence' on communities and countries that prevent the achievement of resilient strong universal primary health care systems. There is urgent need for multi-disciplinary analyses that values social theories, understands notions of power and political economy and how these contribute to understanding patient safety issues at primary care level and how institutions and policies themselves inflict avoidable harm.

Thus, this paper calls for new partnership knowledge alliances to bring a synthesis relevant to both the Global North and South that offers opportunities for wider exchanges in the debate about patient safety and building resilient health systems bringing different approaches to a common area of interest.

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## **Track IV: Healthcare: Engineering, Design & Geospatial Applications**

### **Study of potential risk of dengue outbreak using spatial modeling based on socioeconomic parameters**

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Dengue is the most important vector borne virus disease in the world with 50-100 million cases annually. Rapid urbanization, increasing population movement and lifestyles that contribute to the proliferation of man-made larval habitats of the mosquito are the exacerbated factors for the increasing number of the dengue incidences. The aim of this study was to model areas with humans at risk of dengue prevalence using multicriteria modeling depending on the spatial relationship between dengue fever cases and different socioeconomic parameters. The risk map of dengue incidences was classified as high, medium and low social risks. The developed dengue risk map was then verified by using reported cases in the year 2012 obtained from the municipality health department and it was found that more than ninety percent of the case samples were in the "medium" and "high" categories where most of the victims were found to have lived in the urban and sub-urban areas of the municipality. We applied spatial statistics method Moran's I and Kernel Density estimation together with spatial analysis in the Geographic Information System (GIS) environment to examine spatial clusters in order to identify and visualize areas giving different hotspot regions of the studied area. The output of the results indicated that the dengue cases was clustered ( $p < 0.01$ ) when analyze using Moran's I with Zscores 3.10. Descriptive analysis was used to characterize dengue fever (DF) victims and it was observed that DF was more prevalent in adults between the ages of 15 to 55 accounting for approximately 82% of all reported cases in 2012. Entomology index measured high with higher dengue incidence in humans, hence it is a robust measure of entomological risk for transmission of dengue virus. This study would be useful for decision makers to strategize and create preventive action plans to control the dengue transmission effectively. The novelty of this study is that we prepared the dengue risk zone map using weighted index modeling, Moran's I and Kernel Density estimation were used to identify different hotspot regions, Most DF was prevalent in adults (15 to 55 years) due to movement and travelling and our findings may support preventive action plans to control disease vector transmission effectively.

**Keywords :** Aedes aegypti, Dengue, Disease mapping, GIS, Hot spot analysis

### **A time motion study in the immunization clinic of a tertiary care hospital, BJGovernment Medical College (BJGMC), Pune**

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A time and motion study is used to determine the amount of time required for a specific activity, work function, or mechanical process. In the immunization clinic, time motion study helps to know time taken in different service delivery points in the immunization clinic. The purpose of this study is to determine the activity time at the service points in the immunization clinic. The present observational cross sectional study was done in the immunization clinic of BJ Medical College, Pune over a period of 1 month. The study population was all the beneficiaries attending

immunization clinic during study duration. Pre-synchronized stopwatches were used to record service delivery time at the different activity points. The total median duration for immunization was 57 minutes (mins). Of this, maximum median time i.e. 15 mins each was required for initial registration and for immunization registration (history, treatment and Hospital Management Information System (HMIS) entry) and the vaccination and post vaccination advice took comparatively less time (5mins and 2mins respectively). Median time for pediatric reference (if required) was 9 mins. Maximum median time spent on the vaccination was on Friday (68 mins). A simple time and motion study of an Out Patient Department (OPD) system and suitable inexpensive interventions can go a long way to improve the efficiency of a hospital. Separate arrangement for immunization is needed for OPD registration and upgradation and increase in number of computers for fast HMIS entry and prescription.

**Keywords:** Immunization clinic, Tertiary care hospital, Time motion

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### **Nanofilters to control harmful emissions: technology for health and environment**

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The current review focuses on the use of nanoparticles in the automobile (petrol, diesel emission) filters that emit harmful gases and also in cigarette filters to increase their filtration efficiency and render them less toxic and hazardous. The studies pertaining to modifications or alterations in design of automobile engine filters or cigarette filters have received less attention and thus nanoparticles in these filters may prove to be a good alternative to the problem. For over last few decades the analysis of automobile engine and cigarette emission has rather been restricted to study the pharmacological and toxic effects of automobile, engine and cigarette smoke. This review will thus provide us with useful information to help understand the approach to combat the emission problem. Recent research in China has shown that the use of zinc oxide and manganese oxide in filter tips of cigarettes to entrap poly aromatic hydrocarbons was twice as efficient compared to normal filters. Same methodology can be applied to automobiles and engines by adding nanoparticles and nanotubes to their respective filter tips. Tobacco consumption is the single most important avoidable factor in the growth of non communicable diseases in developing countries. Globally the demand of tobacco is increasing and there are no signs yet of decline. Similar to tobacco smoke, smokes from vehicles are silent threat to lungs, kidneys and various organs of the human. Thus, the use of these nanoparticles in the filters can reduce the risk of health hazards associated with the smoke from automobile and cigarette.

**Keywords:** Environment, Harmful emissions, Health, Nanofilters, Technology

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### **Market feasibility and project conceptualization for a hospital in Navi Mumbai area**

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Today in India, doctors per 1000 population (0.7 per 1000) as well as hospitals beds per 1000 population (0.9 per 1000) is less than that of World Health Organization (WHO) recommendation (3.5 per 1000). The study sought to identify the healthcare need gap in Ghansoli, Navi Mumbai and to analyze whether the existing market of healthcare sector is feasible for setting up the proposed hospital. At present, there is a bed deficit of around 450 in Navi Mumbai and 557 beds in Ghansoli. A market survey was carried out across 25 hospitals / private clinics and 8 diagnostic centres. The study comprised of primary and secondary market research. The key findings of the survey indicated that majority population belongs to middle income group and is mostly uninsured. The study showed that, Ghansoli



lacks super specialty services. Also, it is observed that the Computed Tomography(CT) and Magnetic Resonance Imaging (MRI) services are not available in Ghansoli. Due to lack of basic healthcare facilities available in Ghansoli, majority of the patients are compelled to seek healthcare services in other cities. The most feasible plan is to establish 200 bed multispecialty tertiary care hospital with superior diagnostic and imaging facilities, critical care, cardiac care, orthopedics and neurosurgery being its thrust areas.

**Keywords:** Feasible, Need-gap, Proposed hospital, Tertiary healthcare

### **A reality check of perioperative care practices: Lessons learned**

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Most of the studies either check the completeness and compliance of the World Health Organization (WHO) surgical safety checklist or compliance of practices in any of the phase of perioperative care cycle i.e. pre operative, intraoperative and post operative care phase and discuss about the obstacle in the implementation of WHO surgical safety checklist. In this study researcher has done the prospective investigation of standard practices. The purpose of this study was to develop a strategy to bridge the identified gaps in quality management practices during the perioperative care of patients in a selected teaching hospital of tier two city of Maharashtra. Activities of healthcare professionals were recorded during the perioperative care of patients with the help of checklist in the Operation Theatre (OT). T-test was applied to compare the proportion of observed frequency with the standard practices. Almost in all the instances almost 100% compliance were found for the anaesthesia related parameters. Scarcity of manpower, unavailability of sterile supplies and equipment break down were the main causes of gaps in the perioperative care process. All the phases of perioperative care are equally important as preoperative phase is the precursor for the succeeding phase i.e. intra operative phase and intra operative phase for post operative phase. Thus the preparation of patient, identity check and document verification and the postoperative room activities should be given equal weightage like intra-operative. Management should give emphasis on the allocation of resource and time to assure the patient safety.

**Keywords:** Operation Theatre, Perioperative care, Surgical Safety

### **Risk assessment of pesticide residues in selected chilli samples by chromatography and mass spectrometry**

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Vegetables being excellent source of vitamins and minerals promote good health. However, consumption of pesticides contaminated vegetables poses a major threat to public health. Due to an increase in the agricultural yield due to growing population, pesticides usage has increased thereby contaminating crops, vegetables in particular and also environment which imposes major health risks. The study aims to analyze selected fresh green chilli samples for pesticide residues of Pune region as these are predominantly consumed. 30 samples of Capsicum annum (fresh green chillies) were procured by random sampling from various markets in Pune and Mumbai. Chilli plants being of small size have a higher threat from more pesticides being sprayed. Crushed whole chilli samples (without stalks) were taken; ethyl acetate (10 ml) and acetic acid (100 µl) were added and homogenized. Pesticide residues were determined by Gas Chromatography- Mass Spectrometry (GC-MS) and Liquid Chromatography-

Mass Spectrometry (LC-MS) to assess the type and concentration of pesticide residues. Total 229 pesticides were screened. Of which 77 were analyzed in GC-MS and 152 were screened in LC-MS. A few exceeded the permissible limits (100 parts per billion). Pesticide residues above the Maximum Residue Limits (MRLs) were detected in some of the samples, while most contained pesticide residues at or below MRLs. The most frequently detected pesticide residues are cypermethrin, bifenthrin, fenithrothion, etc., in high concentrations. To educate farmers on the judicious use of agrochemicals in pest control with an aim of decreasing the burden of these chemicals in food stuffs and their impact on public health. The present study would contribute to the existing pool of data for close scrutiny of pesticide residues in vegetables, to protect consumers' health which would help in setting strict regulations and regular monitoring of the use of pesticides.

**Keywords:** Contamination, GC-MS, LC-MS, Pesticide residues, Risk assessment

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### **Medical devices access in Asian countries: Sustainable growth trajectory in India**

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Technologically advanced solutions for treatment of diseases, scientific rigor and research has witnessed tremendous growth in therapeutic usage of medical devices. The role of 'Make in India' initiative has become the most important driving force for technological advancement of medical devices industry. However, challenges exist and need to be addressed in providing affordable healthcare by producing medical devices that are cost competitive and effective to increased access. Asian countries like Japan, China and South Korea are foremost in the Medical devices sector. This paper probes the sustainability of 'Make in India' policy with the growth trajectory of Asian countries in medical devices and discusses ways of overcoming challenges through regulations, policies and other stakeholder contribution. The purpose of this study is to analyze the current status of medical devices sector in Asian markets, plan for its growth and development in India, enlist the challenges that pose a threat to this industry, and incorporate best practices of Asian countries for sustainable strategies for growth of Medical device industry in India. The paper is an exploratory research work, using secondary data collection through electronic media search, print media and published articles focusing on medical device industry in India and Asia. Global medical device production will record 6% growth in 2016 and reach United States Dollar \$520 billion by 2020. The traditional US and western European markets are under regulatory scrutiny and pricing pressure providing the Asian markets an opportunity to leverage accessibility in Medical devices. The Indian medical devices market is fourth in Asia after Japan, China and South Korea. Best practices in these countries in terms of access to health care services, fast track approach, tax holidays etc., can be adopted by India and design a holistic ecosystem for medical devices for sustainable growth. Leveraging 'Make in India' initiative for medical devices and incorporating best practices of the Asian giants in medical devices will provide local innovation and make India a global hub for medical device manufacturing.

**Keywords:** Asian countries, Make in India, Medical devices, Policy

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### **Technological importance in waste management in India: An analysis of issues and challenges affecting health care waste management**

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Worldwide generation of waste has a tremendous rise due to the rise in urbanisation, industrialisation and

population. Waste generation and management is one of the major issue faced in India. There are different types of waste being generated which includes municipal solid wastes, industrial waste, agricultural waste, commercial waste and Health care waste (HCW). Among this, HCW is considered as most infectious waste which is to be handled properly as it poses risk to the public health. Inappropriate waste management practices can directly and indirectly lead to several health problems and environmental issues. There are several methods to be utilized for the appropriate waste treatment where society is not affected inversely. Developed countries are far before in waste treatment technological aspects. Hence it is essential to understand the present technologies being used in India, how to improve the technologies and how the approach of the society towards waste management has to be changed. This paper summarizes the methods used for HCW treatment and importance of technological development in health care waste treatment. The paper also deals with the issues and challenges affecting the health care waste management. Several other constraints existing in the technological aspects have to be analyzed using the study. Technologies used for the HCW treatment have been analyzed. The findings suggested that one of the major challenges which society face is the approach of public towards waste treatment. Public cooperation is an important factor which any function requires which is lagging in the current situation. Another important factor to be changed is the change of concept of waste treatment to sustainable waste management which is to be followed for a proper future. The research findings will guide the future to understand the present technological systems and how to provide more inputs for proper maintenance and functioning of waste treatment technologies. The research analyze the current working condition of health care waste treatment technologies in India which will guide for a better future.

**Keywords:** Health care waste management, India, Technologies, Waste generation, Waste management

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### Significance of Nanovaccinology

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Nanovaccinology assimilate the use of nanotechnology for the development of vaccines. Study of nanoparticle of specific shape, size and surface properties are now feasible due to advent in Nanotechnology. As a part of vaccine development viz. alteration of active and inactive ingredients, its composition, combination of multiple antigen, improved safety profile, adjuvant effects and delivery systems are studied. The purpose of this study is to review the potential for the development of therapeutic vaccines using nanovaccinology. Based on previously reported work, nanovaccinology as an efficient mode of delivery system will be assessed and reviewed. The nanoparticles of specific shape and size can be fabricated and used as nanocarriers for vaccine delivery. By modifying the surface of nanocarriers with a variety of targeting moieties permits the delivery of antigens to specific cell surface receptors. The finding of nanovaccine will be advantageous as the delivery system will elicit humoral and cell mediated responses. This is interpreted that nanoparticles facilitates the uptake by phagocytes, gut and mucosal lymphoid tissues, leading to efficient antigen recognition and antigen presentation. There is an enormous excitement regarding nanovaccine's potential impact on humankind. Nanoparticles can be used for speedy drug delivery as drug formulation itself or as the drug delivery carrier. For better immunogenicity and long lasting immunity, the long circulating target-specific nanoparticles will be designed. The sizing and characterization of nanoparticles for specific target cells is important aspect. Existing vaccine's particle size is less than 10  $\mu\text{m}$  while the proposed nanovaccine's size is almost 100 times smaller than the existing vaccines. This smaller size vaccine penetrates into the cells and elicits better immune response.

**Keywords:** Nanoparticles, Nanovaccinology, Vaccine delivery

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## Machine learning formulation of nutritious frozen desserts: A Vegan approach

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Vegan alternatives for frozen and dairy desserts have become a preferred choice over dairy varieties in mitigating non communicable diseases. Rapid urbanization and emerging trends in food product marketing has led to Nutrition transition. The changing food trends have led to global penchant towards high sugar and high fat sweets viz. ice-creams and frozen desserts. The decisive consumer focuses towards healthier options along with high nutrient density and functional components have driven the consumption of alternative plant based sources. It also serves as a sustainable way to maintain environmental friendly ecosystems. Epidemiological studies have identified an inverse relationship between plant based dietary approaches and development of metabolic syndrome. The study aims to develop a food product by integrating nutritional, information technology and biopsychosocial perspectives. Vegan frozen desserts were standardized using functional ingredients in the Nutrition Laboratory. Trained panellists performed sensory analysis of the developed products using 9 point Hedonic scale. The nutritive value, shelf life, cost and nutrition labels were estimated. Eating psychology of panellists was assessed using a questionnaire. Using incremental learning techniques, conjoint analysis was done on data sets with recommendations for suitability of the products across target groups. The vegan frozen dessert was well accepted (sensory parameters) during the sensory trials wherein the paired sample t test (sensory parameters) revealed no statistical difference ( $p > 0.05$ ) between the two products (control and experimental). The nutrient analysis and behaviour intent rating scale for vegan products is in progress. Food service industry could provide vegan frozen desserts as healthier alternatives across intended consumers. Vegan frozen desserts may be scaled up to food kansei model to reach wider markets. The research is an amalgamation of food product development with Incremental Learning System in providing healthier frozen dessert options.

**Keywords:** Frozen desserts, Incremental clustering, Sensory analysis, Vegan foods

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## Equipment utilization in critical care areas

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Equipment has major role in hospital and health care services as an aid to health professionals, in providing efficient diagnostic and therapeutic tools. It helps to make the identification of the disease problem and their accurate and appropriate cure. Modern hospitals utilize a wide range of equipment for diagnostic, therapeutic and research. Many times, these instruments are purchased without prior assessment of availability of technical knowledge and facilities for repairs and maintenance. In most of the hospitals biomedical department is made and repairs are done by some technicians, biomedical engineers or it is done by the companies. Any health care unit's efficiency is judged by its quality indicators. The availability and optimal utilization of medical equipment is important for improving the quality of health services. Investments are made for the purchase, maintenance and repair of medical equipment. Inadequate management of these equipment will result in financial losses of the institution. It is generally seen that few of the hospitals in India attempt to evolve their own parameters either taking ideas from the established parameters or from their experience in Indian hospitals. Some of the parameters when pursued year after year do not express or reflect the aspirations of the intensivists. In present no proper study found with regards to the

equipment utilization, in critical care areas in hospitals. Overall, the process of care was good although there were some gray areas of sub-optimal and supra-optimal utilization of resources. The data was collected from the records maintained in the Coronary Care Unit (CCU) of the hospitals in Pune. The data for the utilization and management of medical equipment is collected by studying the records maintained, and also by questionnaire method from the staffs working in CCU and biomedical department. The research approach adopted in this study is descriptive type. Even though there are more than 1200 equipment's in use in the hospital, 6 of them have been selected for study. The selection criteria of the equipment were as follows: frequently used equipment, frequently procured and equipment maintenance cost is high. The nursing staffs, biomedical staffs and technicians working in CCU were included for the study. To measure capacity utilization, time format was made and readings are taken according to that. Everyday readings are taken according to format. Actual utilization time of machines is calculated from secondary data from respective critical care departments. Engineered output is calculated with the help of secondary data from biomedical department. Readings were taken for 30 days. The proper utilization of medical equipment is needed in the hospitals under the critical care section especially which can provide minimum cost to the hospital as well as quality care to the patients. A hospital can achieve maximum utilization of the equipment by applying any of the recommendations given. It has been found that use of proper inventory of equipment, Radio Frequency Identification (RFID), optimal utilization of existing equipment, bringing down idle time will reduce the burden of budgetary allocation for equipment utilization.

**Key words:** Equipment's efficiency, Hospital utilization rate

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## **Designing of a low cost, highly reliable, and accurate transcutaneous electrical nerve stimulation unit**

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Millions of people across the globe suffer from persistent pain that lasts for several months. Due to excessive body pain there is gross reduction in the industrial output causing heavy monetary losses to the employer. Majority of the pain in the community is the musculoskeletal pain. Musculoskeletal pain is the pain occurring at joints, muscles and surrounding structure due to stress, strain tension and work related burden. The pain signals are transmitted from the area of pain through the spinal cord to the brain. Electrotherapy is a technique which blocks the pain sensation passing towards the brain by giving electrical stimulations. To achieve successful blockage of pain sensation, a particular type of stimulation signal must be supplied to the area of pain for a longer duration of time. Transcutaneous electrical nerve stimulation (TENS) is a battery operated electrotherapy device which is used for pain relieving. The paper deals with the designing aspect of electronic components to generate different types of stimulating signals. The amplitude, phase and frequency of the stimulating signal plays a vital role in relieving pain. A highly reliable, accurate and lower cost transcutaneous electrical nerve stimulation design has been modelled in the paper. Simulation based designing and testing using National Instruments Multisim Simulator and Cadence Orcad PCB Simulator. Simulation based modeling of the unit using National Instruments Multisim Lab View Software. The robust, compact and user friendly design of the electrotherapy device makes it a commercial product to be used in domestic as well as international markets. The different features of the unit make it a device that can be used for wide variety of applications creating it of optimum relevance for both domestic as well clinical purpose. The cheaper medical device unit will attract more investments from manufacturers and generate revenue. Reliable pain relieving unit will improve health and provide faster healing. It will lower sick leaves thereby improving productivity towards employer.

**Keywords:** Electrotherapy, Musculoskeletal pain, Transcutaneous electrical nerve stimulation (TENS)

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## **Biomechanical analysis and comparison of actual lumbar bone with lumbar bone prototype**

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Biomechanics is of prime importance while designing any automobile, especially with the growing competition in that sector. Present day research focuses to a great extent on this aspect and especially on the comfort of the driver of the vehicle. Researches prove that there is increasing damage to the backbone of the person riding the automobile, due to ineffective design of the suspension system of the vehicle. Lumbar bone is that part of the backbone on which the entire mass of the body acts. Due to improper suspension system, the lumbar bone gets extensively damaged, leading to severe health effects. Our thesis is to fabricate, analyze and compare the properties of a replica of human lumbar bone created from Acrylonitrile Butadiene Styrene (ABS) with that of an actual human lumbar bone. The Magnetic Resonance Imaging (MRI) and Computed Topography (CT) scans of various bone samples are first collected. A prototype of the Lumbar bone is made for experimental studies. Then, the forces acting on a human bone during the actual conditions are considered and the prototype is tested for the same. Biomechanics is of prime importance while designing any automobile, especially with the growing competition in that sector. Present day research focuses to a great extent on this aspect and especially on the comfort of the driver of the vehicle. Nowadays, most of the automobile riders are prone to an adverse phenomenon - "Back Pain". Thereby, the riders are desperate to find a solution to the above mentioned problem. Studies have shown that the part which is extensively affected is the Lumbar Bone. So, in order to move forward we developed a prototype of a human lumbar bone using Rapid prototyping (RPT). Mechanical tests were conducted on the prototype. The regions of maximum distortion were identified from MRI scans of actual human lumbar bones and, then the forces acting on them were analyzed. These forces were applied on the prototype made out of ABS and their characteristics were compared. The limit for the tensile strength of an actual human lumbar bone has been stated to be within the range of 30-50 million Pascals (MPa). The calculated tensile strength for various specimens have been within this range and hence the ABS material shows similar tensile characteristics with the stress in the upper region of the limits. The material cannot be used for fracture testing because of the extended elongation of the material before fracture. Thus, it can be inferred from the research that Acrylonitrile Butadiene Styrene (ABS) can be used to test the tensile and compressive characteristics of human lumbar bone. They cannot be used for testing the fracture characteristics of the lumbar bone. Prototype generation of lumbar vertebra from Computed Aided Design (CAD) model.

**Keywords:** Acrylonitrile Butadiene Styrene, Lumbar bone, Rapid prototyping, Stereolithography

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## **Detection of Urban Sprawl and its health implications around Pune city using geospatial technology**

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Pune city is growing exponentially both in terms of spatial extent, economic activities and demography. In addition to the many positive effects of urbanization there are also negative externalities. City growth and changes in land use patterns have various social and environmental impacts, including the loss of natural spaces, increased vehicular congestion, the loss of highly productive agricultural lands, alterations in natural drainage systems, and reduced air and water quality. As urban areas expand, the advantages of compact cities are progressively lost. Environmental degradation is a major issue in peripheral areas. Specific health hazards arise when agricultural and industrial activities are mingled with residential use. Some sub urban areas become sinks for urban liquid, solid and sometimes airborne wastes. The type, impact and gravity of such problems vary considerably. The lack of regulation of these lands and their use can endanger the health of people who settle or reside there, because they may be exposed to hazardous substances in the air, the water they drink and the food they grow. Risks may be

greater for the population, who are more likely to spend most or all of their time in their homes and immediate environs. The purpose of the study is to determine the urban sprawl around Pune city and study its impacts on the health of the population residing in the study area, by using geospatial techniques. The study was conducted for Pune city and its fringe areas. Land use and land cover (LULC) change map has been derived using temporal spatial data such as Landsat 4-5 data and Linear Imaging Self Scanner (LISS-III). Further geospatial analysis was carried out to determine the urban sprawl and its relevance to the health issues in the region. It has been found that there has been change in the land use and land cover and subsequently the urban growth resulting into sprawl. The study also reveals that urban sprawl has implications on health issues of the population in the study area. The limitation of the current research is that it has been conducted only for the Pune region of Maharashtra and only particular health issue is taken into consideration. The resultant study can be further implied to other states of the country. The research contributes to the existing knowledge of health care sector through implications of geospatial technology.

**Keywords:** Geospatial techniques, Healthcare, Land use-land cover, Urban sprawl

### **Improving the operational efficiency of Out Patient Department (OPD) using Lean method – Value stream mapping**

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OPD is the mirror of the hospital, which reflects the functioning of the hospital being the first point of contact between the patient and hospital staff. Patients visit the OPD for various purposes, like consultation, day care treatment, investigation, referral, admission and post discharge follow-up. Hence the scope of OPD services extend to not only treatment but also preventive and promotive services. However, the OPDs are plagued with the problem of process delays like long waiting time. It is often one of the most frustrating part about the healthcare delivery system. Waiting time for elective care have been considered a serious problem in many healthcare systems since it acts as a barrier to efficient patient flow. This contributes to poor service delivery and a lacklustre work environment. Non-value-adding activities result in, inter alia, long cycle and waiting times, and low staff morale. A study was carried out in a Tertiary Care Hospital (TCH) in Pune to study the operational efficiency of the OPD by mapping the flow process and suggest means to improve it. In order to improve operational efficiency by reducing bottlenecks in the workflow of the OPD a lean method–Value Stream Mapping was employed. The entire OPD patient flow was mapped using a time motion study for a sample of 500 patients. Value Stream Mapping consisted of drawing the process flow as it was happening at present. It consisted of both Value added and non value added activities. A Value Stream Improvement Plan was made to eliminate these bottlenecks or reduce the activities that do not add value, with reducing the delays as the value stream objective.

**Keywords:** Consultation, Delay, Hospital Information System (HIS), Lean, Non-value adding activities

### **Nano mechanical investigation of ECG / EEG Dry electrodes and its application**

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**Introduction:** Functional disorders related to heart and brains are one of the major causes of death and disability in the current days. These disorders can be avoided or at least foreseen by effectively monitoring the bioelectric signals originating from these two organs like ECG, EEG etc.

**Purpose:** In the present study, we have used micro array based dry electrodes which were developed from a biocompatible polymer SU-8. These electrodes are made up of an array of cone shaped micro pillars formed on the flexible substrate. The micro pillars are coated with thin layer of gold. It gives us an advantage over the wet gel based electrodes since it is more robust and survives longer. This device needs to be characterized for their robustness. Being MEMS structure, conventional method of characterizing them will no longer be useful here.

**Methodology:** We have used state of the art nano indentation technique to study the mechanical properties of the dry electrodes. This technique uses a tip which is indented into the sample and its penetration depth is measured against the applied load. The applied load is of the order of mili Newton and the penetration depth is of the order of nano meters. Using the loading unloading curve, we could find the hardness, elastic modulus, stiffness and other nano mechanical properties. This technique is also used for fatigue analysis. The sample was subjected to multiple loading unloading cycles to stimulate the different stresses encountered by the samples during the remote testing or during its life cycles.

**Results & discussion:** In this paper we have discussed the nano mechanical properties of the dry electrodes which will provide the valuable information about the usability, durability and robustness of the dry electrodes.

**Keywords:** Micro Electrodes, Nano mechanical properties, Fatigue analysis, ECG, EEG.

## EEG based Epileptic Seizure Detection using Empirical Mode Decomposition and Hidden Markov Model

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Epilepsy is a chronic neurological disorder which is indicated by recurrent seizure. According to World Health Organization about 50 million people worldwide and 80% people with epilepsy belongs to low or middle income group. Two million new epilepsy cases occur each year globally as estimated by world health organization. So a system which can detect seizure effectively will be helpful both for doctors and patients.

Present method of seizure detection is manual and depends on doctor's efficiency. So the method is time taking and accuracy varies from doctor to doctor. The proposed algorithm automatically detects seizures with higher accuracy.

Hidden Markov model (HMM) based classification approach is proposed for epileptic seizure detection. Electroencephalogram (EEG) signal is decomposed using empirical mode decomposition. Higuchi fractal dimension and differential entropy features were extracted from six intrinsic mode function and average feature values were used for classification.

Features extracted from the signals are efficient in differentiating seizure, healthy and inter-seizure EEG signals. It is observed that classification accuracy for HMM based approach for seizure-healthy, healthy-interseizure and interseizure-seizure is higher compared to other state of art method. We have also compared the performance of HMM based approach with other classification technique such as support vector machine classifier and least square support vector machine classifier.

Proposed method can be used in hospitals by doctors for detecting seizure as well as evaluating the condition of patient recovery after medication. This will reduce the time for EEG signal evaluation and also reduce the false detection.

Proposed method has achieved higher accuracy compared to other state of art methods. A probabilistic based model is proposed for seizure detection. The proposed approach is computationally efficient and achieved good result in seizure detection for both intracranial and surface EEG signals.

**Keywords:** Epilepsy, EEG, Empirical Mode Decomposition, Hidden Markov Model, Support vector machine classifier

# A Geo-Spatial Modelling for Mapping of Filariasis Transmission Risk in Odisha Using Remote Sensing and GIS

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**Introduction:** The Global Programme to Eliminate Lymphatic Filariasis (GPELF) by 2020 depends upon mass drug administration (MDA) of DEC to interrupt transmission. Odisha state is highly endemic for filariasis caused by *Wuchereria Bancroft* infection and transmitted by *Culex quinquefasciatus*.

**Purpose:** Hence it is essential to identify the areas of potential transmission and develop a filariasis risk map for appropriate targeted drug distribution. Therefore, an attempt was made to develop filariasis risk map of two endemic blocks (Satyabadi and Jatani) and one non endemic block Anugul of Orissa using Geographical information system (GIS) and Remote sensing (RS).

**Research methodology:** The above districts such as Khurdha, Puri and Angul are covered in two scenes of LISS-III (Multi spectral sensor) and five scenes of Pan chromatic sensor of IRS-IC/ID Satellite Merged products of PAN + LISS III (Pan +XS) were interpreted using ERDAS Imagine 8.4 digital Image Processing Software Package. Filariasis distributions are governed by environmental conditions. Variable geo-environmental risk factors like temperature, rainfall, altitude, relative humidity, land use/ land cover, soil type, soil PH, soil moisture index, NDVI and water bodies are known to be associated with the occurrence of filariasis. Therefore, Thematic layers of the above risk factors of the studied blocks were developed using ARC/INFO 4.0 GIS package. The field level data of entomological parameters like vector density, larval density, infection and infectivity rate and microfilaria rate were converted into spatial(map) format. The point data (attributes) were linked with spatial database. Once the thematic layers and attribute database are generated, the filariasis risk maps have been generated through superimposition of the aforementioned layers and ground level information database. Linking of terrain parameters derived from R.S. with entomological, epidemiological & climatological parameters through GIS Software modelling. Buffering of different radial distances along rivers and settlement, were carried out. Correlation analysis between different R.S. derived terrain parameters, ground based vectors abundance information and entomological parameters and climatological parameters were carried out using statistical package like 'SPSS' and GIS package like ARC-GIS. This would highlight the correlation between terrains, climatological parameters. Spatial analysis of filariasis distribution in relation to environmental variables using GIS technology.

The field level data of entomological parameters collected by RMRC (ICMR) were converted into spatial(map) format using ARC/INFO 4.0 GIS package, by the ORSAC, the collaborator of the project.

**Findings:** The current study clearly identified the risk factors to be the soil type, soil moisture index, normalised difference vegetation index, large network of canal and water bodies, and drainage which influences the breeding and proliferation of the vector mosquitoes which also directly influences the disease transmission. Taking into account the above factors, risk map of the two endemic and one non-endemic blocks are being developed

**Research implications:** The map identified the filariasis hotspot areas in non-endemic blocks which was validated.

**Novelty:** The information helped the state govt to include the areas under MDA programme. Identification and mapping of the hotspot areas in non-endemic areas of MDA programme for the whole state has been initiated, which will help the state health department for coverage and contribute to the success of Elimination programme.

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# Intelligent Supply-Chain Management Learning System for Homeopathy

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**Introduction:** The paper proposes intelligent, efficient and automated medicine handling scheme for homeopathy clinic.

**Purpose:** Research based on confluence of incremental-learning, homeopathy, microcontrollers, mobile technology is discussed in this paper. Dew computing based mobile system allows homeopath to identify / locate required medicine bottle immediately. Medicine bottles arrangements are recommended based on incremental-learning of prescription and season. Quick and accurate medicine identification saves lot of time and gives "feel good" factor, always. Microcontrollers / sensors attached to medicine bottle safely react to mobile signal to locate. Once located, medicine information is stored in database of patient for future reference.

**Research Design:** The paper proposes embedded ARM cortex based system for effortless and automatic identification of medicine bottle(s). The specific row columns arrangement of the configurable output ports identifies the bottle and its location in the medicine tray by mapping the doctors input prescription. The system could also be capable of maintaining the log record of the quantity and the availability of the medicine. Further the information regarding the diagnosis and prescription can be added to patients' available database for future ready reference. This would not only save both doctors and patients valuable time but provide the doctor with easy access to patients' complete history, using Cloud Computing platform. Soft form of patients' history enables homeopath to analyse the case better, without maintaining hard copies of details.

**Expected Results & discussion:** This proposed system is able to analyse usage of medicine also, during specific period, season, age and profession-wise. Medicines related supply-chain management requirements are easily, effortlessly and effectually handled using this system. Detailed medicine usage report allows homeopath clinic to order required medicines from supplier, supplier in turn can order from wholesaler etc. So all involved entities will be able to predict necessities of medicine ahead of time seamlessly.

**Research implications:** The research would ease of better delivery and effective execution for the homeopath and patients in terms of time and stress.

**Novelty/Originality:** The need of suitable intelligence addition to the service by homeopath to the society will be addressed by this work.

**Keywords:** ARM cortex, dew computing, incremental learning and supply chain

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## Assessment of Traditional Pit Looms and Frame Looms in Context to Work Place Ergonomics and Its Effect on The Health of Weaver

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Handloom art of weaving in India is shrouded in the mists of antiquity. Fragments of woven cotton, bone needles and spindles have been discovered at Mohenjo-Daro and Harappa, the ancient seats of the Indus Valley Civilization. Handloom weaving on pit looms in Aurangabad has been recorded from ancient days. With the advent of



technology many weavers switched from traditional pit loom to frame looms in later years. The present study is to inspect the physiological concerns of weavers during weaving using pit loom and frame loom which help in improving work efficiency and development. The study was carried out using closed end questionnaire, participation and observation method. 50 handloom weavers were selected for the study using snow ball technique. The data collected was assessed using the Borg scale for pain and check list analysis of the work. Statistical analysis revealed there was major difference in the health issues of weavers using pit loom and frame loom. The study discovered working on the traditional pit loom set up led to lesser health issues compared to frame looms. There were major upper back pain issues recorded with frame loom weavers.

**Key words:** Pit loom, Frame loom, Handloom weavers, Aurangabad, Weavers, physiological impact, Ergonomics.

## C2L (Cervix to Lumbar) SUPPORT

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**Introduction:** Wrong posture is a major problem these days seen in almost every age group. The triggers that can cause back problems are: Walking in high heels, carrying heavy bags, getting desk savvy and working on laptops for long hours, Stress, etc. Poor posture often leads lower back pain, neck pain, rounded shoulders, and spinal problems; thus resulting to discomfort and injury. Long-term poor posture effects include arthritis, indigestion and breathing difficulties. All these can seriously affect the quality of one's life. Good posture places one's body in an alignment where stress is properly distributed to the intended muscles and ligaments thereby decreasing wear and tear of the joints. Over the last 5 years, wearable technology – comprising devices whose embedded sensors and analytic algorithms can track, analyse and guide wearers' behaviour – has increasingly captured the attention of venture capitalists, technology start-ups, established electronics companies and consumers [1]. The integrated wearable technology industry has come up with a few solutions of self-care for this problem of wrong posture- Posture-Correcting Wearable Gadget – LUMObac, The Upright Pose, Alex, Darma, Lumo Body Tech, Lumo lift [2]. In this paper we present an overview of current technologies used within wearable applications to monitor and support positive health and wellbeing within an individual. On the basis of the study a wearable prototype is developed and tested during the research that offers consumers a way to lifestyle management.

**Purpose:** A survey conducted in Delhi, Pune and Mumbai between May and August 2015, stated that almost 48.4% of people suffer from lower back pain, 8.5% people suffered from overall back pain and 8% of people suffered from neck pain. [3]. A sedentary lifestyle could be attributed as one of the sources to the problem. However, with a little reminder every now and then, one can be reminded to correct the postures.

**Research Design: "Design for Purpose"** has been an interactive integrated project where sensor technologies have been embedded with textiles to make it a Smart Textile. The aim of this research was to address the problem, develop and test the prototype for posture correction; Cervix to Lumber (C2L) support vest, that is mainly aimed at professionals and corporate office-goers. The three resistors, 30ohms and two of 10ohms and the flexion bend sensors, 4.5inch and 2 of 2.2inch each were connected to lily pad Arduino. When the sensor bends, there is a change in resistance which results in change in the output of the voltage divider. The analog to the digital convertor on the arduino keeps sampling the input by converting it into a numerical value. The threshold of the sensors is set. The motor starts to vibrate when the value is below the set limit to give an indication to the wearer to sit upright.

**Results & discussion:** C2L (cervix to lumber support) vibrates every time the user bent or slouched reminding him to correct his posture. The deflection of the back and shoulders from the optimal position is detected by a set of

flexion bend sensors and it causes a vibration on the user's back, indicative of the need to sit or stand correctly. The angle of deflection can also be measured and recorded using an app connected to the main circuitry. The circuitry included the use of Arduino microcontroller that is programmed for the required feedback loop.

**Research implications:** The product has the potential to be tailor-made and individuals can choose their clothes with whatever designs they wish and yet have the sensors incorporated in them thereby giving them a complete posture correction whether at home or at work. Initially the change in resistance in each sensor when it bends was recorded. It was noted that a visible change in resistance occurred only when the sensor bent for almost 30 degree or more. To overcome this drawback a padding of an elevation of 30 degrees was used at the base of the sensor.

**Novelty:** Tomorrow's garments will do much more than just look good and feel great. Smart clothes, which offer simultaneously a challenging design and utility value, can be only mass produced if the demands of the body are taken care. The current products available in the health care industry with similar features are essentially products that need to be worn below the regular clothes and serve as posture aids. However, C2L support incorporates the sensors into a professional waistcoat and other casual or formal clothes that user can wear making it easy to incorporate into the daily wear.

**Keywords:** Arduino, deflection, flexion sensors, posture correction, slouch, Up-right, wearable technology.

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## Functional Clothing for the Differently Abled

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**Introduction:** Disability may be broadly defined as a physical or mental condition that limits a person's movements, senses, or activities. Functional clothing is essentially designed to fulfil special requirements of the wearer including body disproportions or impairment. It also may affect a person's emotional wellbeing. This is an exciting field of study where opportunities of research, design and development of clothing for differently persons are being explored all over the world.

**Purpose:** Research and development of functional clothing in India is a relatively new field. This paper brings to light, some significant global advances made in the field. It also studies the requirements of functional clothing amongst patients suffering disability undergoing treatment at chosen hospitals in Pune city.

**Methodology:** This paper traces outstanding global research in the field of functional clothing for the differently abled through rigorous literature review. Information on specific requirements of persons suffering from disabilities with respect to their clothing is collected using structured questionnaires. A sample size of 50 such persons undergoing treatment from selected hospitals in Pune has been chosen.

**Findings and Interpretations:** Disabilities are of many types and functional clothing for each type of disability has entirely different requirements. Persons who are wheelchair bound, those who are bed ridden, persons who are spastic, autistic etc. all require different kinds of functional clothing. Clothing should be aesthetically appealing and should follow current fashion trends wherever possible; they should be easy to wear by themselves; they should be easy to care for and also provide the wearers with a sense of physical and mental comfort.

**Conclusion:** Special requirements which arise from disabilities require the application of design and development to address the physical, physiological and mental issues for the differently abled. Global standards in quality, aesthetics and convenience should be followed so that such persons do not feel uncomfortable in any way.

**Novelty:** The paper introduces readers to new and exciting developments in the field of functional clothing for the disabled. It also reveals some key clothing requirements of differently abled persons belonging to Pune.

**Key:** body features, clothing, differently abled, disability, functional

## Track V: Healthcare IT

### Perceptions of Electronic Medical Record (EMR) system by doctors in Pune

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EMRs in healthcare system can reduce healthcare costs as well as improve the efficiency and effectiveness of healthcare facilities. However, only a very few practitioners in India use EMR. The purpose of this study was to examine the factors that impede or facilitate the adoption of EMR by physicians in practice. A qualitative, descriptive research design was used to execute the study. Survey responses from private practitioners were used to test several parameters. The survey included sections assessing the perceived value of using EMR, the practice demographics, and the barriers to the adoption and use of EMR. Responses were collected and analyzed. The response rate for the survey was 59.2%. Overall, 14.1% of respondents used EMR in their practice. Both, the users as well as non-users of EMR, reported the same EMR features to be beneficial in their practices. The likelihood of implementing EMR system varied with the practice size. Smaller practice size was less likely to consider using an EMR. According to the survey, high implementation cost of EMR was the major impeding factor. On the other hand, the facility of anytime-anywhere access to clinical data and an improvement in organization's productivity were perceived to be the facilitators for implementation of EMR. The knowledge created through this study could potentially benefit future researchers by providing information on physicians' perceptions of technology adoption. This study aids implementers and senior managers in encouraging physicians to adopt EMR system.

**Keywords:** Adoption, Barrier, Electronic medical record, Facilitator, Perception

### Alignment of health care records to improve clinical care

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Health care records after its delivery consumes time and energy for all as it is imperative for medicolegal as well as accreditation standards but can we align documentation paper or Electronic Medical Records (EMR) on software to reduce duplication and to reduce time it takes to record it all? To begin a thought rolling to align documents of health care records in the minds of regulators, accreditors as well as those who deliver it and have to record it as is the need. Can we balance the need and still reduce number of columns rows and paper itself of all needed documents? Can we assign administrators or transcribers-non health care delivery agents to record some of them to give more time to nurses and house officers to give more time to actual care delivery? Many documents can be aligned to avoid duplication of recording the same service given. Example-record of blood transfusion or chemotherapy drugs-case paper mentions-"See the document X for Y service given." Date, time began-to and over-from consent to final ok or reaction or event related to it with clinical pre and post event records at one place. Many such ways can be found out by us all and presented to deciders, accreditors like National Accreditation Board for Hospitals and Healthcare Providers (NABH) to preserve the spirit of the rule or need to document but avoid duplication which consumes time and reduces or may affect careful health care service or safety needs like power of two (where two nurses or doctors need to ok or counter check care, procedure or drug delivery before it is given). Saves cost and time and may

improve quality of care and health care delivery and safety. Observations of a senior surgeon 30 years experience who has is an administrator of a modern cancer hospital.

**Keywords:** Analysis, Alignment, Clinical services, Documents, Medico-legal

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### **Telemedicine – boon for preventive healthcare- A case study**

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This case study was conducted by concept integrations Pune for Pune Municipal Corporation for a period of one month with the objective of understanding the utilization of telemedicine primarily for senior citizens through free health checkups with the help of internet and EDS (ECG diagnostic system) software. The intention with which this initiative was taken was to provide best possible healthcare facility to the senior citizens who cannot go to the specialists for diagnosis and treatment. EDS software was used as a connecting tool between patients and doctors which used to collect all the data, process it and sent to the consultant who can access the patient's data using same software. 14 schools were made as centres for health checkup and following investigations were done by technicians- blood tests, urine routine, blood pressure, ECG, general examination by doctor. Examination for breast cancer, examination for arthritis and joint pains was also done. The primary data was collected and all the reports of examinations were sent to concerned consultant doctors residing at various places through internet using health record software EDS. 10236 participated, males-3786 and females-6450, cardiac-10%-cardiac irregularities, 3 cases of Myocardial Infarction were detected and rushed to nearest hospital. Arthritis-43%-complaints of arthritis. 34%-osteo-arthritis, 70%-pain in both knees due to arthritis, 10%-degenerative and inflammatory arthritis. EDS (ECG diagnostic system) is a telemedicine based equipment and software to instantly diagnose the ECG rhythm and provide screening results. These primary results are then sent to consulting doctors over telemedicine platform for opinion and further analysis. Using telemedicine, senior citizens across Pune are benefitted and leading a quality life without going to hospital. From 2013-2016 many camps were conducted and treatment was given. Similar facilities can be provided in the rural areas to give healthcare facilities. This type of study for senior citizen's health checkup was done for the first time.

**Keywords:** EDS software, Healthcare, Health checkup, Internet, Telemedicine

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### **Internet of healthcare things: A review**

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In the last decade, there has been a technological revolution from wired to wireless devices. This transition has given rise to Internet of Things (IoT) - the network of connected "smart" devices. These devices with the help of sensors, talk to each other using internet. They allow monitoring and controlling of things in the physical world electronically. Health care has been subjected to similar advancement, with wireless medical devices and wearable sensors coming into use. The integration of IoT into healthcare has led to a transformation in the delivery of healthcare solutions. The way medical devices and people interact and connect has changed and this has led to the empowerment of patients and providers. The aim of this review is to investigate the Internet of Medical Things

(IoMT) and identify new opportunities offered by connected healthcare. A comprehensive search on the Internet of Healthcare Things (IoHT) and IoMT was performed. Secondary sources of research, including synthesis of workshops and discussions within a special interest group on IoT in healthcare, were used for review. The interconnectivity of medical devices and wearables greatly impact the delivery of patient care. IoT-enabled medical devices help in effective monitoring of patients and also allow for the use of data generated by these devices, for better decision-making. Effective use of IoT in healthcare can help reduce the cost of care and improve patient experience; however, security and privacy issues form the most important challenges in IoHT. There is a need for more inter-disciplinary research on IoHT because only few comprehensive studies emphasize on applications of IoT in healthcare. This review summarizes the discussions and literature from a healthcare perspective, so as to enable a thorough overview of emerging developments.

**Keywords:** Connected healthcare, Home healthcare, Internet of healthcare things, Internet of medical things

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### **A study to assess the level of internet addiction and its relation with psychosocial problems among undergraduate students of selected colleges in Pune**

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Internet addiction (IA) has an effect on many aspects of a person's life, including academic/work performance, relationships and physical and mental health. Evidence of IA has been suggested by the findings that some internet users spend increasingly longer periods of time online and experience withdrawal symptoms when offline. Those preoccupied with Internet-related activities may neglect exercise, family and social activities. IA is a common problem among students. Objectives of this study are to assess the level of internet addiction among students and determine the psychosocial problems among undergraduates with internet addiction. A descriptive research design was used. This study was conducted with 60 samples by using simple random sampling technique. Self-structured questionnaire was administered. The reliability was calculated by Cronbach's alpha ( $r=0.74$ ) which is found reliable. The results indicate that the 40% of the students were from age group 18-19 years. 86% of the students were from nuclear family. 62% of the students have used their mobile phones for internet use. 23.33% of the students have mild internet addiction, 16.67% have moderate internet addiction and 15.00% of the students demonstrate severe internet addiction and 45.00% of the students demonstrate normal internet use pattern. The p-values corresponding to the demographic variables of the undergraduates was less than 0.05 stating an association between the levels of internet addiction with the associated variables. The researcher has also found out the positive correlation between the level of internet addiction and the physical, psychological and social disturbances. Youth is the main pillar of nation, they have to be protected and treated before their psychosocial state becomes worsen. Internet addiction (IA) is a relatively new field of academic inquiry as many of the college students are identified with psychosocial problems due to internet addiction.

**Keywords:** Addiction, Internet, Problems, Psychosocial

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### **Addiction to social networking sites / apps in medical students in a rural medical college**

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The number of active internet users worldwide has reached 2.5 billion. There exist similarities between internet addiction and those with other forms of addiction. It was summarized as a condition involving excessive mental



preoccupation with the internet associated with repetitive thoughts of controlling its use and a subsequent failure to prevent access to the internet. For healthcare students who aim to develop into caring professionals, the implications of this addiction can have detrimental consequences. In the face of these concerns, this study aimed to measure rates of Social Networking Sites (SNS) addiction among a group of health sciences students at rural medical college in western India. Furthermore, this study aimed to distinguish between three main SNSs (WhatsApp, Facebook, and YouTube) rather than measuring general SNS addiction as a monolith. The Purpose is to estimate the prevalence of addiction of 3 common SNSs by Bergen Social Media Addiction Scale (BSMAF). To estimate and differentiate work-related and recreational usage of these SNSs. The 6 item BSMAF was used to estimate the addiction to SNSs on 2 criterion i.e. Lemmens et al and Andreassen et al. Permission for reproduction of the tool was obtained by the original author of the scale. An online version of the questionnaire was circulated in healthcare students and 2 reminders were sent to fill the online forms. Data was analyzed by SPSS V. 23 IBM corp. Descriptive and Chi square test were applied to study the addiction prevalence among the population. 32.45, 19.87 and 21.19% population was addicted to WhatsApp, Facebook and YouTube according to Lemmen's criteria and 10.60, 7.95 and 11.26 % were positive by the use of Andreassen's criteria. Results from the current study indicated a wide range of usage across the three selected SNSs, with all students using the three major SNSs. This result advises us against grouping all SNSs together; given the wide range of usage and purposes served by these SNSs. Generalisations about work-related SNS usage were difficult as the proportion of work related usage of the applications varied widely with the usage of WhatsApp in this field being different from that of the other two applications. The research identifies the present levels of addiction not 3 common SNSs. It highlights the importance of identifying addiction on an app specific level and also the fact that work-related addiction should be taken into consideration while determining addictions. The condition is associated with other co-morbidities such as anxiety and depression and hence may have a direct effect on the healthcare delivery of the future. Generalizations of the findings could be limited because of the rural background of the area of conduct of the study. The paper identifying both the addiction to common social media sites as well as differentiates it between various sites and intent of use in a semi-urban background. It highlights the need for not clubbing addiction to internet as a monolith but to consider the site and purpose in doing so. The findings would interest students, academicians and planners for planning screening and control measures in future.

**Keywords:** Addiction, Apps, BSMAS, Internet, Social media

## **Determining technology trends and forecasts in sugar industry towards sustainable health-care services**

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Sugar industry has often been facing techno- economic constraints. Therefore there has been changing trends in technology adoption in the Sugar factory. Several studies have reported that technology has not only made the work easy but has also played a great role in sustainability. Technology has also made its place in providing a sustainable healthcare service. The purpose of the research is to determine the trends of technologies used and their influence on sustainable health care services in Sugar Industry. The paper also explores the role of each changing technology used in improving health care services. The trends of technologies used from the year 2000 to 2015 have also been discussed in the paper and the changing trends have forecasted a better healthcare. The study has been conducted in the sugar belt of India and is based upon both primary as well as secondary data. The primary data has been collected from 100 sugar factories based on a structured questionnaire reflecting the technology trends and their role towards sustainable healthcare services respectively. Interviews have also been conducted from several sugar factory managers. The quantitative data have been analyzed through Statistical Product and Service Solutions software. The research findings include the changing trends of technologies used in several factories. These trends have reflected upon sustainable health care services in and outside the factory. The authors have forecasted the use of different technology in the sugar factory. The study has interlinked the technology practices with a

sustainable health care service. The research is limited to the sugar factory belt of the country and can be further implied to other agro based industries. The research contributes to the existing knowledge of health care services through technology in sugar factory.

**Keywords:** Factory, Healthcare, Sugar industry, Sustainable, Technology

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### **The perception of provider and recipient on electronic prescription: A systematic review**

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A landmark study, 'To err is human', undertaken by the U.S. Institute of Medicine announced that prescribing errors are the eight most frequent cause of death in United States ahead of car accidents and AIDS. To improve the quality and safety of prescription, e-prescription has been implemented in many countries. However, it is required to look into the perception of two important stakeholders, the provider (physician) and the recipient (patient), towards the uptake of the technology. The purpose of the study is to study the perception of provider and recipient on the enablers and disablers for the uptake, implementation and sustainability of e-prescription. For this systematic review, a literature search was conducted using observational study databases for exploring the perception of provider and recipient towards the uptake, implementation and sustainability of e-prescription. Grey literature searches were conducted using Eldis, Open Grey. The keywords used in combinations were perception, perspective, electronic prescription, physician, and patient. The search strategy was specific to each database during period from 2011 to 2016. About 27 articles met the inclusion criteria. While many studies focus on the perception of providers, few articles looked at the perceived benefits and risks from the patient view-point. Further there is a huge body of research conducted on the implementation of this technology in United States and United Kingdom. Limited work is done from the Indian context. While there are benefits to be accrued from e-prescription such as reduced medication errors there are also associated risks such as system interoperability, resistance to change etc. Implementation of e-prescription in India may have the initial burden of start-up cost. However, there are benefits to be reaped by way of patient convenience and reduced medication errors. A systematic review in Indian context may be fruitful to plan strategy towards digitization of prescription.

**Keywords:** Attitude, Electronic prescription, Patient, Perception, Physician

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### **Effects of simulation-based cardiopulmonary resuscitation education on attitudes, self-efficacy, and satisfaction among the elderly in rural South Korea**

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When the elderly mainly living in rural areas suffer cardiac arrest, the first respondents are likely to be elderly as well; yet, cardiopulmonary resuscitation (CPR) education provided to this population is currently inadequately managed in South Korea. The purpose of this study was to compare the effects of class-based and simulation-based CPR education for the Korean rural elderly on their attitudes toward CPR, self-efficacy, and satisfaction. This study was a quasi-experimental design with a nonequivalent control group, pretest-posttest method with a sample of 46 elderly aged 60 or older. Twenty-three in the control group received class-based CPR education while the experimental

group underwent both class-based and simulation-based CPR education. Both groups were given surveys to complete before and after the education. Statistical analysis was based on the X<sup>2</sup>-test, Fisher's exact test, t-test, and Analysis of covariance (ANOVA), at a 5% significance level. The study found no significant differences between the two groups in terms of attitudes. However, statistical differences were found in CPR self-efficacy before and after the education program in both groups (experimental group T=-4.88, p=<0.001; control group T=-2.32, p=0.30). There was also a statistical difference in satisfaction regarding CPR between the two groups, as the level of significance of the p-value was lower than 0.05 (p=0.24) in a difference test between both the groups after controlling for factors that were not homogeneous. This study provides the baseline data indicating that education methods implemented in this study were effective for the elderly living in rural areas. The role of elderly people as first responders in the event of someone suffering cardiac arrest is extremely important. Thus, it is warranted to make efforts to ensure that the elderly are able to manage emergency situations by boosting CPR self-efficacy through simulation-based education.

**Keywords:** Attitude, Cardiopulmonary resuscitation, Satisfaction, Self-efficacy, Simulation-based education

### ~~~~~ Telemedicine-based Community Screening of Cervical Cancer

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**Introduction:** Every year an estimated 122,844 women in India are newly diagnosed with Cervical Cancer (CC), the 2nd most frequent cancer in India<sup>1</sup>. CC can be prevented through screening, the rationale being detection of the disease at pre-cancer stage where it can be treated with simple methods and cured.

Visual Inspection with acetic acid (VIA) is a simple, inexpensive and practical test for a community based programme, but suffers from subjectivity as it is usually performed by minimally trained paramedics.

**Purpose:** To make quality assured CC screening test accessible to the community through a mobile technology intervention

**Approach:** A team of trained health personnel reach out to women in the community and impart awareness. Consent and relevant information are collected from eligible women and VIA is performed by well-trained nurses in mobile screening camps. To improve performance of VIA, digital images of cervix are captured using a portable colposcope, and synced to a cloud system. The images and information are then accessed and evaluated by the gynecologist at the central clinic. Women with screened abnormal results are requested to come to the clinic for further investigations.

### Results & discussion:

| March – November 2016                                  |              |
|--------------------------------------------------------|--------------|
| <b>No. of camps</b>                                    | 105          |
| <b>No. of women screened</b>                           | 2294         |
| <b>No. of women screened first time ever</b>           | 1979 (87.2%) |
| <b>Screened positive/ recall rate</b>                  | 275 (11.54%) |
| <b>No. of women diagnosed with cervical infections</b> | 787 (35.2%)  |

The quality of VIA, usually interpreted by a paramedic, was improved as every single case was interpreted by a gynecologist, who would otherwise not be accessible in mobile camps.

**Research implications:** Telemedicine-based community screening, in resource-constraint settings like in India-

where for a billion population doctors are only in thousands<sup>4</sup>, provides advantages of

- quality assured screening
- at large scale

**Novelty:** The telemedicine-based CC community screening program and image based cloud system reporting, to our knowledge, is first in the state of Maharashtra.

**Keywords:** Cervical Cancer, Screening, Digital VIA, Telemedicine

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## Cloud Enabled Standard Electronic Health Record Architecture for Indian Healthcare Sector

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**Abstract** - The current health care system in India has three-tier structure for delivering health care services to different strata of society. Individual patient health information is scattered across many levels of the health care system in which consistent data availability during point of care is very much essential to health care system. Currently, many health care sectors use hospital centric approach to maintain and manage hospital information in which patient health information cannot be shared with other hospital during point of care. In this work, a cloud enabled standard Electronic Health Record (EHR) architecture is proposed which uses patient centric approach in which distributed patient health records are made available in an integrated and unified manner at the point of care. Health data recording and reporting is done using standard coding such as SNOMED-CT, LOINC, DICOM and HL7. Two sources of records are used for obtaining the statistics. Statistics obtained directly from the original medical records or patient health records are the primary sources. The secondary source is a disease index containing diagnostic data obtained from the standards. Also physician can use Watson integrated with EHR module to link the prevailing symptoms of the patient with that of emerging medication and treatment in the standard database. This acts as a decision support system for the doctors to take more informed and accurate decisions.

**Keyword:** Electronic Health Records, Healthcare IT, Health Standards, Watson

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## Characterizing the structural connectome of the human brain in Parkinson's disease

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**Background:** In Parkinson's disease (PD), diffusion MRI (DMRI) has emerged as a valuable tool as it demonstrated deficits in anisotropy and increased diffusivity in the sub-thalamic structures in substantia nigra [1]. Analysis techniques which perform voxel-wise or region-wise analyses in DMRI excludes the global network organization. Advances in fiber tracking can be employed in a complex brain network to compute the structural connectome (SC) to identify global as well as local network alterations via network topology markers.

**Methods:** 18 controls and 14 patients that fulfilled the standard criteria for PD diagnosis were scanned on a 3T-MRI scanner at NIMHANS Bangalore. A surface based non-linear registration was performed on each of the T1 images using Freesurfer [2] after parcellating into 95 region of interest (ROI). These anatomical parcellations serve as nodes of the connectomic graph and were transferred to the DMRI space using an affine transform. Probabilistic fiber tracking [3] on the DMRI was performed by seeding on ROIs for computing the number of fibers. Tractography

was performed to get a symmetric matrix of 95\*95 with zero diagonal for each subject. Topological measures were computed and compared between the groups.

**Results:** PD patients demonstrated significant nodal deficits in the left and right hippocampus and left accumbens area (p-value < 0.03). Frontal nodes that include left and right superior-frontal region and left caudal-middle-frontal region and temporal regions such as right fusiform, right transverse-temporal and right entorhinal gyri demonstrated significantly lower centrality measures (p-value < 0.03) in PD indicating poorer influence of these nodes in the entire network as compared to controls.

**Conclusion:** Lower neural connectivity in the basal ganglia is the hallmark of PD. Our core finding suggests lower neural connectivity and lower nodal influence of the hippocampus in PD. Significant deficits were also observed in the frontal and temporal regions that could potentially mark the non-motor symptoms indicated in PD.

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## Study of the initial steps for Internet De-addiction in India

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**Introduction:** Till recently the word addiction was mainly used with relation to consumption of liquor, drug, or substance. However, addictive behaviour may not be confined to physical intake. Today, Compulsive Internet Usage (CIU) has been described as a psychological problem in several countries and Indians are slowly getting into this menace. The persons suffering from Internet addiction indulge in virtual world to connect with real or imaginary people through the Internet, as a substitution for real-life human connection, which they are unable to achieve normally. Children, some as young as ten-year-old, have been identified as Internet addicts. Internet addiction disorder may be associated with abnormal white matter structure in the brain and may be as fatal as craving for drugs. Persons who are affected by this strange disorder spend large amount of time on the Internet, without any definitive aim.

**Current Scenario:** Around 40% of the world population has an internet connection today. 53 per cent of Indians are connected to the internet every waking hour which is higher than the global average of 51 per cent. Too much connectivity in youngsters is leading to severe depression, isolation and aggressive behaviour. Also too much of exposure to other peoples' lives via Facebook, Twitter etc. is making them dissatisfied with their own lives.

**Need:** Internet addiction is now formally recognized as a disease hence centres that deal with these issues are the need of the hour. There are several de-addiction centres in UK, US and other developed countries. In the Indian scenario it is fairly a new concept of having Internet De-addiction centres.

**Objective:** The study aims at understanding the need of Internet De-addiction centres in India by studying the Internet de addiction centres Services for Healthy Use of Technology (SHUT) clinic in Bengaluru, the first Internet Addiction centres in India, started by the National Institute of Mental Health and Neuro Sciences (NIMHANS) to curb Internet addiction in India.

**Keywords:** Internet De-addiction, Compulsive Internet Usage, Mental Health, Neuro Sciences

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## **Innovative Smartphone App for Improving Adherence to Medications in Patients with HIV/AIDS**

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**Introduction:** India has registered third largest number of people with HIV and AIDS. The introduction of free anti-HIV medications also known as antiretroviral therapy (ART), in National AIDS Control Program has achieved significant reduction in mortality. However, poor adherence to the ART is a major challenge. Suboptimal adherence contributes to treatment failure, development of antiretroviral resistance and switch to costly second-line regimen.

Also on the other hand, with improved affordability and connectivity, mobile phone based health care intervention can reach geographically remote and culturally diverse group of population. Prior studies on text message (SMS) based reminders for timely consumption of medications in HIV infected patients were forthcoming but SMS based interventions have a content barrier and are controlled by health care provider. Therefore, there is need for better patient controlled adherence promoting tool in India.

**Purpose:** The primary objective of this study is to develop user friendly ART medications reminder App for the people living with HIV/AIDS. Additionally, inclusion of health education dimension in such App would be helpful in creating awareness about disease.

**Methodology:** Patients and HIV/AIDS treating physicians were interviewed to ascertain their expectations from an app to promote adherence to ART. Android platform based smart phone app was developed based on treatment recommendations of National AIDS Control Organization.

**Results:** This novel smartphone App is named "SATHI", which is an acronym for Self-care App for Treating HIV Infection". The App permits user to set reminders for timely consumption of antiretroviral medications and generates missed pill reports. The awareness tool empowers user about the disease knowledge, diagnostic and treatment facilities available for HIV/AIDS.

**Research implications:** This freely available novel smartphone App can serve as important digital health initiative to reach remotely located HIV infected population and supplement ART management workforce.

**Keywords:** Adherence, antiretroviral therapy, health care App, HIV/AIDS.

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## **Mobile Text Messages- A Silent Revolution for A Sound Antenatal Care**

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**Background:** As a basic human right, every woman has the right to life, health, reproductive autonomy and equality

and non-discrimination. Maternal health indicator reflects how well this right has been ensured for the women living in a nation. India is one of the developing nations which face a high maternal mortality rate. To address to the diversified and scattered populace of the country, India needs connectivity for transforming the delivery of healthcare services. Given the consideration of cost, ease of use, asynchronous delivery, text messages are the most preferred m Health solution across the globe.

**Purpose:** The objective of the study was to test the effectiveness of text messages in generating awareness on antenatal care and essential behaviour change among the pregnant women

**Methods:** An experimental study was conducted among the pregnant women visiting the Primary Health Centers in and around Coimbatore, Tamil Nadu, India. A pre-test was conducted among the pregnant women and an intervention of text messages was sent to their mobile phone numbers for a period of one month. After the invention, a post test was conducted again to test the increase in their level of awareness on antenatal care. The results were analysed using a paired sample 't' test using SPSS.

**Results:** A substantial increase in the level of awareness on antenatal care was found among the respondents.

**Conclusion:** It can be found that the widespread penetration of mobile phones among the rural and marginalized people can be used for connecting them to the healthcare system. This will ensure availability and equality in the delivery of quality health care to the underprivileged people who are deprived of this right for various reasons including social, economic, geographical and political.

**Novelty:** The results will enable the policy makers and the providers who can use such novel systems for the delivery of healthcare for all health problems.

**Key words:** Antenatal care, maternal mortality, mobile phones, pregnant women, text messages.

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## Impact of A Voice Messaging Service on knowledge and Health-Seeking Behaviour of Pregnant and Lactating Women

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2 Lakshmi Kota is the Head of Research, ARMMAN

3 Aparna Hedge is the founder of ARMMAN

**Introduction:** The mMitra programme, launched in September 2014 by ARMMAN, an Indian NGO, aimed to reduce maternal and infant mortality and morbidity in the urban slums of Mumbai, through a free mobile voice messaging service providing culturally appropriate, comprehensive information on preventive care and available interventions for pregnant and lactating women. The voice messages, in the local languages, specific to the woman's gestational age, or age of the infant, were sent to participants' mobile phones, once or twice a week, on a schedule based on the gestational age, or age of the infant.

**Objective:** This study aimed to compare the impact of mMitra on the knowledge and health-seeking behaviour of existing subscribers with those of eligible women intending to subscribe to mMitra ('aspiring subscribers').

**Research Design:** A cross-sectional survey was conducted among 761 randomly selected pregnant women (368 who had been subscribers for > 2months, and 393 aspiring subscribers). Chi-square and logistic regression were used to determine associations in the data.

**Results:** Knowledge related to pregnancy and child care (e.g., frequency of visits to the doctor, supplements to be taken during pregnancy, initiation of breast feeding, harms of pre-lacteal feeding) was found to be higher among existing subscribers than among aspiring subscribers. Existing subscribers did better than aspiring subscribers on some practice indicators (e.g., visits to the doctor, taking supplements). The differences between the two groups narrowed, particularly among multiparous women, on certain other practices (e.g. initiation of breastfeeding, duration of exclusive breastfeeding).

**Conclusion:** Voice messages are effective in improving subscribers' knowledge and health-seeking behaviour, particularly among prim gravidae. Accessing health care information during pregnancy via mobile phones is novel in India. This model shows promise for scaling up, to reach urban poor women across India, and to encourage early enrolment for maximum benefit.

**Key words:** mMitra; antenatal care; infant care; urban poor women; m-health; health-seeking behaviour.

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## **Predictive Analysis of Increased Adherence Level and Improved Health Conditions of Patients through Mobility and Web-based IT solutions**

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**Introduction:** Leveraging technology is of paramount importance in case of industries like healthcare wherein tiny care coordination can make huge difference reviving lives of millions. Healthcare industry needs transformation from legacy systems into next generation technology space leaving behind age old traditional ways of healthcare proceedings having inconveniences like triage, long wait time, queue, travel expenses, etc. Existing healthcare trends lead the patients to go for over-the-counter drugs rather than prescription medicine leading to side effects and in some cases even take the life of the patient. The above mentioned pain points can be resolved by using technology based healthcare solutions. This being a relatively upcoming field, there is a dearth of literature especially from consumer/patient perspective.

**Purpose:** Regular adherence to medication can help improve the health conditions of a patient, enhance patient engagement and superior care coordination. Hence this paper tries to analyse the factors affecting the medication and consultation adherence level of the patient using or who may wish to use new age mobility and web-based technology solutions.

**Research Methodology:** Primary research survey was conducted on 158 patients with chronic ailments as well as non-patients who are willing to adopt technology. Data was analysed using SPSS and statistical methods like Factor analysis and Multiple regression analysis.

**Findings:** The study proposes a significant model with good predictive power for future use of healthcare service providers. It predicts the value of the dependent variable i.e. adherence level on the independent variables of time, cost, convenience and regularity which contribute to encourage the patients to embrace new age technology transformation.

**Research implications:** This study will help healthcare service providers to provide better solutions for improved healthcare. This technology transformation will benefit millions of patients who do not have access to healthcare by providing healthcare service on time and at affordable cost.

**Keywords:** Healthcare-IT, M-health, Mobility-solutions, Web-based-IT solutions, Predictive analysis.

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## **Diagnosis of Vascular Cognitive Impairment using EEG**

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Dementia or Major Neurocognitive disorder is the second most burdensome chronic condition in which 11.9 percent live with disability and 1.1 percent lost their lives, and their numbers will be doubling every 20 years to 65.7 million by

2030, and 115.4 million by 2050 (World Alzheimer Report 2009). Dementia due to vascular diseases is the second most common cause of dementia after Alzheimer's disease and 28 to 36 million people worldwide with dementia are undiagnosed (World Alzheimer Report 2011). Vascular Dementia is characterized by different aspects of impaired consciousness and such an impairment is indexed by declined performances at controlled cognitive tasks. It is related to reduced brain metabolic activity in a network of frontal, posterior associative, and limbic regions due to the occurrence of multiple mini/major strokes or other conditions that affect blood vessels and nerve fibres deep inside the brain. Diagnosis of Vascular dementia in its early stages is a very complex task as it requires screening, Neuro-cognitive testing and brain imaging evidence usually CT Scan or MRI. Sometimes cause of mild impairment cannot be diagnosed by brain Imaging. EEG based diagnostic approaches are promising tool in case of differentiating various types of dementia. Portable EEG with its high temporal resolution property is an economical solution for the many undiagnosed people with dementia in the low and middle income countries. This paper reviews EEG analysis approaches to diagnose vascular mild impairment and dementia as a future diagnostic tool in the healthcare sector.



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## *Track VI: Healthcare: International Relations*

### **Healthcare diplomacy: The path ahead for India?**

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Joseph S. Nye, Jr, coined the term 'Soft power'. According to him, soft power is the “ability to achieve desired outcomes in international affairs through attraction rather than coercion”. Traditionally, cultural and literary exchanges through various festivals, sports – especially like cricket and table-tennis and grants for higher education, have been used as tools of soft power. However, over the past decade, medicine as a tool or ‘currency’ for diplomacy has become a game-changer in International Relations. USA, China and Cuba have already successfully implemented healthcare or medical diplomacy as an integral part of their foreign policy. UK is also looking at using their well-established National Health Service (NHS) as the way forward. India however, is yet to explore the area of healthcare diplomacy. While health tourism is a watchword for India at this point in time, and India has sent medical teams as part of Humanitarian Aid to different parts of the world, we are yet to formalize a strategy or policy on healthcare diplomacy. This paper will explore whether India can use “medicine as a currency for peace” in the present international order. The researcher will review secondary sources which include journals like Yale Law and Policy Review, World Affairs, Indian Journal of Asian Affairs, The Milbank Quarterly as well as other online sites and sources to look at the scope of healthcare diplomacy for India. There is hardly any academic writing on healthcare diplomacy and India. The paper will therefore contribute towards partially filling this void or gap in knowledge. It will also explore how this can be incorporated as a strategy to aid India in using healthcare as an instrument of soft power.

**Keywords :** Healthcare diplomacy, India, Medical diplomacy, Soft power

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### **Perception of healthcare education ecosystem among international students pursuing medical technology specialization in Western India**

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The Medical technology specialization is an evolving healthcare discipline in India. There are few academic institutions imparting medical technology education to both the Indian and the international students. Limited published data is available regarding the perception of the quality of Medical Technology education by the international student community. The purpose of this study is to investigate the perceptions of International students about the healthcare education ecosystem in the specialized field of Medical Technology in an educational institute in Western India using the Dundee Ready Educational Environment Measure (DREEM) survey method. A total of 58 students pursuing the 3-year graduate programme in medical technology were administered the DREEM questionnaire of which 29 International students and equal number of their Indian counterparts referred to as buddies participated in the study. Data was analyzed by SPSS version 23.0 software. The mean (95% confidence interval) for overall DREEM score for international students pursuing medical technology specialization was 158.75



and for Indian students was 168.06; which showed an excellent educational environment for both the International students as well as their Indian buddies. The DREEM Score, a universal tool for assessment of education environment at institutes imparting healthcare education depicts the level of excellence in conducting education programs and providing an optimum learning environment by academic institutes. This study encourages international students to have linkages in the Indian healthcare education system making India a preferred destination of choice for healthcare education. DREEM survey method for assessing healthcare education environment in medical technology specialization on international student community is a novel approach to study the quality of education environment.

**Keywords:** Education, Healthcare, International, Medical technology, Perception

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### **Towards next generation of live attenuated viral vaccines**

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This mini-review aims to focus on the changing trend in the industry towards the type of cell substrates being used for viral vaccine production. Most of the commercial live attenuated viral vaccines were developed in the mid twentieth century, when primary cultures were traditionally being used for routine production of vaccines. Vaccine strain development process then essentially involved multiple passages on various primary cultures derived from different tissues. However, today in the twenty first century, the trend has seen a complete reversal. Established cell lines are being preferred over the primary cultures. Over the years, vaccine industry has learned the limitations of primary cultures as cell substrate. The industry and regulatory agencies have also understood the unique benefits offered by the established cell lines as substrates for vaccine production. Measles and rubella vaccines are being produced on the diploid Medical Research Council (MRC)-5 cell strain. Production technologies for rotavirus and dengue virus vaccine are being established on Vero cells, an already approved cell line by regulatory agencies. Rabies vaccine production has seen a journey from usage of sheep brain, through human diploid cells to continuous cell lines as cell substrates. Majority of commercially produced mumps vaccines are still dependant on primary culture of chicken embryo cells, derived from specific pathogen free eggs. Recently, mumps RS-12 strain has been reported to be established on human diploid MRC-5 cells. Other mumps vaccine strains such as Leningrad-Zagreb, also needs to be explored on the diploid or continuous cell lines to derive the benefits. In conclusion, additional research efforts are needed towards adapting the vaccine viruses on established cell lines to produce next generation of live attenuated viral vaccines, which are anticipated to be at least equivalent in characteristics but more cost-effective, thus beneficial to the society.

**Keywords:** Continuous cell lines, Diploid cell lines, Next generation viral vaccines, Primary cultures

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### **Access to patented essential medicines in the World Trade Organization (WTO) - plus regime: A critical appraisal**

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The ongoing furore over the access to and affordability of patented essential medicines is one of the several multitudinous instances of intrusive impact of International Trade Law (ITL) on national economies and through them on the lives of the ordinary people. Despite the right to health being recognized as an indispensable human

right, and the right of access to essential medicines an inseparable facet thereof, the latter has palpably deteriorated in the post-WTO, Trade-Related Aspects of Intellectual Property Rights (TRIPS) era. Although the debate on pharmaceutical patenting, and the contestation of the ascendancy of the commodity or market-oriented view of pharmaceutical patent protection, is an old one, the advent of the mega regional Free Trade Agreements (FTAs) like Trans-Pacific Partnership (TPP), Transatlantic Trade and Investment Partnership (TTIP) and Regional Comprehensive Economic Partnership (RCEP) have undeniably added new content and impetus to the debate. Therefore, it is the clarion call of the hour to critically evaluate those agreements to decipher their promises and prospects for the impoverished people's right of access to life-saving drugs. In the context of the prescribed adherence to the eponymous TRIPS agreement, the argument that international law has been used and is continued to be used to exploit, marginalize and dispossess the impoverished, leading to the creation of a transnational oppressed class, has resurfaced. Therefore, the sufficiency and efficiency of the framework for access to medicines in the rules the TRIPS agreement and in the WTO-plus regime of the FTAs, and the sophistry of TRIPS-compliant flexibilities, shall be appraised in this paper. The theme of research would be glimpsed through need-based prism of ordinary citizens which transcends geographical criterion and borders on class dimension. Abiding primarily by a doctrinal mode of research, perusing relevant primary and secondary sources of literature from the print and web resources, the existing legal and philosophical framework on pharmaceutical patents and human rights shall be deciphered. A semantic component and pragmatic intonation shall be imbued whilst culling out meticulously the inadequacies in the TRIPS agreement and in the TRIPS plus regime. A perusal of the historical evolution of the legal norms and policies on access to patented medicines reflect a tilt towards catering to the interest of the transnational pharmaceutical corporations, to the detriment of the impoverished. Engendered in this globalizing era marked by attempts at neo-colonization, the FTAs' tilt towards strengthening the already dominant voice of the transnational capitalist class is ubiquitous. The paper proposes to unveil the true nature of the rules which, under the guise of promise to protect the right of access to life-saving drugs, curtail such entitlement; thereby generating awareness amongst the stakeholders and the victims. Since the mega regionals are of new import in the arena of International Trade Law, a comprehensive and critical analysis of the impact of their provisions on the right of common people to access and afford essential medicines is a topic not much pondered upon, thus imparting novelty to this attempt.

**Keywords:** Access to essential medicines, Impoverished class, Mega regional free trade agreements, Pharmaceutical patenting, WTO TRIPS

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## **Hazardous levels of PM<sub>2.5</sub> (particulate matter less than 2.5 microns in mean aerodynamic diameter) are emitted during burning of individual fire crackers in India**

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**Introduction:** Diwali or the festival of lights is the most popular festival celebrated in India, when fire crackers are burnt in almost every household for 3 days. Levels of ambient air pollution are reported to be very high during the Diwali festival. In this study, we aimed to measure personal exposure levels to PM<sub>2.5</sub> during the burning of six of the most commonly used fire cracker types in India

**Purpose:** The main objective of this study was thus to measure personal exposure levels to PM<sub>2.5</sub> during the burning of six commonly used fire-crackers types in India.

**Methodology:** Sparklers, ground spinners, flower pots, pulpuls, garland of 1000 sounding crackers and snake tablets were burnt outdoors in an open area during the late evening hours. PM<sub>2.5</sub> levels were measured at a distance and height from where they are normally burnt using Thermo PDR 1200, USA.

**Results:** The results showed that the snake tablet produced the highest amount of PM<sub>2.5</sub>, followed by lad of 1000, pulpul, fuljhadi, chakri and anar. Although the snake tablet burnt for only 0.2 minutes (9 seconds), it produced the

highest level of PM2.5 (64,500 mcg/m<sup>3</sup>) and these high levels of PM2.5 lasted for three minutes.

**Research implications:** The findings point to the fact that fireworks contribute significantly to PM2.5 levels which is an intractable air quality concern. This study aims to create awareness amongst individuals regarding the impact of PM2.5 emitted from fireworks on health and ecosystem.

**Originality:** While there are several studies reported from various parts of India on the emissions and accumulation of pollutants, especially PM levels and their temporal variation in ambient air before, during and after the festival of Diwali, no study reported from India has till date looked into real life exposure levels during burning of individual crackers in a real life setting.

**Keywords:** PM2.5, fire-crackers

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## Track VII: Healthcare: Innovation and Entrepreneurship

### Flipped classroom model - to enhance the prescription writing skill

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In healthcare there is a shift of focus from advances in technology to patient safety and there is loss of 29 billion due to health care errors annually. One important error is prescription writing error. Prescription is an important therapeutic transaction. Unfortunately, it is often observed that incomplete and illegal prescriptions are advised to the patients. It makes the prescriber responsible towards the clinical care and carries legal implications. This study is planned to enhance the prescription writing skills of the interns using flipped classroom model. The objective was to assess the prescription writing skill of the graduate students before and after training using the flipped classroom model. Study involved 30 graduate students / interns posted in the department of oral medicine and radiology. After obtaining an informed consent the graduate students were included in the study. On the first day of the posting a pre test Objective Structured Clinical Examination (OSCE) on prescription writing skill for an oral disease / condition was conducted. The case scenario was displayed on the computer screen, for which the graduate students had to write the prescription, which was evaluated using a checklist consisting of items which are valid to complete the prescription writing skill. On the same day the graduate students were then provided with the reading material regarding periapical, pericoronal abscess and prescription writing format based on the Goodman and Gilman's Principles of prescription order writing and patient compliance instructions. After seven days of their posting, a discussion was conducted by the faculty. Faulty prescriptions for oral conditions were prepared, which included superscription / inscription / subscription / transcription errors. These faulty prescriptions were distributed to the graduate students to identify the deficiencies and the graduate students had to rewrite the prescriptions overcoming these deficiencies. Simultaneously the significance of each aspect of prescription was discussed. Following the discussion a post test in the OSCE format was conducted for 15 minutes, the students had to write the prescription for the same case scenarios included in the pretest. Pre test and post test scores of the graduate students were compared using the paired 't' test which revealed statistical significant improvement in the prescription writing skill after training the graduate students using flipped classroom approach with a t value of 19.7 and p value of 0.0001. This educational intervention trained the students in prescription writing skill using the flipped classroom approach. The graduate students prescription writing skill was enhanced from being unorganized to clear and systematic.

**Keywords:** Dental, Flipped classroom, Patient safety, Prescription, Skill

### Measuring the impact of technology trends and forecasts in sugar industry towards sustainable health-care services

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Sustainable health care service is the present need of the time. Despite the efforts carried out by the sugar factories there is still research to be conducted exploring the impact of technologies towards health care. Since long sugar

industry has often been facing techno-economic constraints which have led to unsustainable health care failure. Therefore there has been changing trends in technology adoption in the sugar factory. Today, technology has made its place in providing a sustainable healthcare service. The purpose of the research is to measure technologies used for providing sustainable health care services in and around Sugar Industry. The trends of technologies used from the year 2000 to 2015 have been discussed in the paper and the changing trends have forecasted a better healthcare. The study has been conducted in the sugar belt of India and is based upon both primary as well as secondary data. The primary data has been collected from 200 sugar factories based on a structured questionnaire. Interviews have also been conducted from several sugar factory managers. The quantitative data have been analyzed through Statistical Product and Service Solutions software. The research findings include the changing trends of technologies used in several factories. These trends have reflected upon sustainable health care services in and around the factory. As compared to the past, data shows that sugar factories had been a source of severe pollution which has reduced through application of technologies. The study has interlinked technology with sustainable health care service. The research is limited to the sugar belt of the country and can be further implied to other agro based industries. The research contributes to the sustainable health care services through technology in sugar factory.

**Keywords:** Healthcare, Sugar factory, Sustainable, Technology, Trend

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### **Mind and brain synergy-E=TMC2**

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Almost every human ailment has mental origin. Up to great extent we haven't found any uniformly effective solution for psychosomatic issues yet. Hence, new angle for study of mind, brain and body became necessary. The purpose of the study was: Installation of peace in human mind, drugless cure of psychological issues, help to control psychosomatic illnesses, to have better relationships in family and society, proper and better use of human creativity, energy and time. The link between human memories and emotions was found out. Past traumatic memory conversion and new memory creation technique was invented. Simple technique of past memory label conversion and new memory creation has been invented which solved the purpose of this research. Control of psychological issues, psychosomatic illnesses, physical illnesses, relationship issues, social disharmony, communal disharmony. Increase in human productivity, creativity and positivity. Novelty of the study is formula of reasonable quantification of emotions relating to memory, easy technique for painful past memories label conversion, easy technique for creation of new memories, alternative or supportive therapy to psychotherapy for early stages of psychosomatic illnesses, novel way for increasing human resource productivity.

**Keywords:** Emotion, Human productivity, Psychosomatic illnesses, Relationship, Stress

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### **Animal trials of Carica papaya leaf extracts for increasing platelet count**

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Thrombocytopenia is defined as a platelet count below the 2.5th lower percentile of the normal platelet count distribution. Papaya rich source of nutrient and probable components to increase platelet count add such cases. Studies have shown the potential of Carica papaya leaves extract against dengue, with dramatic rise in platelet count. Man trials for papaya leaf juice had shown remarkable improvement in white blood cells count and platelet



count in Dengue fever. Experiments have proven the anti-plasmodial activity of crude extract especially Carica papaya leaves extract. Carica papaya leaf extract have some phyto-constituents to prevent its destruction and enhance its ability to produce platelet. Some studies have shown that freshly prepared mature leaf concentrate of Carica papaya is orally active, effectively increases rat platelet, WBC and RBC counts with no acute toxicity, and possesses potent anti-inflammatory activity, that overly justify claims of traditional medicine. The potential role of fresh Carica papaya leaves extract on hematological and biochemical parameters and toxicological changes in a murine model. Thrombocytopenia is common in patients who are exposed to dengue, chikungunya, malaria, chemotherapy and irradiation. The major mechanisms for a reduced platelet count are decreased production and increased destruction of platelets. Role of papaya is supposed to increase the count. The proposed research work has main aim to explore Carica Papaya leaf extract for increase in platelet count in induced thrombocytopenic experimental animals and to study hematology and histopathology of various organs for any side-effects. The selected healthy 15 days old leaves papaya plants after washing were dried under sunlight for few weeks and were grinded by using blender to powder. The powder was extracted with n-hexane, acetone, ethanol and methanol using Soxhlet apparatus and distilled water using maceration for 8hours. The extracts were then dried by using rotary evaporator until semi-solid is obtained. Further these extracts were used for animal experiments. Animal studies suggest that papaya leaf extracts have potential therapeutic effect in thrombocytopenia by increasing platelet count without any side-effects. Carica Papaya leaf extracts should be explored for biochemical component(s) responsible for increasing platelet count. Trials of various Carica Papaya leaf extract have not been conducted. These trials will give transparency which solvent works efficiently. This in turn may be beneficial for further studies in the related field.

**Keywords:** Carica papaya, Extracts, Organic solvents, Thrombocytopenia

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## **Resource based view of innovative strategies in sugar industry and their effects towards health care**

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Understanding sources of innovative strategies for sugar industry has become a major area of research in the area of innovation. Building on the assumption that resources are heterogeneously distributed across all the factories, the paper builds a link between resources and innovative strategies. Sugar industry has been a sign of high alert in terms of its presence since past. The innovative strategies have led the researchers to sustain the industry with the available resources. The main purpose of this paper is to discuss the resource based view of innovative strategies in the sugar industry. The effect of innovative strategies on health care issues has been studied. The paper has undergone extensive literature in the beginning of research to build up the model. The model has been constructed on the basis of resource based view theory and innovative strategies. The constructs have been well defined and then linked with the healthcare issues. Well defined structured questionnaire has been prepared to collect the primary data from the respondents. For health care issues the effect of innovative strategies has been studied through employees. For the present study, the resource based theory was studied and then it was linked to the innovative strategies. Resource based theory includes physical capital resources, human capital resources and organizational capital resources. The physical capital resources comprises of physical technology used in a sugar factory, its geographical locations and the availability of raw material. The human capital resources include training and insight of individual managers and workers in a firm. Organizational capital resources include planning, coordinating and controlling of system as well as informal relations among groups within and outside the firm. The four indicators of innovative strategies have been defined in the paper and the model has been tested through confirmatory factor analysis and regression. The model is applied by analyzing the potential of several firm resources for generating innovative strategies in the industry. The article concludes that resources contribute to

innovative strategies. The effect of innovative strategies towards healthcare has also been studied in the paper. For this the four indicators of healthcare has been defined in the paper. The model is a creative piece of work for linking resource based view with the innovative strategies and their effect towards healthcare. The novelty of this research is that the innovative strategies will improve the health conditions in the industry.

**Keywords:** Health care, Innovation strategies, Resource based view

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### **MicroRNAs in determining the subtype specific treatment regimens for breast cancer**

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Micro Ribonucleic Acids (miRNAs) are a class of non-protein coding endogenous small single-stranded RNAs which were originally discovered in *Caenorhabditis elegans*. They are evolutionarily conserved in nature and are also found in eukaryotes including human. Depending upon the level of complementarity between the miRNA and its target mRNA there can be two regulatory mechanisms namely degradation of target messenger RNA or translational inhibition. Various studies have shown that miRNAs serves as molecular signature to classify the subtypes of breast cancer. The intrinsic subtype properties of the primary tumour play a role in determining the treatment regimen for breast cancer. Thus investigating the myriad of miRNA expression would enhance the understanding of the role played by specific miRNAs in breast cancer and those can be used as therapeutic targets for treating breast cancer. The purpose of the study was to determine the role played by particular miRNAs in regulating the molecular mechanism involved in breast cancer metastasis. Meta-analysis of previously published research data has been used to generate a comprehensive list of differently expressed miRNAs in various subtypes of breast cancer. "TargetScan" was used to identify the target genes of different miRNAs in breast cancer. Pathway analysis will be done using "Panther" and "KEGG". Various aberrantly expressed and subtype specific miRNAs in breast cancer metastasis with respect to their target genes were identified viz., let-7c-SUV39H2, miR-10a-HOXA3, etc. Further analysis of the signalling pathways will be carried out to understand the role of identified miRNA in defining breast cancer subtypes. Breast cancer subtype specific novel miRNAs exhibiting a differential expression pattern were identified which can have feasible applications in both basic and clinical research. Various novel miRNA-mRNA targets were identified which can be used as diagnostic markers for classifying breast cancer subtypes.

**Keywords:** Breast cancer, MicroRNA, Subtype, Therapy

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### **Techniques used in the production of androstenedione from phytosterol: A systematic review**

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Androstenedione is a steroid precursor used in the production of drugs for osteoporosis, blood pressure, menopausal complications etc. Production of this compound by synthetic route is well known, however it is not economical and environmental friendly as it produces toxic compounds. Microbial biotransformation on the other hand may serve as a better approach. The rationale of the study is to review the various techniques used for the synthesis of androstenedione from phytosterols which may lead to improvement in its production in terms of quality

and quantity. Techniques to increase the yield of androstenedione will be reviewed and discussed. Additionally the role / function of metabolites that are generated during the production of androstenedione will be elucidated. A comparative note on advantages of microbial biotransformation over synthetic method will be examined. Review of literature highlights the following: Androstenedione is produced chemically by addition of thiol reagents to appropriate dienone intermediates which affects the environment by generation of toxic compounds. Microbial biotransformation of phytosterol to produce androstenedione shows an alternative to synthetic method which is economic and environment friendly. The addition of hydroxypropyl- $\beta$ -cyclodextrin (HP- $\beta$ -CD) in the fermentation media, enhances the androstenedione production. Microorganisms producing 17 $\beta$ -hydroxy steroid dehydrogenase, an enzyme responsible for side chain cleavage of phytosterol, give better yield of androstenedione. Androstenedione is a steroid hormone precursor for various drugs, and hence the aim of the present review is to discuss the various methodologies that could enhance the production of androstenedione on a macroscopic scale. Androstenedione is used in the preparation of various important drugs. A review that discusses in detail the various methodologies in the production of androstenedione has not been done so far. Such an understanding will lead to the development of new improvised techniques for production of androstenedione on a macroscopic scale.

**Keywords:** Androstenedione, Microbial biotransformation, Microorganisms, Phytosterol

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### **Menstrual hygiene in rural India**

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Menstruation, a phenomenon unique to women of reproductive age is the periodic shedding of the uterus lining is a critically important but under-recognized public health issue. Good hygiene, such as use of sanitary pads, adequate washing and cleaning of genital area is essential during menstruation. Studies in three Low and Middle Income Countries (LMICs) i.e. Nagpur district of India, Western Ethiopia, and rural Nepal have reported low level of hygiene practices despite of existing knowledge. This review was done to develop a formative understanding of menstrual hygiene in rural India. A search was done using key words menstruation, rural India, menstrual absorbents, and menstrual hygiene. A total 24 articles were reviewed. Two search engines i.e. Google Scholar and PubMed were used for the search. A study in the district of Maharashtra reveals that 36.95% of adolescent girls in rural area are aware of menstruation prior to menarche and 33.85% follow satisfactory cleaning practices. There exists a gap between knowledge about menstruation and practices. Lack of gender sensitization, multi-sectorial governance, appropriate measures for assessment of hygiene facilities, and lack of extensive consolidation of the activities of Water, Sanitation and Hygiene (WASH) Sector has led to wide gap between knowledge and practices of menstrual hygiene. The gap between rural and urban settings also plays a significant role in menstrual hygiene practices adopted. This review highlights the gaps in research related to menstruation practices. Exploring challenges among women is equally important since issues like availability and accessibility of menstruation absorbents, appropriate disposal practices, knowledge imparting from women to adolescent girls, etc. remains persistent.

**Keywords:** Menstrual absorbents, Menstrual hygiene, Menstrual waste, Rural India

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## **An insight in to hardiness status of medical students**

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The construct of hardiness was first introduced by Kobasa and Maddi in 1979, who defined it as a resistance resource in encounter with stressful situations. Hardiness is related to three mutually related dispositions- commitment, control and challenge. The present study is an attempt to make an insight into hardiness level among medical students and to study the association between hardiness and psychological distress. A cross-sectional study was carried out among medical students of a private medical college in Maharashtra. The participants in the study were medical students enrolled in a private medical college. A validated Hardiness questionnaire was administered. Scores on control, commitment and challenge were calculated and then summed up to calculate total hardiness score. Psychological distress was measured by Self-Reporting Questionnaire (SRQ). There were 331 participants out of which 39 medical undergraduates had hardiness score less than zero indicating that 12% of study subjects were unable to cope up with stressful conditions. There was no statistically significant difference between hardiness and variables like attempts in examination, sports activity, year of MBBS study. However, significant negative association was observed between hardiness level and psychological distress.  $\chi^2=4.618$ ,  $p < 0.05$ . Hardiness status of student population deserves special attention because medical students have to deal with heavy workloads associated with pursuing higher education. Counseling services and hardiness training need to be introduced at admission of Bachelor of Medicine and Surgery (MBBS) and then on yearly basis. Hardiness is a neglected domain of a medical student. Individuals high in hardiness tend to put stressful circumstances into perspective and interpret them in a less perspective manner

**Keywords:** Hardiness, Medical students, Prevalence, Psychological distress

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## **A study of quality consciousness in doctors of a tertiary care teaching hospital**

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Six dimensions of health care quality defined by World Health Organization focuses on patient and facilities like safety, effectiveness, acceptability, accessibility, efficiency and equity. The quality accreditation agency in India NABH defines 10 quality standards, 5 Patient Centric and 5 Organization Centric. Another concept of quality sparingly mentioned in literature is 'Quality Consciousness' and may be categorized as 'Individual Centric'. This concept has never been studied or applied for health care services. Doctors are the team leaders in a Healthcare organization directly responsible for providing patient care and in Teaching Hospitals; the administrative leaders like deans and medical superintendents are Doctors who manage the facilities in the organization. The level of 'Quality Consciousness' of the Doctors directly affects the Quality of Health Care. The purpose of the study was to determine the 'Quality Consciousness' of doctors working in teaching hospital. The data was collected by Primary method, from 50 senior doctors, using a structured questionnaire where response was recorded on a 5 point likert scale. We found a low level of quality consciousness amongst doctors. Detailed analysis showed the areas of least consciousness to be awareness about the standards of quality and low motivation to change individual habits. This study was however confined to one teaching hospital and therefore we do not wish to generalise the specific findings. Further studies are required using this tool in different categories of hospitals and other cadres of health care providers like nurses, technicians and support staff for more conclusive results. This is a novel approach to study Quality in Health Care, as it considers a new paradigm of 'Quality Consciousness'. A simple questionnaire tool to measure 'Quality Consciousness' of individuals has been developed, which can be used and improved by

researchers in future.

**Keywords:** Accreditation, Quality consciousness, Teaching hospital

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## **Performance efficiency of Indian private hospitals using data envelopment analysis**

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In India private hospitals are striving higher to provide world class treatment and care to customers. On the other hand, government hospitals are lagging behind on account of lack of funds and skilled manpower. These findings were highlighted by the “The Week- Nielsen Survey 2016” of the best hospitals in India. It is also observed that private sector hospitals have to do a balancing act in terms of cost reduction and better treatment. In spite of employing number of performance enhancement initiatives, profitability of Indian private hospitals is a major challenge. Thus, there is a need to assess the performance efficiency of hospitals in India. The main purpose of this paper is to study and examine the technical efficiency of hospitals using Data Envelopment Analysis (DEA). Based on the analysis, the best and the laggard hospitals will be identified and suggestions for improvement of the lagging hospitals will be recommended. Data of the hospitals for the study will be collected from Prowess database of Centre for Monitoring Indian Economy. The data will be analyzed using DEA. The findings will focus on the factors differentiating the high performing and laggard hospitals. The discussion will also suggest ways in which the laggard hospitals could improve their performance. The research will be beneficial to hospitals and policymakers to measure current level of hospital performance and work towards improving the same for the benefit of customers. Hospital Performance measurement has been a neglected area in terms of research in India. The paper using a DEA approach will help hospital administrators in devising more efficient methods to ensure better utilization of resources and thereby ensuring enhanced levels of customer satisfaction.

**Keywords:** DEA, Efficiency, Hospitals, India, Performance

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## **Change in completeness of medical records after NABH process in a teaching hospital**

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Comprehensive medical records are a cornerstone in the quality and efficiency of patient care during hospitalization and in subsequent follow-up visits, as they can provide a complete and accurate chronology of treatments, patient results and future plans for care. An incomplete medical record may reflect a poor and incomplete clinical care. It can also be used to support the allegations of negligence and fraud. The purpose of the study was to check the completeness of medical record / in patient department (IPD) files in a teaching hospital in Pune. The study was done at a Bharati Hospital, a teaching hospital attached to a medical college in Pune. Activities pertaining to National Accreditation Board for Hospitals and Healthcare Providers (NABH) accreditation were done in October 2015 which were considered as intervention. A comparative study was done during January to May 2016 on the IPD records of September (pre-intervention) and December 2015 (post-intervention). Sample size was calculated to be 170 in each group. The IPD records of pre and post intervention period were analyzed on the parameters in structured checklist. Data was analyzed statistically by simple proportions using Statistical Package for the Social Sciences (SPSS) v20. In September the completeness of IPD records were found to be 78.74% and a significant



increase in December to 88.15% (p-value <0.01) was noted. Department wise participation was seen maximum of medicine (65/170 i.e. 38.24%) in September and of pediatrics (49/170 i.e. 28.82%) in December. Department wise average completion per cent of IPD records was best seen in psychiatry (97.06%) in September and in December it was of ENT Department (95.00%±7.07). Maximum change was observed in Ear, Nose and Throat (ENT) department. Few activities pertaining to accreditation of the hospital to NABH improves the completeness of Medical Records. There is a paucity of existing data regarding the completeness of IPD records.

**Keywords:** Completeness, Intervention, Medical records, NABH

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## **Asian medical tourism industry: An insight into movement of healthcare consumers in search of value**

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The global growth in the flow of patients and health professionals as well as medical technology, capital funding and regulatory regimes across national borders has given rise to new patterns of consumption and production of healthcare services over recent decades. A significant new element of a growing trade in healthcare has involved the movement of patients across borders in the pursuit of medical treatment and health; a phenomenon commonly termed as 'medical tourism'. There has been a shift towards patients from richer, more developed nations travelling to less developed countries to access health services, largely driven by the low-cost treatments available in the latter and helped by cheap flights and internet sources of information. This research paper provides an insight into Asian medical tourism industry, major medical tourist destinations and value network adopted to attract foreign patients, drawing some cost comparisons mainly with closest regional competitors, Singapore, Thailand, India, Malaysia and Philippines where relevant. Objectives of the research-To understand the Asian Medical tourism Industry, analysis of major tourist destinations, its value network adopted to attract foreign patients, to draw comparisons mainly with closest regional competitors, Singapore, Thailand, India, Malaysia and Philippines (STIMP), major issues and Challenges of Medical Tourism. Medical tourism is prospering in countries such as Singapore, Thailand, India, Brazil, Mexico and many more. Malaysia and Philippines are emerging markets for medical tourism. The authors have proposed to understand various aspect of medical tourism industry in Singapore, Malaysia, Beijing and Shanghai countries. The work in this area is still in initial stages, but the authors wish to explore it further in future. Information and data in this paper has been collected from various printable and non-printable sources like magazines, newspapers, trade journals, online paid databases, news website, government agencies and trade associations and the informal talks with some health practitioners and medical tourists who came to these countries. Medical Tourism in Asia is one of the emerging lucrative businesses in the last couple of years. STIMP countries have derived the competitive advantage among the Asia Pacific by dominating the industry for quite some time. Thailand and India have been the preferred destinations among medical tourists, while the Singapore, Malaysia and Philippines have put in place government-supported medical tourism programs to capitalize on this growing industry. Advancements in service delivery models, medical technology and rise of low-cost travel, extensive tourism infrastructure and the evolving methods of medical marketing through social media are the main elements that affect the decision for offshore medical care. These factors continually lure cost-conscious patients with the consolation of exploring Asia, since the bargain of combining cost-effective treatment and travel in one airline ticket is hard to beat. This research can be taken forward by interviewing medical tourists in these countries and customer surveys can be conducted to understand the expectations of customer in the medical tourism industry. A marketing survey can also be created for designing marketing mix approach for medical tourism industry of STIMP countries in order to position each country differently with its regional competitors. The research paper provides an insight into Asian medical tourism industry, major medical tourist destinations and value network adopted to attract foreign patients, drawing some cost comparisons mainly with closest regional competitors, Singapore, Thailand, India, Malaysia and Philippines where relevant. This development is framed in the context of

globalization of the healthcare industry and an increasing trend in the commodification of healthcare and its implications.

**Keywords:** Asian medical tourism industry, Commodification, Health care services, Treatment and health tourism

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### **Engaging with facility staff to improve family planning commodity management: Learning from the field**

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Government of Chhattisgarh with technical support of Jhpiego launched EAISI program in 2014 with objective to improve access to Intrauterine Contraceptive Device (IUCD) services in states of Chhattisgarh and Odisha. During baseline assessment and in first few months of the program, frequent stock out of IUCD and other family planning supplies hampered the program to a large extent. To better manage family planning consumption and ensure round the clock supply, we trained pharmacists, Lady Health Visitor (LHV), Auxiliary Nursing Midwifery (ANMs) and other staff. Standard training package which was earlier used in Jharkhand was adopted as per SSV feedbacks and performance assessment. One-day long targeted trainings were conducted involving selected pharmacists, LHVs, ANMs and other staff at divisional level. A total of 33 such participants from one division of the state were trained. SSV was conducted within 3 weeks of training to identify bottlenecks and challenges faced by trainees. There was a lack of proper indenting mechanism at all levels, state, division, district and facility. Instead of supplying as per demand, push down approach was being utilized. We advocated with facility in charge and district administration to print standard formats, taught their utilization during monthly visits and handholded facility staff to improve storage conditions. As compared with baseline when none of the 15 facilities had racks for storage, registers for proper documentation, indent / demand / issue book, all 15 facilities has attained the same. Storage conditions improved at all intervention sites. As compared with 2 facilities out 15 which reported stock out during baseline, none of the facilities reported stock out after the intervention. Fortnightly assessment of consumption and requirement was done by program team using a WhatsApp group. The same medium was utilized to share cross learning among facility staff. This ensured rapid adoption of peer learning and stock registers were printed at all sites using National Rural Health Mission (NHM) funds. Persistent follow up over mobile using WhatsApp and supportive supervision visit along with customized training package ensured institutional changes which ensured round the clock supply of family planning commodities. There was no such intervention reported from amongst many technical support program implemented across the country. Unlike other resource intensive intervention, this was a low cost and easily implementable successful interventions which will ensure round the clock supply and also prevent pilferage and wastage.

**Keywords:** Commodity management, IUCD, Stock out

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### **Antifungal activity of neem (*Azadirachta indica*), tulsi (*Ocimum tenuiflorum*), shikakai (*Acacia concinna*) against *Malassezia globosa*, associated with dandruff**

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One of the major causes of hair loss is dandruff and dry scalp. *Malassezia* is a genus of fungi. *Malassezia* is naturally found on the skin surface of many animals, including humans. *Malassezia* are common lipid dependent fungi that grow on the sebaceous areas of human skin, including the face, scalp and upper trunk. Causative agent of dandruff is *Malassezia globosa* and diseases caused by *Malassezia globosa* are tinea versicolor, pityrosporum folliculitis and

seborrheic dermatitis. The purpose of the current investigation was to inhibit the growth of dandruff causing fungi, *Malassezia globosa*. Dandruff is a common skin condition that affects 55 percent of people worldwide. In patient with dandruff, *Malassezia* species were identified by culture on Saboraud Dextrose Agar (SDA) containing chloramphenicol to get rid of bacterial contaminants. The isolates were identified by morphological and physiological characteristics. Biochemical tests were carried out, yielding positive catalase reaction; typical of *Malassezia globosa*. Microscopically using 10% KOH, smear of the samples from showed characteristic spaghetti and meatball (globose) appearance of hyphal growth and microconidia respectively; the only characteristic microscopic appearance that differentiates *M. globosa* from other species of *Malassezia*. In this regard, growth was obtained on SDA. Antifungal activity of neem, tulsi, shikakai was tested by zone of inhibition method. Both water and alcohol extracts of shikakai and showed inhibition activity against *Malassezia globosa*. In case of neem only alcoholic extracts showed inhibitory activity. The alcoholic extract of these three plants showed antifungal activity against *Malassezia globosa*, this may be because of the presence of alcohol in the extract while the water extract showed highest antifungal activity against *Malassezia globosa*.

**Keywords:** KOH-Potassium hydroxide, *M. globosa*- *Malassezia globosa*, SDA- Saboraud Dextrose Agar

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### **Prenalytical variables and errors in sample collection, sample transport, sample preparation and storage**

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To identify variables in collection, transport, preparation and storage of blood samples and enlist remedial measures a prospective study was carried out in the phlebotomy unit of a tertiary care hospital, involving ~600 patients (especially old, obese subjects and children <5 years) over a duration of 6 weeks. Observations were made during the entire process of blood sampling. Special emphasis was laid on proper venous localization for the draw, tourniquet tying, use of vacutainers / needled syringes (minimal trauma), disinfection, colour coded / labeled test tubes / containers (to prevent mix-ups / use correct anticoagulant), timed draws, transportation and processing of samples as well as proper identification of the patients. Interactions were done with the collecting technicians, laboratory staff and patients based on specific questions. Patient-variables like food-intake, drug(s) taken, hypersensitivity reaction etc. were also taken into consideration. Needlestick-injury was enquired about. In 3.6% cases, there were sample collection errors with 95% Confidence Interval (CI) 2.04% to 4.78% (upper and lower limits respectively); in 8.4% cases, there were improper samples received with 95% CI 6.35% to 10.54%; in 1.8% cases, there were patient identification errors with 95% CI 0.89% to 2.96% and in 5.4% cases, there were transportation errors with 95% CI 4.02% to 7.54%. Pre analytical errors in blood sample testing play a significant role in discordant test outcomes in the patient-population selected. Phlebotomy can be performed under a doctor's supervision in difficult cases. Clotted blood samples need to be centrifuged within half an hour of collection and the haemolyzed samples have to be discarded to avoid incorrect reporting. Sometimes, these errors are cumulative and following standard operating procedures will help to overcome the hurdle. Streamlining the sampling process with computerized database to track errors and quality controls will contribute to precise and accurate reporting (for adequate management of disease-states), prevention of discomfort / infection to the patient and saving expenses.

**Keywords:** Blood, Errors, Prenalytical, Sampling, Variables

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# Intellectual Property Protection for Innovation and Entrepreneurship in Indian Healthcare Sector

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**Introduction:** India's healthcare industry is projected to grow both in terms of revenue and employment by approximately 7 times from 2010 to 2020. It is expected to reach \$280 billion by 2020 at CAGR (compound annual growth rate) of 22.9%. With the introduction of the National Intellectual Property Right (IPR) policy released in 2016 which fosters innovation, and entrepreneurship, the focus is now on enhancing access to healthcare. Intellectual Property (IP) protection is essential and beneficial to the innovators, wherein their rights are secured. IP encourages innovation, and this paper accumulates all the IP necessities for healthcare sector.

**Purpose:** To help the innovators and entrepreneurs understand IP regime of India related to healthcare sector.

**Research Design:** Doctrinal research methodology to study current and upcoming IP regimes. Scope of this paper is limited to India.

**Results & discussion:** NITI Ayog's report by Expert Committee on Innovation & Entrepreneurship proposed strengthening IP rights for increased private sector investment and thus enhance entrepreneurship. There are various funding opportunities available through Government, NGOs, private companies like Pfizer, for innovators and social entrepreneurs in the healthcare field. Therefore, every interested player should be aware of the IP regime in India specifically focussed upon the healthcare sector. Government is intensifying its IP administration by enhancing enforcement, assigning dedicated courts for IP matters, and by increasing number of expert patent examiners. Innovators and researchers are therefore expected to keep up with the new IP Policy and regulations.

**Research implications:** This research will help medical and legal practitioners, innovators, and investors to understand IP regimes in India particularly in healthcare sector. This will assist in spurring innovation and cross sector partnerships promoting development of novel technology platforms. Investors will realize the growth in healthcare industry and start-ups can furnish to that growth by meeting demands securing their IP. It will in turn help in economic development of the country wherein attention is required in the critical issues of healthcare such as diagnostics, digitalization of medical records, medical informatics, etc.

**Novelty:** Entrepreneurs will find everything they need to know related to IP regimes including policies, legislations, regulations they should be aware about at one place.

**Keywords:** Innovation, IP, Intellectual Property, IP Policy, Patents

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## Fair and Handsome, Faring Handsome?

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**Introduction:** “We didn't just launch a product, we created a category in India.”

Emami's consumer understanding extends beyond product functionality. When their consumer study indicated that nearly 30% of women's fairness cream were actually used by men, they studied user buying patterns and worked on these cues resulting in introducing a fairness product exclusively for men- Fair and Handsome. The skin care segment of Emami, was hence no longer limited to women, the men began to take a lead to, etching a milestone

shift in skin care category in India.

**Purpose:** The case is built around the Branding aspect of Emami's Fair and Handsome where Product Innovation in the skin care segment has been focused upon to give the students insights into Branding, Communication, Product Development and Category Creation.

**Methodology & Discussion:** The case entails a journey into the world of men's fairness category in India as per the contributions of the Brand Fair and Handsome, a pioneer brand under the Emami India Ltd. In 2005, Emami created a marketing history by introducing the largest brand in men's fairness category in India. With the launch of FAH, fairness no longer remained exclusive for the eves of the country and provided men an opportunity to break free from being the closet users of women's fairness creams, and still look fair. However, the company has to take into account the powerful entry of other brands eating up Fair and Handsome's market share with newer variants and offerings. Fair And Handsome by and large has only 3 products under its brand since the 11 years of its existence- Fairness Cream for Men, Fair and Handsome Winter Solution Cream and Instant Fairness Face wash. The case would thereby analyse whether Fair and Handsome should ideally come up with more product offerings or change its communication and positioning strategy to continue to be the leader in the market in this dog eat dog era.

**Keywords:** Fair and Handsome, Fairness, Male Grooming, Skin Care, Emami

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## **Patients Satisfaction with reference to Healthcare Facilities at Corporate Hospitals in Hyderabad**

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**Abstract** Patients visit hospitals to get treatment for their ailments and after discharge, they have varied experiences and different levels of satisfaction with regard to Health Care Services received in the Hospital. With Liberalisation, Privatisation and Globalisation, there has been an increase in the number of hospitals across India and there are multiple avenues open to patients for their treatment. Hyderabad is one of the hubs for medical tourism and there are many corporate hospitals in Hyderabad. Many Hospitals claim to offer best facilities for the patients. This study tries to probe the Patients satisfaction level with reference to the Health care services provided by Corporate Hospitals in the city of Hyderabad.

**Methodology:** This study tries to probe the satisfaction level of Patients with regard to Healthcare Facilities offered by Corporate Hospitals in Hyderabad. The study is based on primary data which is collected by administering a questionnaire to a sample of 50 respondents based in Hyderabad, who have undergone treatment at various corporate hospitals in Hyderabad.

**Research Results:** The study is in progress, and the result analysis will be done and presented in the full paper to be submitted.

**Research Implications:** The current study will give an insight into the satisfaction level of patients about the healthcare facilities provided by corporate hospitals, which can be used by the decision makers to make appropriate decisions.

**Novelty/ Originality:** The current paper is an original work done by the authors through primary data collection and analysing the results. Not many studies have been done on the given topic; hence it can give an insight into further research by others in this direction.

**Limitations:** (1) Being a sample study of 50 respondents, it is difficult to extrapolate the findings. However, a comprehensive study with a large sample would be taken up at a later stage in future.

(2) The names of Hospitals will be kept confidential.

**Keywords:** Patient satisfaction, Healthcare facilities, Corporate Hospitals, Hyderabad.

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## Extracellular vesicles in regulation of Hematopoietic Stem Cells

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**Introduction:** In recent years, there has been an escalating interest to investigate the role of extracellular vehicles (EVs) in the regulation of biological systems. EVs are composed of micro-vesicles (MVs) and exosomes, which are involved in intercellular communications; however, the precise role of these various types of extracellular vesicles in the regulation and functionality of hematopoietic stem cells (HSCs) has not been elucidated.

**Purpose:** The micro-environment plays an important role in the regulation of proliferation, differentiation and self-renewal of HSCs. We are interested in examining whether the EVs derived from the mesenchymal stem/stromal cells (MSCs) play a regulatory role in regulating HSC functionality.

**Approach:** Components of EVs viz. MVs and exosomes from the secretomes of MSCs can be isolated by differential ultra-centrifugation and their independent effects on the HSCs can be analyzed using various assays. Mouse model system can be used to assess preliminary effects, which can later be replicated in human model system.

**Expected Outcome:** We expect that the isolated EVs would improve the proliferation and functionality of HSCs.

Research implications: Quantity and quality of infused HSCs present in the graft is one of the major concerns in Hematopoietic stem cell transplantations (HSCT) or bone marrow transplantations (BMT). Hence, if the EV-mediated regulation of these HSCs is understood in molecular terms, it could lead to a better outcome in clinical transplantations. Hence, the main focus of our lab will be to examine whether a brief culture of HSCs with MSC-derived EVs improves their functionality.

**Novelty-** The molecular profiles of MVs and exosomes will enhance the understanding of the mechanism involved in the regulation of HSCs. Furthermore, such a study would not only improve the outcome of HSCT and BMT but also improve the application of MSCs in regenerative medicine protocols applied in non-haematological conditions.

**Keywords-** Extra-cellular vesicles, Micro-vesicles, Exosomes, Hematopoietic stem cells

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## Impact of Microbiome Studies on Human Healthcare

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**Background:** Although distinct microbial communities inhabit all body surfaces most of them are located in the intestine. Genome of these microorganisms collectively forms microbiome; of which gut microbiome plays a vital role in human well-being by contributing to metabolism, immune system development, and pathogen regulation. It is also influenced by age, dietary habits, socio-economic status, geographic location, genetic makeup of individuals and varied states of dysbiosis, i.e., microbial imbalance which leads to a myriad of changes throughout the lifetime. For developing microbiome-based therapies, it is crucial to deduce the relationship between different microbes in an intestinal ecosystem.

**Purpose:** Advancement in the sequencing technology has made it easier to identify the bacterial population residing in an ecosystem at a given time but the evaluation of varied degree of complex interactions between different bacteria is still in its infancy. A study of such kind will provide a systematic approach for further scientific

investigations.

**Approach:** Researchers have studied human microbiome by employing next generation sequencing platforms; findings from these studies provide the basis to formulate the network of microbial interactions; while its validation may demand experimentation.

**Findings:** Study focusing on diet and geography by Bhute, et. al., suggests the enrichment of Prevotella and Megasphaera in Indian population - Prevotella is known for degrading complex plant polysaccharides and Megasphaera can produce short chain fatty acids. There exists a plethora of such observations on association of bacteria in healthy and dysbiosis states like IBD, asthma, insulin resistance, obesity, etc.

**Research implications:** Network stimulations holds great promise for researchers from diverse disciplines and particularly so to the healthcare professionals.

**Originality:** Bioinformatic tools address the bacterial interactions merely on the basis of numbers but our approach of systematic incorporation of data will provide better insights on such interactions.

**Keywords:** Dysbiosis, Human microbiome, Next generation sequencing, stimulation models.

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## Metabolic Engineering of Flavour Biosynthesis in Lactic Acid Bacteria

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**Introduction:** Flavours and fragrances are important part of food products, feeds, pharmaceuticals and cosmetics. Although many flavour chemicals are naturally produced by plants, in many cases their quantities are very small. Chemical synthesis is preferred for the industrial production of these compounds. However, these procedures have many drawbacks. An interesting alternative for the production of flavour chemicals is clued by their biosynthetic pathways in the plants. The genes encoding the enzymes catalysing such pathways can be isolated from the plants and expressed in bacterial hosts for 'bio-similar' production of flavour chemicals. Lactic acid bacteria (LAB) which are an important class of organisms associated with the food products represent the most ideal hosts for such metabolic engineering experiments because of its small genome size and simple carbon metabolism.

**Purpose:** Heterologous production of plant flavour compounds in lactic acid bacteria

**Methodology:** Biosynthetic pathways of many flavour chemicals are known in plants. The genes encoding key enzymes of such pathways will thus be isolated from plants and expressed in LAB. For this purpose, we are developing an expression vector by modifying the plasmids which naturally occur in LAB. The biosynthetic pathway for flavour chemicals in lactic acid bacteria will eventually be metabolically engineered.

**Research implications:** Bio-fortification can not only impart the desired aroma to the LAB-associated food products but this approach is also very safe since both the genes and the vectors being used are adopted from the food-grade biological sources. Since bio-similar food products are also now-a-days being demanded by the common consumers, our approach is likely to revolutionize the food industry.

**Novelty:** This work will provide a tool for the enhancement of probiotic functionality of lactic acid bacteria and will be further useful for the development of functional foods.

**Keywords:** Metabolic engineering, Flavour Biosynthesis, LAB plasmid vector

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## Evaluating the Performance of an Advanced Breast Cancer Diagnosis Unit in India

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**Introduction:** Breast Cancer (BC) is the commonest cancer in India with highest mortality rates. Lack of awareness in women about symptoms, screening and diagnosis lead to negligence, thereby, resulting in costly delay in diagnosis and treatment. Given the increasing BC burden, there exists a need to establish BC advanced diagnostic centers in India that deliver affordable services with global standards. Herein, we present the evaluation of an advanced BC diagnosis unit in Pune that was established on such theme.<sup>1</sup>

**Purpose:** To evaluate the performance of an advanced BC diagnosis facility in Pune, India.

**Methodology:** Radio-diagnosis department at Orchids Breast Health Clinic (OBHC) in Pune is equipped with 2-D Full-field Digital Mammography with 3-D Tomosynthesis (FFDM, Siemens Mammomat Inspiration™), Automated breast volume scan (ABVS) (Siemens Acuson S2000™) and precision biopsy devices (i.e. stereotactic, vacuum and mammotome). Breast radiologists, surgeons and radiographers follow NCCN guidelines and BIRADS lexicons for BC diagnosis based on ultra-sonography (USG, < 40 years) and FFDM (>40 years). Suspicious cases undergo appropriate imaging-guided biopsies. Retrospective Radiology and Clinico-pathology data (February 2015-October 2016) was collected from clinically annotated patient archives maintained at OBHC.<sup>2</sup>

**Results & Discussion:** Performance of OBHC BC diagnosis for the given period is tabulated as:

Parameter	Total no. of cases		
FFDM	1405		
USG (ABVS) after FFDM as needed	1393		
		Type of Biopsy	
		Trucut	Stereotactic on FFDM
Biopsies (with correlation on FFDM and USG)	209 (Rate of Biopsies = 14.8%)	195 (93%)	14 (7%)
Positive BC cases	126 (Rate of diagnosis = 60%)	122 (96.8%)	4 (3.2%)

**Research Implications:** Training facilities for clinicians (i.e. radiologists, surgeons, pathologists) and para-clinicians (i.e., radio-technicians and researchers).<sup>1</sup> Radiology and clinico-pathological databases for translational BC research in Indian women.<sup>2</sup>

**Novelty:** Operational model for Indian context providing affordable excellence in advanced BC diagnosis with global standards.

Interdisciplinary platform for technology innovations in BC diagnosis and collaborations with private sector.

**Keywords:** Breast Cancer, FFDM, ABVS, BIRADS, Biopsy.

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## **Role of microRNA in Acute Myeloid Leukemia (AML)**

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**Introduction** - Acute Myeloid Leukemia (AML) is a genetically heterogeneous clonal disorder characterized by the accumulation of acquired somatic gene mutations. EVI1 (Ecotropic Viral Integration Site-1) is a transcription factor gene which is associated with myeloid Leukemia including AML and overexpression of this gene indicates poor prognosis in AML. Aberrant expression of miRNA has been observed in different diseases including AML. But a mere number of miRNAs have been shown to be associated with EVI1 in AML and also how EVI1 regulates or being regulated by miRNA has not been studied.

**Purpose** - The purpose of this study is to identify important miRNAs in EVI1 expressed AML cells, which can be used as potential therapeutic biomarkers in EVI1 expressing AML and also to determine the cellular function of EVI1 in AML cells.

**Approach** - Lentivirus mediated EVI1 gene KD will be carried out in AML cell line and different functional assays such as cell proliferation, apoptosis, cell cycle and colony forming assay will be assessed. Furthermore, miRNA profiling of EVI1 positive/KD will be performed to identify deregulated miRNAs.

**Expected outcome** - EVI1 KD will give insight into biological role of EVI1 in AML and will also give important information on differentially regulated miRNAs in EVI1 KD AML cells. This will help in identifying particular miRNA(s) and its target upon EVI1 knockdown.

**Research implications** - This research aims to establish a relationship between miRNA and EVI1 in AML. Selected miRNAs can provide us useful information regarding AML disease pathogenesis and can be used as probable molecular biomarkers for AML disease prognosis in relation to EVI1.

**Novelty** - This study will highlight the relationship between EVI1 gene and miRNA expression in AML. In future, this information can be utilized as a potential therapeutic approach targeting miRNAs in AML patient.

**Keywords** - Leukemia, AML, microRNA, EVI1, Lentivirus.

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## Track VIII: Healthcare: Integrative Approach in Indian Setup

### Effectiveness of training provided to emergency medical services professionals working with Maharashtra Emergency Medical Services Project

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Maharashtra Emergency Medical Services (MEMS) is project of Government of Maharashtra under National Rural Health Mission (NRHM) and is operated by Bharat Vikas Group (BVG) India Limited in academic association with Symbiosis Institute of Health Sciences (SIHS) and United Kingdom Specialty Ambulance Services (UKSAS, United Kingdom). It is a toll free '108' number based 24 x 7 hours pre-hospital emergency medical services free of cost to entire population in the state of Maharashtra. Training was imparted to all Emergency Medical Services Professionals (EMPs) working with MEMS project by Symbiosis Institute of Health Sciences, a constituent of Symbiosis International University. The present study shows the analysis of performance of Emergency Medical Services Professionals (EMPs) before and after the training based on their scores in pre-course test, post-course test and skills assessment. This study was conducted before providing the training and after training was completed during 01 July, 2013 to 31 January, 2015. Only Bachelor of Ayurveda, Medicine and Surgery (BAMS) and Bachelor of Unani Medicine and Surgery (BUMS) doctors were enrolled for the study. The participants with MBBS background were not included in this study. At the beginning of the training session, course test and skills test assessment of 100 points each was administered. Total of 122h of theory and practical training programme was carried out for all participants. After training session, course test and skill test assessment to 100 points each was again administered to determine the change. The questions used for assessment were pertaining to Emergency Medical Sciences (EMS) and experience gained in EMS system. Total 3000 trainees attended the training during 01 July 2013 to 31 January 2015. Of them 38 participants submitted incomplete assessment at either time points and were not considered for final analysis. Thus the final analysis was carried out on 2962 participants. The average score of course tests and skill test assessment of participants before training was 53.1 (SD 10.9) and 52.1 (SD 10.5) respectively. The course test assessment showed that more than 1/3rd of the participant had score below 50% before the course test assessment and course skill assessments. Also 3/4th of the participants have score below 60 percent in course test assessment and almost 8 out of 10 participants have score below 60 percent in course skills assessment. After training, the mean score of course test assessment was 77.0 (SD 9.3) and skill test assessment was 77.9 (SD 9.5). Thus there was more than 45 percent change from before training to after training in course test and skill test assessment of participants. This change was statistical significant ( $p < 0.0001$  for both test). Looking at the average of the score of the doctors in the pre-test and skills assessment and for the post-test and skills assessment after undergoing training it can be concluded that the training provided to the candidates has helped them improve their skills and there has been up gradation in their knowledge. This is a significant observation and highlights importance of hands on training in building skills. In order to do this well, doctors and nurses need to be trained to recognize the severity of illness and to categorize conditions in relation to the likelihood of treatment priority and the strategies most likely to maximize outcome.

**Keywords:** EMP, EMS, MEMS.

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## Driving practices among university students in Pune, India

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According to WHO, Road Traffic Accidents (RTA) are the sixth leading cause of death in India and these fatalities occur amongst the most productive age group. India contributes to around 73 percent of the regional burden of fatalities. In the year 2015, the estimated accident severity for the Pune city was 30.4, higher than that of Maharashtra state (20.7). Pune being one of the largest educational hubs of Asia is recognized as Oxford of the East. Due to the automotive revolution, it is also recognized as Detroit of India. So, there is large population of students in the city with large number of two wheelers used by them. Pune also has the dubious distinction of maximum number of accident involving two wheelers. The study was aimed to assess driving practices among university students and recommend appropriate measures, bridging the gap in relation to road safety and safe driving practices. A cross sectional study among 384 students of Symbiosis International University was carried out using a self-administered structured questionnaire from January 2015 to February 2016. Data was analyzed using SPSS version 20.0. Of the 384 students enrolled, 54 percent and 46 percent were males and females respectively, with an age range from 18 to 31 years (Mean-20.1 years and SD±2.3). Exceeding lawful speed limit (25%), sudden acceleration or deceleration (20.0%), carrying excess persons (19.1%), overtaking from left side (17.4%), not using side indicators / hand signals (13.4%) and use of/speaking on mobile phone while driving (12.1%) were the commonly followed unsafe driving practices. Drunken driving (3.1%) was the least followed unsafe driving practice. Around 36 and 23 percent students reported not using helmet while driving two wheeler and seatbelt while driving four wheeler vehicle respectively. Communication strategies in the form of Entertainment Education (EE) integrated with behavior development, mobilization and advocacy, to achieve the objective of bridging the gap between road safety awareness and safe driving practices, should be planned. Behaviour Change Communication (BCC) activities and mobile technology can be used to disseminate information on road safety awareness through mobile applications or other form of media. This action research was conducted at a university from India which is marching towards being a Health Promoting University, amongst its own students. The recommendations can be implemented and also disseminated through various stakeholders responsible for the wellness of the university students.

**Keywords:** Driving practices, Health promoting university, Road safety, Road traffic accidents

## Students' perception of health checkup programme: A case study / experience of an Indian University

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An 'on campus' health centre deploying Information, Education and Communication (IEC) strategies is a critical component of a Health Promoting University (HPU). Feedback analysis regarding the perception of students availing these services is vital. The purpose of the study was to study students' perception regarding Health Checkup. 16,880 students were enrolled in 2014-15. 9,491 (56%) students attended the Annual Health Checkup; out of these, 6227 (66%) students responded to the feedback questionnaire. Data were analyzed using Statistical Package for the Social Sciences (SPSS) v20.91% students attended health checkup annually. 23% had a significant past medical history. 62% students opined that there is a need for health checkup. 85% students mentioned that they received all the requisite information about the health checkup procedures in time and in a user

friendly language. 87% find the health checkup program well organized. 86% of them were satisfied as regards diagnosis of their health related issues. However 40% students expected more interactive time with the consultants. 84% were happy with the functioning of the health centre and 47% students reported that the medical advice and consultation they received after the health checkup were helpful. 90% preferred their medical report via email. The current study emphasizes the deployment of IEC strategies to create awareness for importance of health checkup. Feedback analysis of the responses of the students is critical in evaluating the quality of services rendered. Need and models of an ongoing training of the staff is useful for better acceptance by the students. All these are essential prerequisites for establishing a HPU. This study helps one to understand the concept better in our march towards a health promoting university.

**Keywords:** Annual health check up, Health centre, Students

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### **Swami Vivekananda: An eternal inspiration to his followers: Personal in-depth interviews**

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Swami Vivekananda continues to inspire generations through his literary works. Thus, it is a qualitative research that assesses the impact of inspiration on social and spiritual evolution of the mankind. Ascertaining the inspiration drawn from Swamiji and positive difference made to the society on the grounds of humanitarian works. To understand Swami Vivekananda's concept of service and spirituality. To establish the validity of qualitative and literary researches in the subject where data cannot be quantified but lives are directly touched. Personal in-depth interviews for personal in depth interviews, around 20 to 25 individuals inspired by Swamiji from organizations like Ramakrishna Math, Swami Vivekananda Yoga Anusandhana Samsthana and Vivekananda Kendra among others have been chosen. A questionnaire was devised for personal interviews. Gigantic humanitarian works done by organizations in the fields of education, spirituality, rural development, tribal areas, women welfare and yoga therapy and research speaks for itself. Understanding inspiration drive of the inspired is the underlining point of the result. The study has analyzed the process that transpires between the inspirer, inspired and inspiration. Through this study, what is implied is the chain of inspiration that begins with powerhouses and energy magnets like Vivekananda and is passed on to followers with umpteen lives being touched. A very handful of papers have been presented on such subject so far. This study puts together all individuals inspired by Swami Vivekananda. This compilation may be instrumentally inspiring.

**Keywords:** Inspiration, Spirituality, Swami Vivekananda

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### **Analysis of attrition of staff in a multispecialty hospital and formulation of retention strategies**

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The presence of experienced and skilled team is an asset for any industry to have, none more than the hospital. The cost and effort involved in hiring and training new employees is a not just a serious investment, but also a liability. In this study, we have analyzed the attrition rate of a multispecialty hospital quantitatively. As attrition is a serious concern for any hospital, it is necessary to find possible solutions to not just solve the problem but also to mitigate it. This was a cross sectional study conducted in a multispecialty hospital. The data was collected on a 5-point Likert type agreement-disagreement scale. Cronbach's alpha was used to assess the reliability of the data. Overall Cronbach's  $\alpha$  for instrument was 0.962 which showed high reliability of the instrument. Major reasons for employee attrition were supervisor behavior (28.67%), salary issues (15.3%), lack of coordination (18.67%). The results presented in this study would serve as a useful resource for the hospital management to consider and potentially

address the issue even before they start to occur. This is an original research done for studying the reasons of employee attrition in hospital.

**Keywords:** Attrition, Behavior, Cronbach's alpha, Hospital, Retention

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## **Outcomes of high hospital Bed Occupancy**

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This study has been conducted in a tertiary care Hospital. The study tries to understand that a "uniform occupancy rate" for hospitals is not a meaningful concept because the ability of individual hospitals to maintain a certain occupancy rate consistent with a specified "protection level" depends upon several factors. These factors include hospital size, the number of non-substitutable patient facilities, the percent of non-urgent (elective) beds, and the number of hospitals serving an area, and the relative variation (fluctuation) in the demand for services faced by the hospital. The bed-occupancy rates exceeding 85% in acute care hospitals are associated with problems in handling both emergency and elective admissions. There are a number of known factors from different lines of evidence that support the use of bed occupancy as an operational target and measure of quality. These include the risk of cross-infection between inpatients in overcrowded wards and the need for timely admission to an appropriate ward of patients presenting to emergency departments (EDs) or for booked surgery. Staff welfare may also be adversely affected by high bed-occupancy rates. Timely access to safe hospital care remains a major concern. Target bed-occupancy rates have been proposed as a measure of the ability of a hospital to function safely and effectively. High bed-occupancy rates have been shown to be associated with greater risks of hospital-associated infection and access block and to have a negative impact on staff health. Clinical observational data have suggested that bed occupancies above 85% could adversely affect safe, effective hospital function. There is an urgent need to develop meaningful outcome measures of patient care that could replace the process measures currently in use.

**Keywords:** Hospital occupancy, Infection, Turn around time

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## **A prospective evaluation of 150 individuals to analyze the cause and effect relationship of morbid obesity towards certain co-morbidities**

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People are unable to find a cause and effect relationship between obesity and its co-morbidities. Data of 150 obese patients undergoing Bariatric Surgery of which 57 were males and 93 females, with a mean pre and post op BMI  $46 \pm 17$  and BMI  $39 \pm 16$  was evaluated prospectively with a questionnaire to see presence of commonly seen obesity related co-morbidities like Type II diabetes, hypertension, etc as induced by obesity. Out of 150 patients 100% patients had one or more co-morbidities. In the present study the % of patients who correlated these co-morbidities with obesity as a cause was 20%, 40%, 100%, 7%, 10%, 10%, 0%, 60%, 65%, 0%, 0%, 100%, 60%, 10%, 5%, 0% out of 100% for Type II diabetes, hypertension, dyspnea on exertion, snoring, acanthosis, polycystic ovarian disease (PCOD), migraine, depressive symptoms, lethargy, urinary incontinence, hirsutism, joint pain, oedema, varicose veins, gynecomastia and Gastroesophageal Reflux Disease (GERD) respectively. Many co-morbidities related to obesity like acanthosis, PCOD, migraine, varicose veins, gynecomastia and GERD (<50%), were not perceived by patients as induced by obesity. Even depressive symptoms, lethargy and oedema did not have 100% correlation in the patient's perception. There is a huge scope for educating population and creating awareness.

**Keywords:** Bariatric surgery, Co-morbidities, Cause-effect relationship, Morbid obesity

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## **Just the two of us: Involuntary childlessness, causes, consequences and coping strategies**

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In the recent decades there has been a growing trend towards controlling fertility, the desire to have at least one child is universal. Couples who are involuntarily childless undergo trauma and face stigma, as the Indian cultural tradition bestows special honor on woman with children and applies variable degree of stigma to the childless. Causes of infertility are mostly linked with physiological malfunction. Studies have shown that, social change in general and its subsequent change in lifestyle along with various other social cultural factors are linked to biological processes like menstruation, conception and carrying the pregnancy full term. The present qualitative study included in depth interviews with couples experiencing involuntary childlessness, gynecologists and infertility specialists from Pune city. Hospital case papers were studied in order to highlight the profile of the couples facing involuntary childlessness, along with its causes. Majority of the respondents seeking medical assistance belong to the age group of 20-35 years, which is the peak reproductive age. The causes of infertility can be categorized into genetic, physiological and lifestyle related. The common problems observed in males are lack of sperm motility, sperm count or complete absence of sperm, whereas in females it is obesity and polycystic ovaries syndrome which can be a consequence of and erratic and stressful lifestyle. The medical treatment provides an opportunity to overcome the problem of infertility, at the same time it is expensive and takes a toll on the couple's physical and mental health. The present research will help trace the socio cultural causes of infertility, treatment seeking behavior, the socio cultural pressures and coping strategies of the couples seeking treatment. If along with medical treatment, they are helped to deal with socio cultural circumstances then it may help to mitigate their circumstances.

**Keywords:** Causes, Coping, Infertility, Involuntary childlessness, Socio-cultural

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## **Perception regarding quality control among medical laboratory technicians**

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Quality control (QC) is a vital technical component of the continuously developing quality system. Technicians are important stakeholders in performing quality control routinely in the medical laboratory. To develop the quality system, it is required that the technicians should have knowledge and skills to perform QC activities efficiently. The present study was conducted to understand the perception of the medical laboratory technicians about quality control. A pre-tested questionnaire was administered to 48 technicians employed at private non-accredited laboratories to elicit information on QC aspect and its feasibility in medical laboratory. Five point likert-type scale was used to record perception of the technicians regarding benefits of QC, accreditation, effect on their workload, cost and documentation involved, requirement of qualification and training, interest in QC work. All the technicians participated in the study reported that it was their responsibility to provide correct report to patient and QC activities will help them in doing so. Majority (95%) of the respondents agreed to the fact that QC is beneficial and essential to clinical laboratories and requires additional training. Mixed responses were reported for cost component, 58% of the respondents agreed that QC activities need high cost, 21% respondents disagree and another 21% reported neutral response. The respondents were aware that qualified technicians are required, however there is ambiguity

regarding qualifications acceptable by accrediting agency. It was agreed upon by 68% of the respondents that it involves lot of documentation however 56% disagreed that it is a time consuming activity. In summary, high acceptance of QC activities was observed among the technicians. The data on knowledge and perception of QC among technicians will help to understand and develop training needs. This study is restricted to medical laboratory technicians from private set up in Pune region. The study provided finding based on primary data collection. The laboratory management will understand training gap in accreditation process and can develop appropriate training programs for the technicians.

**Keywords:** Accreditation, Laboratory medicine, Medical laboratory technician, Perception, Quality control

## **Understanding impact of unhealthy lifestyle choices and cognitive ability in college going students at an Indian higher education institute**

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The growing problem of stress, obesity, insomnia and lethargy among young adults is a huge concern today. Unhealthy lifestyle choices are shown to cause adverse consequences on physical health. The cognitive ability of college students is also affected further as they indulge more into such activities. The present study attempts to understand the correlation between stress, sleep, exercise and diet on cognitive ability amongst the college students. A cross-sectional study was conducted amongst the college students in Indian setup for a period of one month. Random sampling was used to collect data from 60 samples. The questionnaire on lifestyle focused on factors such as exercise, diet, stress, smoking, drinking, sleep habits etc. as section A. Section B focused on certain typical questions related to ability to remember and applying simple logic. Quantitative and qualitative data analysis was done using Statistical Package for the Social Sciences (SPSS) version 21. It was observed that most of the students under study are in the normal stress range between 4 and 7{range included: 1-3, 4-7 and 7-10(low, moderate and high)}, maximum students get adequate amount of sleep depicting no case of insomnia. Further, students who get optimum sleep between 6 to 7 hours, are found to be in the stress range between 4 to 7. Relationship between stress and cognitive ability showed that low stress levels improves memory and thinking capabilities as the majority of the students in the low stress range scored the highest memory test points. Study shows a cumulative association of stress levels, sleep patterns, consumption of fruits and vegetables, low physical activity level with poor cognitive function, this can be further utilized to develop programmes focusing on improving the wellbeing. Assessing relationship between diet, stress, sleep and cognitive ability.

**Keywords:** Correlation, Cognitive ability, Lifestyle, Stress

## **Circulating micro RNAs as novel biomarkers for type 2 diabetes**

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Type 2 Diabetes mellitus (T2DM) has become a global health burden. With urbanization, the burden of rapid increase of non-communicable disease such as T2DM has been observed in the recent years in India. T2DM remains asymptomatic and thus delays the actual diagnosis of the disease. Micro RNAs are the non-coding RNAs emerged as the post transcriptional regulators of gene expression and expressed differently under different pathophysiological conditions. They are remarkably stable in body fluids such as whole blood, plasma and serum. Recent evidences indicated that microRNAs are the potent micro-regulators of  $\beta$ -cell functions. The previous studies reported altered microRNA profiles in blood samples of T2DM patients than that of healthy individuals. The



differential expression patterns of microRNAs have been reported in the blood samples of prediabetic, newly diagnosed T2DM patients and T2DM individuals. This novel class of non-coding RNA molecules can be considered as the clinically relevant biomarkers to detect diabetes in high risk population. The circulatory microRNAs can be used as novel biomarkers of T2DM and can be used to detect at pre diabetic stage. This review aimed to summarize an account of circulatory microRNAs associated with T2DM.

**Keywords:** Biomarkers,  $\beta$  cell, Circulating microRNAs, Type 2 diabetes

## **Relationship between mother's knowledge on nutrition and incidence of malnutrition among under-five children in selected rural area at Pune**

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Malnutrition "the silent emergency" is a dreadful condition which is one of the leading cause of at least half of the 10.4 million child deaths in each year. Infants and young children are most susceptible to protein energy malnutrition characteristic growth impairment because of their high energy and protein needs and their vulnerability infection. Globally, children who are poorly nourished suffer up to 160 days of illness. The main purpose of the study is to assess the relationship between mother's knowledge on nutrition and incidence of malnutrition among under-five children. A descriptive correlational study was conducted on 100 under-five year children and their mothers from Mutha village of Pune. Non-probability convenience sampling technique was used to select the samples. Demographic characteristics, structured questionnaire and UNICEF criteria were used to collect data from the subjects. The obtained data was analyzed by using descriptive and inferential statistics. Frequencies, percentage, mean and standard deviation was used to explain demographic variables and to assess the mother's knowledge on nutrition and the incidence of malnutrition among under-five children. One of the majority finding was that the mothers of under-five children had average knowledge regarding nutrition of under-five children and the incidence rate of malnutrition out of 100 samples was 64 and only 36% were healthy as per Gomez's classification. There is no association between mothers knowledge on nutrition and incidence of malnutrition in under-five children ( $p > 0.05$ ). Demographic age, education and dietary pattern were found to have significant association with incidence of malnutrition.

**Keywords:** Malnutrition, Mothers knowledge, Nutrition, Rural

## **Exploring dietary practices and food habits: a focus group study on rural women in Mulshi, Pune**

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Good nutrition and access to adequate diet and health are essential for overall wellbeing. Nutrition education programmes in schools and communities would help in improving the nutritional status among vulnerable groups. The purpose of the study was to study current food habits of rural population across SCOPE (Symbiosis Community Outreach Programme for Education) villages in Pune through qualitative research and educate them regarding the healthy dietary choices. Phase I: 7 Focus Group Discussions (FGDs) among 7 target groups (infancy to geriatrics - 10 respondents each) for duration of 1-2 hours were carried out. FGDs were moderated in Marathi, using themes on dietary practices, commonly prepared recipes and recorded using smart phones. These discussions were transcribed into individual scripts for interpretation. Phase II: the reported recipes were developed; nutritive value of each recipe was calculated and compiled into a booklet. Mothers of infants / toddlers routinely fed their children with regular family diet indicating the unawareness of weaning to be initiated at 6 months and ignorance towards significance of special foods needed for growth and development. School children displayed the habit of consuming

packaged foods. Practices revealed that adolescent girls consumed special foods (e.g. addition of black pepper in tea) to overcome Premenstrual syndrome (PMS). However, nutritional knowledge and practices among pregnant, lactating and menopausal women was limited due to poverty and lack of awareness. Interestingly, geriatrics believed that engaging in physical activity and eating preparations made of millets is a key to good health. Gaps in nutrition knowledge and practices could be achieved by including nutrition education (extension programmes) in schools and communities using recipe booklet as an educational tool. Development and compilation of recipe booklet would serve as a key tool for nutrition education. Qualitative research technique helped gaining a better understanding of their food habits.

**Keywords:** Focus group discussion, Dietary practices, Nutrition education, Recipes

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## **Development of Nutritional Assessment Tool for Patients Undergoing Hemodialysis**

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Malnutrition is commonly seen in patients undergoing hemodialysis. Multiple factors interact in a complex way which results in poor nutritional status and metabolic derangement. The study was aimed to develop a reliable and structured nutritional assessment tool to evaluate nutritional status of patients undergoing hemodialysis. Patients aged >18 years and undergoing hemodialysis for more than 3 months at a dialysis centre were enrolled in the study (N=50). This nutritional assessment tool comprised of anthropometry measurements, biochemical, clinical information, Dialysis adequacy (kt/v), food frequency questionnaire, subjective global assessment and Karnofsky scale. The mean BMI was  $21.75 \pm 4.79 \text{ kg/m}^2$  among males and  $19.7 \pm 4.15 \text{ kg/m}^2$  among females. Consumption of energy and macronutrient was found to be higher on the day of dialysis day compared to non dialysis day. Also consumption of milk was significantly lower among these participants leading to less intake of calcium than recommended dietary allowance. Normal serum protein levels were observed among those who consumed egg at least twice weekly. Educational and occupational score was significantly higher ( $p < 0.05$ ) in well nourished subjects. On Karnofsky scale 63.6% of males had normal functional capacity and did not require assistance for personal care whereas females had varied functional capacity. Overall the tool was found to be reliable using Cronbach's alpha scale (0.733). The tool would be useful to facilitate a standardized nutritional screening and to plan adequate medical nutritional therapy for patients undergoing hemodialysis. The tool comprises all possible key predictors of nutritional assessment suitable in an Indian set up. Therefore this tool is reliable for its application in hospitals, renal clinics and dialysis centres for nutritionists.

**Key words:** Anthropometry, Hemodialysis, Nutritional assessment, Nutrient intake

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## **Association between serum vitamin D level and glycemic markers in Indian type 2 diabetes patients**

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The growing evidences indicate that vitamin D deficiency (as measured by serum 25-hydroxy vitamin-D3 concentration) may be correlated with an increased risk of type 2 diabetes mellitus (T2DM). Vitamin D and its metabolites may play a crucial role in preventing T2DM by increasing insulin production and secretion. Also, vitamin D improves glucose homeostasis and overall  $\beta$ -cell function. The objective of this study will be to investigate the association between vitamin D status and glycemic markers (fasting glucose, HbA1c and fasting insulin) in Indian T2DM patients. The T2DM patients and healthy participants will be recruited in this case control study. The consent

form will be obtained from all participants. Demographic, anthropometric, and dietary information will be obtained from all the participants in the form of questionnaire. The serum concentrations of fasting glucose, HbA1C and fasting insulin will be measured using standard biochemical methods. Serum vitamin D [25(OH)D] will be measured using liquid chromatography mass spectrometry (LC-MS) technique. Insulin resistance will be assessed using homeostatic model assessment index (HOMA). The expression level of 25(OH)D will be low in patients with T2DM as compared to healthy participants. In T2DM patients there will be inverse correlation between glycemic markers (fasting glucose and HbA1c) and 25(OH)D level. Also, insulin resistance will be a negatively correlated to circulating levels of 25(OH)D in people with type 2 diabetes.

This study will emphasize that vitamin D might possibly play a role in maintaining glucose homeostasis.

The protective role of vitamin D in diabetic patients will be elucidated and also the role of vitamin D will be understood both as an etiological concept and as a therapeutic option.

**Keywords:** Glycemic markers, Insulin resistance, Type 2 diabetes mellitus, Vitamin D deficiency

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### **Comparative study of knowledge, attitude and practices among antenatal care facilities utilizing and non-utilizing women**

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Associations between availability and use of antenatal services have been shown in various types of epidemiological studies. Hospital case series and confidential enquiries into causes of maternal mortality frequently identify lack of antenatal care as a risk factor. Case-control studies of maternal deaths in developing countries also show an association with lack of antenatal care. To compare the knowledge, attitude and practices (KAP) among women attending and not attending antenatal care clinics with special reference to recognizing the danger signals during pregnancy. A Cross-sectional survey was conducted, including 200 married women in the age range 18 -45 years. Knowledge, attitude and practices of women utilizing and not utilizing antenatal care facilities during their previous pregnancy were compared by calculating odds ratios and 95% confidence intervals. P-values were obtained by doing chi-square test. Pallor was significantly lower among women utilizing antenatal care (57%) as compared to those who were not (77.6%). Tetanus toxoid coverage was higher among women utilizing antenatal care (92%) compared to those who were not (59.2%). Knowledge about danger signs in pregnancy and realization of the importance of eating a healthy diet during pregnancy was significantly higher among women utilizing antenatal care. Lesser prevalence of anemia and better tetanus toxoid coverage was seen among women attending antenatal care facilities. Identification of danger signs in pregnancy and recognition of nutritional demands of pregnancy are better understood by women utilizing antenatal care facilities.

**Keywords:** Antenatal clinics, Anemia, Danger signs in pregnancy, Morbidity, Tetanus toxoid

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### **A study to evaluate the effectiveness of planned teaching programme on obesity and its consequences among adolescents**

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The WHO has already says that obesity a global epidemic biggest current health problem in children as well as adolescents. Overweight and obesity are a matter of growing concern in India. Obesity is associated with increased morbidity and mortality in adolescents. So it's important to educate about obesity and its consequences to improve

health of the adolescents. The purpose of the study to study the knowledge and attitude among adolescents with acquire to get obesity and its consequences recognizing the danger health issue for the adolescents. The study was conducted using pre experimental one group pretest-posttest design. The research variable was knowledge regarding obesity and its consequences, while the demographic variables were age, gender, religion, educational status of parents and monthly income of family, food pattern and source of information. The study was conducted on 120 adolescents using simple random sampling. The data obtained was tabulated and analyzed in terms of objectives of the study using descriptive and inferential statistics. The findings on assessment of knowledge regarding obesity and its consequences showed that 69 (57.5%) adolescent had average knowledge and 30 (25%) had poor knowledge. After the administration of planned teaching programme, the pre-test and post-test data analysis revealed that the mean post-test score ( $24 \pm 2.68$ ) was higher than the mean pre test score ( $15.59 \pm 3.16$ ). The study concluded that planned teaching programme was effective for high school students to gain knowledge regarding obesity and its consequences.

**Keywords:** Adolescents, Consequences, Effectiveness, Obesity

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### Utility of Maharashtra emergency medical services project: A study

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To reduce morbidity and mortality, Government of Maharashtra decided to offer Emergency Medical Services (EMS) in the state of Maharashtra. This study was aimed to assess efficacy of pre hospital care provided through situational analysis for period of 30 months from 01 January 2014 to 30 June 2016 across all districts of Maharashtra through the MEMS project. Maharashtra Emergency Medical Services (MEMS) Project is a toll free '108' number based 24 x 7 hours pre-hospital emergency medical services free of cost to entire population in the state of Maharashtra. State of art Emergency Response Centre (ERC) is developed at Aundh Chest Hospital Pune. ERC operates 24 x 7 hours through a centrally operated toll free telephone number-108 which can be dialed from any part of the state. There are state of the art 937 ambulances (233 Advanced Life Support (ALS) and 704 Basic Life Support (BLS) ambulances) operational across Maharashtra capable to provide competent care for the sick or injured in emergency medical settings. Training was imparted to all Emergency Medical Services professionals (EMPs) working with MEMS by Symbiosis Institute of Health Sciences, a constituent of Symbiosis International University. This study was aimed to assess efficacy of pre hospital care provided through situational analysis for period of 30 months from 01 January 2014 to 30 June 2016 across all districts of Maharashtra through the MEMS project. This study was conducted during 01 January 2014 to 30 June 2016 across all 34 districts of Maharashtra. Emergency Medical Services Professionals (EMPs) working on 937 ambulances respond to emergency calls, perform medical services and transport patients to appropriate hospital as required. Number and type of cases attended by these EMPs every month during the period of study are considered for analysis. Year and district wise data is represented by frequency and percentages. Incident types are represented by descriptive statistics and data is analyzed in Statistical Package for the Social Sciences (SPSS) V.23. Maharashtra EMS receives on an average 25000 emergency medical calls every month. The clinical incidents are relatively increasing throughout the years from 2014 to June 2016 and a total of 1100 cases were attended during two and half years. EMS across 34 districts was provided to on an average 32 (min: 22, max: 61) clinical cases per district with incidents in Bhandara district being highest. Number of incident increases during the month of May to October perhaps due to rainy season. More than 1000 cases of accidents, assault, burns, cardiac, fall, intoxication, labour utilized emergency medical services. Emergency Medical Services professionals are immersed in the fast-paced service sector of saving lives in response to a wide variety of emergency medical situations. Duties include quickly assessing and prioritizing patient needs with the goal of providing life support in situations where trauma, respiratory, diabetic, behavioral, cardiac, allergic, poisoning, and childbirth emergency situations might exist. Earlier EMS was fragmented and not accessible. In a short span of three years MEMS has shown commendable results. State wide 108 services cater to

community at large with a definitive goal of reducing morbidity and mortality, thus confidence and trust among people is instilled to use 108 ambulance services during emergencies as shown by the increased utilization of the services.

**Keywords:** EMS–Emergency medical services, ER –Emergency response centre, EMP’s–Emergency medical services professionals

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### **High flux versus low flux membranes: Adequacy of hemodialysis**

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Hemodialysis is the most widely used renal replacement therapy globally. One of the major causes of impending death in chronic renal failure patients is inadequacy of hemodialysis. Choice of dialysis membranes influences the clinical outcome of patients. Two types of membranes namely high flux and low flux membranes are commonly used for hemodialysis. As compared to low flux, high flux dialyzer membranes have larger pore sizes which allow enhanced removal of uremic toxins. This study aims to compare the patient outcome on adequacy of hemodialysis by using high flux and low flux dialyzer membranes. In this cross-sectional study, 40 patients who required dialysis for more than 6 months were evaluated. Two consecutive sessions of low-flux and high-flux membrane dialysis were performed on these patients. After completion of both the sessions, pre and post dialysis blood samples were collected and sent to the clinical laboratory for assessment of hemodialysis adequacy. Dialysis adequacy (Kt/V) and urea reduction ratio (URR) indexes determined the adequacy of hemodialysis. A total of 40 patients were included in the study of which 28 were males (60%). The mean age of the patients was 42 years. The mean Kt/V was  $1.3 \pm 0.3$  in high flux membrane and  $1.2 \pm 0.2$  in low flux membrane hemodialysis whose differences were statistically significant ( $p=0.000$ ). The mean of URR was  $64.2 \pm 10.3$  in high flux membrane and  $61.1 \pm 9.8$  in low flux membrane hemodialysis whose differences were also statistically significant ( $p=0.000$ ). Thus, the dialysis adequacy is more effective on high flux dialysis membranes compared to low flux dialysis membranes. In developing countries, low flux membranes have been regularly used for dialysis patients because of its cost effectiveness. This evidence based study promotes use of high flux membranes for efficient adequacy of dialysis and may be considered as a treatment management plan for chronic renal failure patients.

**Keywords:** Chronic renal failure, Hemodialysis, High flux membrane, Low flux membrane, Renal replacement therapy

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### **Incidence of ventilator associated pneumonia in a tertiary care ICU setup in Pune city**

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Ventilator Associated Pneumonia (VAP) significantly enhances morbidity and mortality in mechanically ventilated patients. The knowledge of incidence of VAP is important for improving preventive strategies in tertiary care ICU setups. The available published data shows varied incidences of VAP in hospitals. The aim of the study was to assess the incidence of VAP in a tertiary care ICU setup in Pune city. A prospective study over a period of 6 months was done to determine the incidence of VAP in critically ill adult patients receiving mechanical ventilation for more than 48 hours in a tertiary care ICU setup in Pune city with no underlying respiratory disease. Clinical pulmonary infection score (CPIS) was used as a screening method for clinical diagnosis of VAP which was further confirmed by using microbial criteria. Endotracheal aspirates (ETA) of suspected VAP patients were quantitatively cultured for



isolation of causative organisms of VAP. The CPIS was positive in 1007 (83.36%) patients receiving mechanical ventilation for more than 48 hours. Causative pathogenic organisms were isolated in 456 patients by quantitative microbial cultures and incidence of VAP was found to be 31.45 per 1,000 ventilator days. Infection control awareness is widely promoted in India and previous studies reveal incidence of VAP was 22.94 per 1,000 ventilator days in a tertiary care ICU setup. However, in the present study VAP was found to be increased to 31.45 per 1,000 ventilator days. Hence the study reflects that infection control practices should be implemented rigorously and enforced for prevention of VAP in mechanically ventilated patients. This original research was conducted in a tertiary care ICU setup in Pune city.

**Keywords:** Incidence, Intensive care unit, Mechanical ventilation, Ventilator-associated pneumonia

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### **Mindfulness meditation as an effective intervention in fostering well being in a healthcare environment**

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Today, the practice of mindfulness included by psychologists as a useful tool in their repertoire of solutions to help patients who come to them for treatment. Originating from Buddhist tradition, mindfulness is the practice of being aware and attentive to what we are doing, where we are and what is happening moment to moment. Paying attention to one's breathing, also known as "Anapanasati", is a simple way to achieve a preliminary state of concentration with the end goal of calming the mind and internal body rhythms or can be used as a first step towards more intense exercises. Several therapists have reported using anapana as relaxation therapy in clinical practice. Embracing the practice of mindfulness meditation in one's life helps one to develop desirable behavioral qualities like insight, awareness, wisdom, compassion, and equanimity among others and at the same time helps to reduce suffering. Keeping in mind the immense benefits of this non-intrusive and cost effective intervention, a literature review was conducted to highlight the applications and benefits of mindfulness. The literature review indicated that practicing mindfulness gives the individual the ability to modulate his behavior and respond to life situations with equanimity, thus achieve a high level of wellbeing. It is hoped that the current research will foster and facilitate the application of mindfulness as an intervention particularly in the healthcare practices in India as the concept of meditation is very well understood and accepted in Indian society.

**Keywords:** Anapana, Equanimity, Health care, Mindfulness, Wellbeing

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### **Effectiveness of oral health education among community health workers based on communication-behaviour change model**

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The purpose of this study was to assess the effectiveness of health education based on communication-behavior change model in improving the knowledge, attitude and practices of the Accredited social health activists (ASHA) and Anganwadi workers regarding oral health. A community randomized trial was conducted on ASHA and Anganwadi workers of Kaiwara and Chinnasandra, Primary health Centre (PHC) based on Communication-behavior change model. They were provided with a self-administered questionnaire to assess knowledge, attitude and practices regarding oral health. This was followed by a 30 minute oral health education based on the persuasive

health message framework using audio-visual aids. The ASHA and Anganwadi workers of Kaiwara PHC were randomly chosen to provide oral health information leaflet for reinforcement. After an interval of one month they were again given the questionnaires and the improvement in the knowledge, attitude and practices regarding oral health was assessed. 95 ASHA and Anganwadi workers participated in the study. The mean knowledge score before the intervention was 26.54 whereas after the intervention it increased to 29.77 and was statistically significant according to paired t-test. Community programs based on sound scientific models can be effective in bringing about behavior change in the community. The community health workers can be effectively used to reach the population who has limited access to dental services.

**Keywords:** ASHA workers, Anganwadi workers, Health education models

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### **Maternal perceptions on the health seeking behaviour during childhood illnesses - A mixed method study from Patna, Bihar**

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Despite the massive efforts undertaken by various national and international agencies, malnutrition still remains as a major public health challenge in Bihar. Often childhood illnesses are aggravated due to existing malnutrition, poor care and management, and the challenges experienced by the mothers in accessing healthcare facilities. The study aimed to understand health seeking behavior of mothers during illnesses of their children aged less than 2 years and the factors influencing the same. Cross-sectional study was conducted in 4 blocks of Patna district, Bihar. 71 mothers of children aged less than 2 years were recruited for the study. Information on socio-demographic factors, infant and young child feeding practices and health seeking behavior during illnesses were collected from mothers using a pretested interviewer administered questionnaire. Descriptive data analysis was conducted using MS-EXCEL. There were about 73 children (including two pair of twins) in the study malnourished (n=56) and normal (n=17). The majority of children (93%) were having common childhood illnesses such as diarrhea, fever, common cold or measles. Of 56 malnourished children, 73% (n=41) were not exclusively breastfed. The mother's health seeking behavior was majorly influenced by perceived severity of the disease, user fees and flexibility in payments.

**Keywords:** Child, Health seeking behavior, Illnesses, User fee

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### **Role of cardiovascular technologists in screening and risk profiling of young hypertensives at a tertiary care hospital in Pune**

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Disease burden of young hypertensives a cause of concern worldwide and is a major risk factor for stroke, coronary heart disease and chronic renal failure. Advances in technology and improved patient outcomes in cardiovascular illnesses is resulting in longer life-span of cardiac patients with greater co-morbidity; increasing the burden of cardiologists. Though capacity building is vital, the effectiveness of health work force is dominated by a skill mix quality and opportunities for upgrading skills which has led to evolution of training programs for medical technologists especially in the cardiovascular technology. Trained cardiovascular technologists play a key role in screening of cardiovascular diseases. Thus, giving doctors more time to devote their skills for complex tasks. The purpose of the study was to evaluate the role of cardiovascular technologists in screening and risk profiling of young

hypertensives at a tertiary care hospital in Pune city. A cross-sectional study was conducted on 50 individuals visiting tertiary care hospital for a routine health check-up. Screening and risk profiling protocols of young hypertensives were applied to these individuals by cardiovascular technologists as per the criteria laid by Joint National Committee VII. A total of 50 participants were included in the study of which 32 (64%) were males and 18 (36%) were females. According to the risk factors, 11 (22%) were smokers, 5 (10%) were having alcohol, 6 (12%) had high cholesterol diet, 14 (28%) were obese, 6 (12%) were already having diabetes mellitus where 8 (16%) were not having any risk factor. 10 (20%) patients were normotensive, 24 (48%) patients were pre-hypertensive, 11 patients (22%) patients had stage 1 hypertension and 5 (10%) patients had stage 2 hypertension and were referred to the physicians. Among the young hypertensive patients, abnormal ECG was detected in 25 (50%) patients, 16 (32%) patients had positive stress test, abnormal echocardiography findings were present in 30 (60%) patients. The patients with pre-hypertension, stage 1 hypertension and stage 2 hypertension were referred to physicians for further management of hypertension. Patients with abnormal electrocardiogram, positive stress test and abnormal echocardiograms were treated by cardiologists. The Blood pressure readings, electrocardiography procedure, conduct of stress test and echocardiography and interpretation of the findings were carried out by the Cardiovascular Technologists and the treatment of patients was managed by physicians and cardiologists. Thus, the Cardiovascular Technologists were able to reduce the workload of both the physicians as well as the cardiologists. This paper is an evidence based research on the role of screening and risk profiling of young hypertensives by cardiovascular technologists who were able to screen hypertensive patients from the normotensive patient and helped in identifying the cardiovascular complications of patients.

**Keywords:** Cardiovascular technologists, Cardiologist, Hypertensive, Physician, Risk profile

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### **Intrinsic factors of childhood malnutrition: Insights from a case study in Patna, Bihar**

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Indian states have varied prevalence rates of childhood malnutrition with about eight states having higher prevalence than others. Such scenario warrants a contextualized approach to address the intrinsic factors that directly or indirectly contribute to malnutrition. The present case study from the life of Sita Devi, a mother of four children living in Chandos village in Paliganj Block of Bihar State underpins the necessity of a holistic approach. Sita Devi hailed from a family of labourers and was married away at the age of 14 years due to family circumstances. She was an undernourished, smaller teenager who conceived a boy soon after her marriage. Sita Devi delivered a baby girl successfully, however, due to deep rooted symbolism of superiority associated with having a baby boy subsequently had to conceive a second baby with less birth spacing. She had a stillbirth which had a substantial impact on her mental and emotional wellbeing. Additionally, this incidence followed recurrent pregnancies and deliveries with lack of support, care and access to healthcare facilities resulted in a miscarriage and loss of two children due to diarrhea and pneumonia. Presently, at the age twenty seven, Sita Devi has four children from eight pregnancies within a span of twelve years. The loss of four children and other related experiences taught her many lessons in life-a realization that malnutrition was the cause of the deepest sorrow of her life-the death of her children. In the present case study, malnutrition was not the sole cause of childhood mortality. Lost opportunity for education, early marriage, repeated teenage pregnancies with little birth spacing, physiological immaturity and poor nutritional status, inadequate nutrient reserves compromised her health and in turn, the health and lives of her children.

**Keywords:** Childhood malnutrition, Holistic, Intrinsic, Patna

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## Effect of pre-treatment bacillary load on treatment outcome of new pulmonary tuberculosis patients receiving DOTS under Revised National Tuberculosis Control Programme

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Under Directly Observed Treatment (DOTS) strategy, a high pre-treatment bacillary load may appear to be an important predictor for poor treatment outcome. The purpose of the study was to find out the treatment outcome of new smear positive pulmonary tuberculosis patients with various grades of sputum smear positivity. A retrospective record based cohort study conducted among all new smear positive pulmonary tuberculosis patients registered during period of 1st January 2015 to 31st December 2015 in a TU of Pune. Smear positive patients under study was divided into two groups as per grading of sputum AFB: Group I High bacillary cohort (sputum 3+) and Group II Low bacillary cohort (sputum 1+ and 2+ combined). Sputum conversion rate at the end of 2 months intensive phase and at the end of 3 months was significantly low in Group I as compared to Group II ( $p < 0.001$ ). Non adherence to treatment was significantly more among Group I in intensive as well as in continuation phase as compared to Group II ( $p < 0.001$ ). Unfavourable outcome was seen in 10 (16.1%) and 7 (2.8%) among Group I and Group II respectively ( $p < 0.01$ ). Odds ratio of unfavourable outcome was 6.62 (CI-2.40-18.2) among Group I as compared to Group II. From practical point of view, it would appear that grading of sputum need not be an academic exercise but instead help pinpoint a group of patients who are likely to have unfavourable outcome oftener than others and these patients need to be closely supervised.

**Keywords:** DOTS, Predictor, Pretreatment bacillary load, Treatment outcome

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## Determinants of HIV prevalence in tribal population of India

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Health of tribal people in India is generally poor since they are socially and geographically marginalized from the general population. Sexual practices of tribal people are also different than the general population. High prevalence of sexually transmitted infections has been reported among tribal population. Determinants of HIV infection among the tribal people is not yet well documented in India. It is important to study the factors associated with HIV infection among tribals, which will help planning of HIV prevention services for this population. Secondary data of National Family Health Survey (NFHS-3) of tribal people ( $n=8474$ ) was used. HIV prevalence was calculated with 95% Confidence Interval (CI). Chi-square / Fisher's exact test were applied to study determinants of HIV infection. Overall HIV prevalence was 0.25% (95% CI: 0.162, 0.379) among tribals of India. It was higher in the urban tribal population 0.51% (95% CI: 0.208, 1.132) than the rural 0.21% (95% CI: 0.122, 0.332), ( $p=0.086$ ). HIV prevalence was significantly associated with temporal mobility i.e. among those who were away from home for more than a month ( $p=0.004$ ). It was 1.16% (95% CI: 0.583, 2.740) among tribals who were away from home for more than a month and 0.21% (95% CI: 0.089, 0.486) among tribals who were not mobile. Correct knowledge of HIV prevention

was known to only 26.8% of tribal population, which was significantly higher ( $p<0.0001$ ) in urban tribals (53.8%) than rural tribals (23.1%). Higher prevalence of HIV in the urban tribal population necessitates effective strategies, additional messages for the migrant population. Determinants of HIV prevalence were studied for the tribals of India. This data may prove to be helpful to the government, NGOs and programme people to plan HIV prevention strategies for tribal people and further reduce new HIV infections.

**Keywords:** HIV prevalence, HIV prevention knowledge, NFHS-3, Tribals

### Physiological and physical profile of Indian fencers

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Fencing is an indirect combat sport which requires high physical, aerobic and anaerobic physiological capacities. These physiological and physical factors are important to evaluate fitness and monitor performance of fencers. Fencing is an emerging sport in India. Therefore it will be relevant and important to study these factors among Indian fencers. The purpose of the study was to study physiological and physical profile of Indian male fencers. All male fencers aged  $\geq 18$  years, who were on training and not injured were enrolled in the study. Anthropometry, physical and physiological tests of 7 foil, 7 epee and 9 sabre fencers were conducted at elite sports training institute in India during January 2013. Anthropometric parameters included age (years), height (cm), weight (kg). Lean body mass (%) and body fat (%) were measured using Bioelectrical Impedance Analysis (BIA) machine. Lower body anaerobic capacities peak and average power were measured by Wingate test. Aerobic capacity was measured as  $VO_{2max}$  (ml/min/kg) using Canadian test. Summary statistics mean, Standard Deviation (SD), percentiles were calculated. Mean age of fencers was  $24.2 \pm 3.19$  years, height was  $176.2 \pm 7.85$  cm, weight was  $68.7 \pm 6.04$  kg and body fat (%) was  $10.9 \pm 3.35$ .  $VO_{2max}$  was  $54.1 \pm 4.0$  ml/min/kg. Peak and average power was  $10.4 \pm 0.69$  Watt/kg and  $7.86 \pm 0.43$  Watt/kg respectively. Agility was  $6.64 \pm 0.18$ , flexibility was  $21 \pm 5$  and standing broad jump was  $2.56 \pm 0.16$  meter. Study results are useful for coaches and sports scientists to evaluate fitness, and monitor performance of fencing. Outcomes further help to plan specific training programmes to improve targeted motor qualities and subsequently performance of fencers. Data is not available for Indian fencers. Therefore, it will be pertinent to evaluate fitness and monitor performance of fencing in the Indian scenario.

**Keywords:** Aerobic and anaerobic capacity, Fencing, Fitness, India, Performance monitoring

### Comparison among the EMG activity of the anterior deltoid and medial deltoid during two variations of dumbbell shoulder press exercise

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To analyze the muscles activation of anterior and medial deltoid muscles while performing two different grip variations in dumbbell shoulder press. Ten healthy men volunteers (age =  $20.9 \pm 1.449$  years) agreed to the test procedures and performed 5 repetitions of two different grip variation of dumbbell shoulder press. The exercises were Arnold Dumbbell Press (ADP) and Overhead Dumbbell Press (ODP). Surface ElectroMyoGraphy (SEMG) was used to record the muscles activation and for measuring muscle electrical activity that occurs during muscle contraction. Paired t-test was used to detect mean differences between the two variations of dumbbell shoulder



press. It was found that Anterior and Medial Deltoid muscle was more active while performing ADP (AD-1346.4±292.495; MD-827.5±146.426) as compare to ODP (AD-1043.4±141.299; MD-725.4±100.4). Also while performing both the exercises, the muscles activation of anterior deltoid was found to be much higher than Medial Deltoid. Arnold dumbbell press was more effective exercise for the activation of Anterior and Medial deltoid muscles as compare to the Overhead Dumbbell Press. Anterior deltoid acts as primary muscles while performing both the exercises, as the muscle activation is much higher as compare to medial deltoid.

**Keywords:** Anterior and medial deltoid, Dumbbell shoulder press, Electromyography, Muscle activation

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### **A study to assess the knowledge and practices of newborn care among mothers attending pediatric inpatient departments of selected hospitals in Pune**

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Globally, four million new-borns die before they reach one month of age in 2015 approximately 45% of deaths among children under five were newborns. The mortality ratio of Infant and under 5 in developing countries have reduced significantly in the past couple of decades, but the neonatal mortality rates have remained static. The study has conducted using cross sectional design. A structured questionnaire and observation checklist was used to collect the data was used to interview the mothers. The survey questionnaire consisted of three sections; section A was pertaining to socio-demographic information, section B was regarding antenatal care; section C was regarding the immediate new-born care including cord care, eye care, bathing of new-born and breastfeeding practices. Respondents' mean knowledge was on keeping new-born warm was 40.2%, on new-born care 48.4%, on immunization 71.8%, on danger signs 25.53. Mean knowledge and practice of respondents was on measures to keep warm 8.5 and 17. Although 62 (62%) had knowledge regarding hand wash before the breastfeeding, and after diaper care, only 11 (11%) followed it in practice.

**Keywords:** Exclusive breastfeeding, Eye and cord care, Knowledge, New-born care practice, Pediatric

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### **Analysis of relevance of formal professional training to hospital housekeeping staff in India using SAP-LAP inquiry**

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The purpose of this paper is to explore the need and relevance of professional training to healthcare housekeeping aide. This would not only enhance their service delivery but also improve the quality of service delivery in Industry. The foundation of the present study is based on extensive review of extant literature by authors and appreciative inquiry. Furthermore, keeping the purpose of the study in mind authors tested the relevance of training using situation-actor-process and learning-action-performance (SAP-LAP) technique of enquiry. The study outcome has proposed the relevance of professional training to healthcare housekeeping aide in India. This can be further used for design of professional training modules for housekeeping aide in healthcare for sustained and enhanced service delivery of the Industry. The study proposes need and relevance of professional training based on insights

from Artificial Intelligence (AI) and literature review; it needs to be further validated using various methods including empirical ones. Although, authors have interviewed few selected hospital administrators and housekeeping aide from respective hospitals based on their availability and willingness to contribute. They may induce high risk of bias and to further strengthen the present study, the similar study needs to be conducted on large scale. Since, housekeeping aide in healthcare in India primarily falls under unorganized sector with lack of awareness and unity among workers of the industry. However, interviewing the senior housekeeping aide provided diversified insights. The study recommendations are configured outcomes of literature review of extant literature, appreciative inquiry and SAP-LAP analysis. These recommendations would help industry and professionals to understand the prominence of such training and development to enhance service delivery and service quality of the Industry. The study finding formed a basis for the subject to establish and to be picked up by researchers to validate further in another setup. The present study ventures in to new domain i.e. it is one of the initial attempt to understand the relevance of training of healthcare housekeeping aide in India.

**Keywords:** Healthcare housekeeping aide, Professional training, Profitability, Service delivery, Service quality

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### **Logistics of diagnostics centre gaps in the process and suggest measures to improve efficiency.**

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The project is based on the procedure for inward and outward transportation of specimen/samples, kits, reagents, documents and consumable from different locations of diagnostics centre. This also covers training requirements for personnel involved in Logistics. The purpose of my study was to understand gaps in the process of sample movement and suggest measures to improve Turnaround time (TAT), improve efficiency, and ensure integrity of samples, reduction of cost. And assess training requirements of personnel involved. Methodology used for this study is: problem statement, root cause analysis, data collection method and time motion study. Primary data for process analysis and to improve their efficiency collected by doing current route surveys. Visited all PUP's (Pick up Points). Plotted all PUP location using "Google Map" application, by noting down latitude and longitude of location. This data helped to understand actual TAT of the sample and also helped to manage kilometres and reduce kilometre costing of agencies. To assess training needs of logistics boys collected data through survey questionnaire. The study identified few findings like temperature reading not captured at all points, erroneous routing of some of the routes, incorrect arrival time captured by logistics boys, sample integrity issue with possible root causes which in turn will help to understand the gaps in the process and will be useful to improve the efficiency by designing a routes in terms to reduce customer TAT, continuous monitoring and maintenance of sample temperature and tracking of sample movement. Managing kilometres and manpower thereby improvising efficiency by reducing cost. Recommendations like technology intervention (Logistics Application), thermal bag (Gel packs lasts longer in this bag), training to personnel involved in Logistics will help to improve the efficiency of the process.

**Keywords:** Gel packs, Latitude and longitude, PUP's (pick up points), SOP (standard operating procedures), Turn around time (TAT)

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## Comparative Study of Nutritional Status of Preschool Children of Rural Area and Urban Slum

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**Background:** Malnutrition is a major public health problem in developing countries and in early stage of life affects growth and development of the child. The incidence and prevalence of malnutrition may differ among rural and urban population, due to a variety of factors.

**Purpose:** The present study aims to assess and compare anthropometric indices among preschool children in a rural area and in urban slum.

**Research Design:** A cross-sectional study was carried out to compare rural (n=40) and urban (n=40) children aged 2-5 years old from in and around Pune. Anthropometric indices weight-for-height (WHZ), weight-for-age (WAZ), height for age (HAZ) and MUAC were used to estimate the children's nutritional status.

**Results and Discussion:** Prevalence of moderate wasting (WHZ<-2SD), severe stunting (HAZ<-3SD) and severe underweight (WAZ<-3SD) was higher in children from urban slums while prevalence of severe wasting (WHZ<-3SD) was similar in both the populations. MUAC criteria revealed that 2.5 % children in urban slums were severely malnourished (MUAC<-115mm) which was not detected among rural children more over percentage of children at risk of malnutrition was also found comparatively more in urban population. Dietary assessment revealed no difference in the consumption of cereals, legumes, bakery products in urban and rural populations but urban population consumed processed foods, sweets (chocolates/candies) and tea, in addition.

**Research implications:** The study would help to identify determinants for malnutrition and thereby appropriate measures to combat child malnutrition in rural as well as in urban set up.

**Novelty:** Present study investigated the extent of malnutrition and the differences in food habits among children from rural as well as urban setting.

**Key words:** Nutrition status, Preschool children, Rural, Urban

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## Effectiveness of text messages for positive change in behaviour amongst young adult tobacco users in rural Wardha: Quasi experimental study

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**Introduction:** Addictions developed in adolescence are likely to persist into adult life. The most susceptible time for tobacco use in India is during adolescence and early adulthood (15-24 years). Hence, an innovative community-based intervention for reducing primary uptake of tobacco among young adults is on priority. The objective of this study is to study the effectiveness of text messages for positive change in behaviour amongst young adult tobacco users in rural Wardha. A community based interventional study was carried out. All the young adults in the age group of 12-25years and willing to participate from selected village were enrolled in the study after informed consent. At recruitment, information like sociodemographic data, tobacco use pattern, addictions in family and peers was collected. The mobile numbers of the enrolled participants were taken and messages disseminating anti-tobacco health education were sent at fixed interval of time. The follow up was done at 3 months and 6 months. The

effectiveness was measured on the parameters like reading the message, recollecting the most recent message correctly, understanding of the message and change in behaviour in terms of avoiding company of peers who consume tobacco and others. The results show a significant change in the behaviour in terms of avoiding the tobacco consuming peers and family members by the end of 6 months. The others parameters also showed a change. A formative research through Focussed Group Discussions was conducted which showed the feasibility and acceptability of text messaging to young adults in rural settings.

**Keywords:** Young adults, Text messages, Wardha

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### **Prevalence of Metabolic Syndrome in Pune City, India**

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**Background:** Prevalence of metabolic syndrome indicators like fluctuated lipid profile, hypertension, obesity, impaired glucose levels are increasing exponentially in all age groups among developing countries. The prevalence ranges between 11%-56%. Changing lifestyle and dietary habits are the most related causes. Coronary Heart Disease and Stroke ranks 1st and 3rd respectively as major causes for death in India.

**Purpose:** To evaluate the prevalence of metabolic syndrome among adult and school age population in urban Pune.

**Methods and materials:** The study involved a questionnaire survey for n=185 adults (aged 20-50 yrs.) and n=151 school aged children (9-15 yrs.). The indicators for this study were Body Mass Index (BMI), Waist Circumference (WC), Blood Pressure (BP), Physical activity. Also biochemical Parameters (Blood Sugar Level (BSL), Lipid profile) were assessed among adults.

**Results and Discussion:** Mean BMI and WC were above normal in 69% and 75% adults and 28.3% and 22% children. Mean Blood pressure was high among 35% adults and 10% children. Only 50% of the adults and 61% of the children performed vigorous physical activity 5 days a week. Mean BSL was observed to be 102 mg/dl, indicating risk of dysglycemia. Mean Triglyceride and HDL levels were observed to be 135 mg/dl and 45.09 mg/dl.

**Research Implication:** The results indicate the existing risk of metabolic syndrome and possible future risk of Non Communicable Diseases in the affluent population.

**Novelty:** This study provides a platform for a large scale blanket health promotion initiative. This may help in rectifying the existing risk and preventing further development of NCDs in all age groups.

**Key words:** Adults, Blood pressure, Diabetes, Metabolic syndrome, Obesity, School children

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### **Market survey for the availability of processed foods with health claims in supermarkets in Pune and Delhi**

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**Introduction:** Food labelling not only provides us with the information but also encourages healthy eating habits. Food labelling is therefore an important communication tool between consumers and food manufactures. Consumer's ability to read and understand information on a food label is vital.

**Purpose:** Recent evidence shows a trend wherein people have moved from consuming meals to an increased consumption of snacks. The aim of the study is to conduct a market survey to identify the packed foods available which carry health claims on their labels.

**Methodology:** Market surveys were conducted out in 10 selected popular supermarkets (Dorabjees, Big Bazaar, MORE, Reliance Mart, D-Mart etc.) in Pune and Delhi to specifically look for packaged foods carrying health claims.

**Results & Discussion:** The packaged foods identified in the market surveys were categorized into 11 broad food categories such as Milk and Milk products, Breakfast cereals, Beverages, Confectionery, Bakery products, Savories, Ready-to-eat foods, Fats and oils, Cereals (flours, rice) and spices and condiments. The varieties and flavours of various foods were further tabulated in the sub categories and health claims were recorded. Interestingly, many products, e.g. fats and oils carried health claims such as low fat, transfat free, zero cholesterol, fortified with vitamin A, D & E etc.

**Research implications:** To create awareness among the general population about the health claims mentioned on the packaged foods which would help them in making healthy food choices. It is envisaged to provide guidelines on social media (LinkedIn/Facebook) to enable consumer understanding of food labelling.

**Novelty:** The study will result in a tool such as webpage (via social media) to impart education on food labelling to consumers which would enable them in making healthy choices of foods.

**Keywords:** Nutritional Information, Nutrition labels, Health Claims, Food labels

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### **Comparative Performance of Clinical Breast Examination and Mammography for Breast Cancer Screening in Indian Setup**

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**Introduction:** Detecting Breast Cancer (BC) early is critical for providing effective treatment, thereby, reducing the disease burden and mortality. 1 Common methods used for BC screening are Clinical Breast Examination (CBE) and Screening Mammography (SM). CBE is affordable, but gives inconsistent results, while the expensive SM has better chances of detecting cancer at very early stage. 2,3

**Purpose:** To compare the performances of CBE and SM in an ongoing BC screening programme in Pune city.

**Methodology:** We have created a Mobile Cancer Screening Unit which operates in Pune city with a team of trained health personnel who reach out to women in the community and impart awareness on BC. After obtaining consent and relevant clinical history, CBE and SM is performed on all eligible women (40 - 70 years). While CBE findings are recorded on the spot, the SM images are made available to the radiologists at the center for reporting. All abnormalities detected are recalled to the center for further diagnostic follow-up. Retrospective data (n= 852 women) was collected between period of June-November 2016.



## Results & Discussion:

| Total woman screened: 852<br>Age: 40-70 years |        |        | Period: June – November 2016 |                                                                                                         |
|-----------------------------------------------|--------|--------|------------------------------|---------------------------------------------------------------------------------------------------------|
| Parameters                                    | CBE    | SM     | Both tests                   | Literature findings                                                                                     |
| Screened positive/ recall rate                | 117    | 106    | 77                           | Practices with recall rates between 4.9% and 5.5% achieve the best trade-off of sensitivity and PPV (3) |
|                                               | 13.73% | 12.44% | 9.03%                        |                                                                                                         |
| Cancer cases detected                         | 0      | 0      | 1                            | Incidence rate = 0.7-4.4% (4)                                                                           |
|                                               | 0%     | 0%     | 1.36%                        |                                                                                                         |

Based on pilot data from all three modalities, recall rate and chances of picking cancer was the best when BC screening was done with a combination of CBE+SM.

**Research implications:** Identification of appropriate BC early detection methods relevant to the Indian context.

**Novelty:** Comparative performance between CBE and SM has not been reported before.

Creating employment opportunities for allied healthcare professionals.

**Keywords:** Breast Cancer, CBE, Mammography, Screening

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## Women's Education, Household Decision Making and Their Inter-Linkages with Contraceptive Use in India

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**Introduction:** Fertility and contraceptive use in developing countries associated with various markers of socio-economic status, most prominent of which is women's education (Martin, T. C. 1995) the well-documented link between female education and use of contraception plays a significant role in development of family planning policies in lower income countries. Improving women's education has been seen one way to increase their status and autonomy (Jejeebhoy, S. J. 1995) and it has been proposed that autonomy acts as a mediator of the link between education and contraceptive use

**Purpose:** The study attempts to investigate the relation between women's participation in household decision making and education with contraceptive use in India.

**Research Methodology:** This paper utilizes the data from National Family Health Survey 2015-16 (NFHS-4), the fourth in the NFHS series, it has provided information on population, health and nutrition for India and each state/Union Territory.

**Results & Discussions:** This paper highlighted the fact that High women's autonomy seen as desirable, however, this study finding suggests that the impact of women's education on contraceptive use is independent of decision autonomy. In Andhra Pradesh, due to women illiteracy and low work participation, it effects on household decision-making. Hence, in the state the higher female and male sterilization and moderate use of other contraceptive methods like as IUD, pill and condoms also the unmet need for spacing found to be weak. But in Sikkim, due to high women education and decision making had a high prevalence of male sterilization and IUD and low prevalence of female sterilization. With high participation in decision making and literacy the use of modern methods is very low among Manipur women; also the unmet need found higher in the state.

**Research Implications:** The development of reproductive health is crucial to achieving the (MDG) goals on improving maternal health, reducing child mortality and eradicating extreme poverty. This requires that women have access to safe and effective methods of fertility control.

**Novelty:** The previous research has shown that better access to contraception helps people to avoid pregnancies they do not want, and to plan and space the pregnancies they do want. The purpose of family planning is to make sure that the desired resources are available for parents to give their children a better quality of life.

**Keywords:** Contraceptive Use, Decision Making, Education.

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## **HIV/AIDS Initiative in India: Community Mobilization and Sustainability of Health Care**

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**Introduction:** In India, as in other countries, community mobilization has proved valuable in working with sex workers and other groups at high risk of HIV infection, as an approach that can improve HIV risk reduction and enhance program relevance and sustainability. The challenge of community mobilization has been threefold: to develop cohesion and a sense of shared identity among marginalized individuals; and to empower them to define and implement their own agendas for change as a community. In 2010, under Bill and Melinda Gates Foundation (BMGF) Initiative in India, (AVAHAN 140 community groups or organizations have been formed, some of which are legally registered and charge nominal membership fees. This enhanced scope of the programme synergies well with the NACP III, which also aims to strengthen participatory programming and build community networks. During the course of this phase, AVAHAN plans to transfer the Targeted Intervention programme to its natural stakeholders – Government of India and communities.

**Purpose:** Even though community mobilization approach is used in HIV/AIDS intervention programs, an emphasis on the importance of Community Mobilization (CM) approach in addressing structural issues and the structural barriers in terms of HIV issues and the relating policy implications of structural barrier is not undertaken.

**Research Design:** A detailed analysis of community mobilization, relevant at the level of individual groups is conducted among 4 Community based groups (CBGs), operating in Maharashtra using participatory research methodology (PRM).

**Results & discussion/Findings & interpretation:** The research findings highlight that community mobilisation through these CBGs is successful in implementing the existing government programs among high risk groups. The study reflects that communities' engagement with the state, and society increased and the community's decision making skills, networking, and resource mobilisation skills enlarged and community mobilisation helped to address issues of rights, social entitlements and stigma. This study also identifies some of the structural barriers of CBG approach, while dealing with vulnerable groups.

**Research implications:** Research finding is helpful in bringing community mobilization group (CBG) models in our health policy to build communities capacity to oversee and manage aspects of disease prevention programming, and in dealing with any related health care challenges among stigmatized groups and related policy change in dealing with structural barriers.

**Novelty/Originality:** Qualitative research is conducted to assess the sustainability of community groups capacity in disease prevention and awareness creation using participatory research methodology, is rare especially among HIV/AIDS specific groups. A participatory approach to monitoring in health and development, in which the communities from whom data are collected are involved in analyzing those data themselves, can enhance the legitimacy and practical usefulness of such efforts. The environment where resources for health are increasingly tight, methods that can improve program performance are essential. The method may contribute to strengthening programmatic approaches and the commitment to undertaking such approaches in policy making

**Keywords:** Community mobilization, HIV/AIDS, health care, high risk group, Intervention

## Breast Cancer Biobank: A Novel Resource for Translational Research

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**Introduction:** Current Breast Cancer (BC) knowledge has primarily emerged from translational research in western populations. Given the genomic and population diversity, extrapolation to BC in Indian women is incorrect. Hence, Indian-population specific research resources are needed.<sup>1</sup> Herein, we describe the creation of a pilot BC Biobank as a repository of clinically annotated bio-specimens from BC patients at our clinic.

**Purpose:** To establish a BC Biobank for translational research.

**Methodology:** Given its high prevalence in India, our pilot study focuses on a BC subtype named Triple Negative BC (TNBC).<sup>1</sup> Retrospective data (i.e. medical history, clinico-pathology, imaging, surgery, chemotherapy and post-treatment status) was collected after informed consent from 43 TNBC patients. Formalin-fixed paraffin-embedded (FFPE) tissue from post-surgery samples was also collected.<sup>2</sup>

| Parameters     |                                       | Number of Cases<br>(out of 43) | Percentage   |
|----------------|---------------------------------------|--------------------------------|--------------|
| Age(years)     | 31-40                                 | 10                             | 23.25        |
|                | 41-50                                 | 15                             | 34.88        |
|                | 51-60                                 | 09                             | 20.93        |
|                | 61-70                                 | 07                             | 16.28        |
|                | 71-80                                 | 02                             | 4.65         |
| Histopathology | IDC Gr I                              | 00                             | 0            |
|                | IDC Gr II                             | 21                             | 48.84        |
|                | IDC Gr III                            | 18                             | 41.86        |
|                | DCIS                                  | 03                             | 6.96         |
|                | Poorly differentiated<br>Meta plastic | 01<br>01                       | 2.32<br>2.32 |
| Tumor Size     | T1 (<2cm)                             | 08                             | 18.6         |
|                | T2 (2-5cm)                            | 23                             | 53.49        |
|                | T3 (>5cm)                             | 01                             | 2.32         |
|                | T4 (Extended to chest<br>wall)        | 01                             | 2.32         |
|                | Tumor not assessed                    | 09                             | 20.93        |
| Disease Stage  | IA                                    | 07                             | 16.28        |
|                | IIA                                   | 15                             | 34.88        |
|                | IIB                                   | 04                             | 9.3          |
|                | IIIA                                  | 06                             | 13.95        |
|                | IIIC                                  | 01                             | 2.32         |
|                | IV                                    | 01                             | 2.32         |
|                | Complete Response                     | 09                             | 20.93        |

|                         |                   |    |       |
|-------------------------|-------------------|----|-------|
| <b>Chemotherapy</b>     | Neo adjuvant      | 34 | 79.1  |
|                         | Adjuvant          | 09 | 20.9  |
| <b>Survival</b>         | Alive             | 36 | 83.72 |
|                         | Deceased          | 05 | 6.98  |
|                         | Loss to Follow-up | 02 | 4.65  |
| <b>Imaging Database</b> | Mammography       | 21 | 48.8  |
|                         | Ultrasound        | 17 | 39.5  |
|                         | Not available     | 05 | 11.62 |

## Results and Discussion:

TNBC Biobank Status:

**Research implications:** DNA from FFPE-TNBC tumours: to identify mutational patterns in cancer-specific genes. Imaging database: to identify unique radiological features of Indian TNBCs.

**Novelty/Originality:** Creation of a novel research repository for TNBC-themed research in Indian women. Driver for research collaborations with scientists from academic and private sectors.

**Keywords:** Breast Cancer, Translational Research, Biobank, TNBC

## Prevalence and Health Seeking Behaviour of Depressed Persons in India

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Depression is a significant contributor to the global burden of disease and affects people in all communities across the world. India enters the new millennium with many changes in the social, political, and economic fields with an urgent need for reorganization of policies and programmes for mental health. The objective of the study is to study the prevalence of depression and to find out the possible factors of depression in India and to study the unmet need for treatment among depressed people. Present study utilizing the secondary data from study on global ageing and adult health (SAGE), India. This is implemented in six states – Assam, Karnataka, Maharashtra, Rajasthan, Uttar Pradesh, and West Bengal. A separate bivariate analysis and multivariate logistic regression analysis are carried out to examine the socio-economic and demographic factors, risk factor, co-morbidities affecting the dependent variables used in the study i.e. depression. The study reveals that the prevalence of Symptom-based depression is high than self-reported. It is found to be highest in both less developed and more developed states Uttar Pradesh and Karnataka. It is found high in person with higher age, low educational level, poor, in currently married and widowed/divorced/separated. Unmet need for medication and treatment is found to be high for depression and it gets decreased as it co-morbid with other diseases. The high unmet need for medication in the present study stresses for efforts to provide better health care to them.

**Keywords:** Health-seeking behaviour, co-morbidities

## **An Analysis of Organizational justice on employee engagement in selected Healthcare NGOs in India.**

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**Introduction:** Organizational justice refers to employee perceptions of fairness in the workplace. These perceptions can be divided into four forms namely distributive, procedural, informational, and interpersonal. Justice perceptions can influence employees' attitudes and behaviour for good or ill, in turn having a positive or negative impact on their performance and the organization's success (Baldwin, 2006). Justice is therefore a basic requirement for the effective functioning of organizations and the personal commitment of the individuals they employ (McFarlin & Sweeney, 1992). Employee engagement which refers to a heightened emotional and intellectual connection that an employee has for his/her job, organization, manager, or co-workers that in turn influences him/her to apply additional discretionary effort to his/her work (Gibbons, 2006)

**Purpose:** The purpose of the paper is to investigate the effect of organizational justice perceptions on engagement of employees in selected healthcare Non-Governmental Organizations in India.

**Research Design:** Justice Perceptions were measured using Colquitt's four construct model comprising of distributive, procedural, interpersonal and informational justice while engagement was measured through a 7 item scale. Inferential statistics comprising of correlation, multiple linear regression models and ANOVA analysis were applied to establish the relationship between the independent and dependent variables. Quantitative data was analyzed through the use of questionnaires. Qualitative analysis was also used understand the others aspects which could not be covered in the quantitative results. The study adopted descriptive and correlational research designs with a statistical sample of 100 employees from selected Indian Health care NGOs responsible for key result areas in selected Healthcare Non-Governmental Organizations in India.

**Results & discussion:** Results of the study show that distributive justice perceptions, procedural justice perceptions, interpersonal justice perceptions and informational justice perceptions have a significant relationship with employee engagement in health care non-governmental organizations in India. The study findings provide support to the contention that employees evaluate their employer/employee interactions from a justice perspective and interpret the experience as just or unjust treatment. This justice perception in turn impacts on their being engaged or not engaged towards the organization. The study therefore recommends that NGO health care organizations enhance their organizational justice in order reap the positive outcomes of highly committed employees.

**Research implications:** The findings of this study will help in the development of work place policies which promote fairness in order to enhance employee engagement and as a result efficient performance. The management of health NGOs in India will significantly benefit from the findings in that it helps them appreciate the role of justice and its influence on engagement of employees. This enhanced understanding should lead to the development and application of appropriate human resource management practices in the Indian health care NGOs.

**Keywords:** Human resources, Employee engagement, Organizational Justice, NGOs

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## **Understanding Challenges and Opportunities before Wellness Tourism in India**

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**Introduction/Background:** Make in India initiative of the present government has identified tourism & hospitality as one of the sectors for expediting the growth of Indian economy through generation of employment opportunities



in the country. Adhering to the national call, author conducted a study on Wellness Tourism (WT). WT is a travel associated with the quest for maintaining or enhancing one's personal wellbeing. In India this niche segment is still unexplored.

**Purpose:** The objective behind research in hand was to understand the challenges & opportunities before WT in India. It also studied the impact of changing family size, women's social roles and concern towards healthy lifestyles over WT.

**Research Design:** Research was based on both primary as well as secondary sources of information. The primary data was collected through a questionnaire survey of 297 people from Himachal Pradesh (Shimla, Manali & Dharamshala) belonging to different income & age groups. The income groups of the sample were 25 to 35 years, 35 to 45 years, 45 to 55 years and 55 years & above. The income groups included were less than 0.3 million, 0.3 - 0.6 million, 0.6 - 0.9 million and 0.9 million and above annually. In-depth interview of 15 hoteliers and tourist guides was also conducted. Analysis and interpretation of data was done through Cluster Analysis, ANOVA Test and Factor analysis.

**Results & discussion/Findings & interpretation:** The changing demographic and economic environment has led to a significant change in the attitude of people towards tourism. People in the higher income group have started connecting tourism with wellness rather than the traditional cultural, sports or eco- tourism. Attributes such as availability of spa, gym and healthy food have started luring higher income groups. Sample also showed keen interest for attending yoga classes, meditation sessions or spiritual lectures as part of their tourism package.

**Research implications:** WT is generating employment and earning revenues. India in addition to housing beautiful geography, rich culture, variety of food, is the home of Ayurveda and Yoga. All these factors are bound to make India a favorable destination for WT.

**Novelty:** There has been an insignificant research in the field of wellness tourism in India. Research Outcome will be beneficial to the tourism industry and other support industries such as spa, yoga, meditation centers and spiritual gurus.

**Keywords:** Changing Demography, Changing Economy, Employment Generation, Wellness Tourism, Yoga.

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## Promoting Naturopathy in India

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**Introduction:** The health condition of Indian is becoming an issue of concern, as number indicates India has maximum number of people suffering from many diseases. There are preventive as well curative ways to resolve it. Within this broad classification prevention and cure; multiple alternative health care systems are available. Allopathy has got maximum share of this market, but alternatives like Naturopathy which are equally effective as well as are economic has not been so popular. Naturopathy include nutrition, hydrotherapy, fasting therapy, yoga, behavioural therapy, and health promotion. It integrates the physical, mental, and spiritual aspects of human being and has the capacity to prevent and in some cases also cure the diseases.

**Purpose:** The system need to promote its benefits to the public to attract them towards it. In the prevailing, situation efforts are being made by multiple stakeholders like the Government, private players as well as non-profit organizations, but effects are less than desired. The paper analyses the functioning of two organizations Nisargopchar Ashram and Kaivalyadhama Health and Yoga Research Centre both of these organizations are working in Pune.

**Research:** The study would be based on case study method and analysis would be done by making comparison between cases.

**Results & discussion/Findings & Interpretation:** Gandhi founded Nisargopchar Gramsudhar Trust on 1st April 1946, which worked under the dynamic leadership of Manibhaiji. Over the years the Ashram has made remarkable progress and has set up the unique example in the field of Naturopathy. Ashram conducts every day lectures on nature cure principles, dietetics, yoga and various chronic diseases to educate the patients and make them aware about the importance of laws of nature. Swami Kuvalayananda founded Kaivalyadhama in 1924, and since then it has carried out substantial and innovative studies into almost every aspect of Yoga's practice. Both of these organizations are functioning well and can act as an example for others to follow as role model to promote Naturopathy in consumer.

**Research implications:** Both of these organizations are functioning well and can act as an example for others to follow as role model to promote Naturopathy in consumer.

**Novelty/Originality:** These two organizations are showing the way to practice Indian way of focus on preventive health care.

**Keywords:** Naturopathy, alternative health care, preventive health care, Nisargopchar

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## **Assessment of Healthcare Utilization in A Community-Centric Model of Primary Healthcare for Rural Populations**

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**Background:** Public health infrastructure in rural communities, where 70% of India's 1.2 billion live, begins with Health Sub-Centres as first point-of-care, which require a >3 km commute, have no physician access and offer little proactive risk screening/ curative care. PHCs (first point of physician access) require a >7Km commute, threatening rational care-seeking and long-term adherence. The IKP Primary Healthcare model was operationalized in rural Thanjavur, through SughaVazhvu Healthcare (SV) – a not-for-profit social enterprise – delivering primary care and chronic disease management. The model promotes the use of innovative technology products suited to low-resource settings to improve care delivery; evidence-based treatment protocols to standardize care and use of human resource alternatives (ex: AYUSH physicians) to overcome physician shortfall. This study is an effort to assess the health service utilization of one such community-based clinic facility, as measure of its ability to meet community health needs.

**Purpose:** The primary objective of the study is to assess service utilization patterns at the SughaVazhvu facility and also association with underlying healthcare needs of the local community.

**Approach:** Data on healthcare needs was obtained from community survey and utilization data from SV's residents' visits database.

**Results:** Preliminary data analysis indicates that 22.65% (203) of the households in the local community have utilized SV services in the last six months. On-going data analyses of records of the last 6 years, includes age-based stratification of clinic services, common primary care presentations, proportion of chronic vs. acute care services provided, etc.

**Implications:** The paper will provide strong insights to aid on-going efforts within the public health system to strengthen last-mile care delivery capabilities, to cater to remote, rural populations.

**Novelty:** The model represents an innovative strategy involving technology and alternate human resources, to deliver patient-centric, proactive, basic primary care services.

**Keywords:** Primary healthcare innovation, patient-centric care, chronic disease management

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## **Prevalence of Mental Disorders in Clinical Settings of Pune City**

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**Background:** Mental health was a much unheeded field earlier in India. Little is known about the extent and challenges in diagnosis of mental disorders in the clinical settings. Hence, it was important to study the current scenario of mental illnesses. Numerous studies have been conducted in other parts of India but not in Maharashtra.

**Purpose:** The study was carried out to estimate the prevalence of mental disorders and explore the differences in the sociodemographic determinants of the patients by types of mental disorders in the clinical settings.

**Research Methodology:** The study was undertaken among 1 private clinic (n=90) and 1 private hospital (n=366) of Pune. An informed consent was taken from the medical officer and the psychiatrists. Data was obtained from the case files of the patients that were registered between January and March 2014, in the Psychiatric OPD of both those settings. Interviews were conducted with the senior psychiatrists.

**Results:** Most prevalent condition was Neurotic, stress-related and somatoform disorders (34.0%); it was highest among females (34.6%), males (33.5%), married patients (34.2%) and in age group 20-29 (36.3%). Second prevalent condition was Schizophrenia, schizotypal and delusional disorders (26.5%); it was highest among unmarried patients (36.3%). Third prevalent condition was Mood disorders (25%); it was highest among divorced patients (28.6%). The least prevalent condition was alcohol substance use disorder and it was highest among male separated patients (50.0%).

**Research implications:** The study holds importance because it provides useful information about the most prevalent mental disorders in the clinical settings. Findings will be useful to develop mental health care infrastructure including health care providers and customized intervention programs to fulfil the needs of district level clinical community.

**Novelty/Originality:** Prevalence of mental disorders in clinical settings is not available for Pune.

**Keywords:** Clinical Settings, Mental disorders prevalence, Pune, Socio-demographic determinants

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## **Ayurveda Ergonomics-Practical Solutions for Working Women in IT Sector**

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**Introduction:** Information Technology sector has its inherent spill over benefit of creating employment potential for a large pool of educated unemployed youths including an attractive option for the women. The industry has now captured about 51 per cent of the world market women constitute 24 percent of total IT work force which is higher than participation in National economy as a whole (Mansi 2013).

**Purpose:** Women employees in software sector have to fulfil multiple responsibilities as a professional and as

homemaker. The target and performance based works imparts more stress while the busy schedule at home adds up to the physical and mental labour. Recent researches identifies an array of health issues-low back ache, stress induced ailments, eye problems are some of them. (Geetha& Pandey 2010).

**Approach:** Ayurvedic concept of Ergonomics is not just designing the work to fit the worker. It emphasizes on moulding the workers' endurance to adapt to the work in a healthy manner.

Altered daily routine, food habits sleep pattern and stress has been identifying as major risk factors for non-communicable diseases. The Ayurvedic intervention therefore focus on imparting mediated daily routine, healthy food, quality sleep and corrective measures for mental and social health, which can alter the health and quality of work of an individual.

**Research implications:** The presentation is a humble effort to propose a cost effective and practical protocol with the help of Ayurvedic and yogic practices, which can be conveniently adopted in spite of the busy schedule of the professionals for better work outcome and quality of life.

**Novelty/Originality:** Ayurvedic Ergonomics is an emerging concept which undisputedly can be used as a potential tool to improve the quality and health of workers in all sectors.

**Keywords:** Ayurveda, Ergonomics, Women, Software sector

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## Role of Tertiary Health Care NGOs in Health Care of Abandoned Geriatric Population in India

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**Introduction:** As per Help Age, at present 95 million people in India are above the age of 60, by the year 2025 nearly 80 million more will be added to this population bracket. With improved life expectancy rate in our country, it's estimated that as many as 8 million people are currently above the age of 80 years. Changing family value system, economic compulsions of the children, neglect and abuse has caused elders to fall through the net of family care. Homes for the Aged are ideal for elderly people who are alone, face health problems, depression and loneliness.

However, increased life expectancy does not imply sound health conditions for these inmates of old age homes. The abandoned old age population suffers from infectious to chronic ailments like degenerative diseases like Parkinson's disease, dementia, Alzheimer's to name a few of old age diseases. The focus of this study will be case stud(ies) of multiple tertiary care old age homes. We will conduct in-depth survey interviews of the inmates, staff, care givers and social workers to understand and comprehend the level of health care or the lack of it in these homes. The paper will seek to understand and analyse the wide gaps of health care support in these homes and ways of bettering them.

**Purpose:** The author found out that abandoned geriatric care is a problem which has assumed alarming proportion. In response, NGOs have started many old age homes which are honest to their objective but lacking in the delivery of sound tertiary geriatric care. The author also being a nutrition and wellness expert is concerned to address the means that can improve all aspects of their health in terms of providing nutritional, emotional and mental support. Conclusively, the paper will attempt to identify aforesaid gaps and suggest possible solutions to improve the quality of inmates' lives.

**Research Design:** The methodology will be field visits of the old age homes where we will observe existing practices, conduct in-depth interviews of the care givers, visiting health care professionals and authorities who run these homes. We will also rely on secondary research done on the subject. We will employ quantitative surveys to social workers, medical practioners, nutritionists to understand areas of improvement in health care of old age homes inmates.

**Results & discussion:** We will provide the results to such old age homes to improve upon the existing gaps by

including them in their day to day practices.

**Research implications:** We will also share results with the counsellors, nutritionists and emotional support givers to improve services.

**Novelty/Originality:** There have been numerous studies concentrating on Old age homes and their need in the society. However, our study aims to identify the health care loopholes and suggest practical solutions for course correction.

**Keywords:** Tertiary care, nutrition, wellness, old age homes, care givers

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## Overview of Rotavirus Vaccines and Parameters for Determination of Vaccine Efficacy and Immunogenicity

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**Introduction:** Rotavirus has been a major concern for both developing and developed countries since it causes more than 500,000 death and over 2.4 million hospitalization cases in infants and children less than 5 years of age (Jiang, Jiang, Tate, Parashar, & Patel, 2010). Currently two licensed rotavirus vaccines are marketed, namely RotaTeq® (Pentavalent vaccine by Merck Vaccines, Whitehouse Station, NJ) and Rotarix® (Monovalent, GSK Biologicals, Belgium). Since 2006, the WHO has made it mandatory to include rotaviral vaccine as a part of the National EPI (Extended Program for Immunization) (Jiang et al., 2010).

**Purpose:** In the current review article, the reviewer aims to collect and compile the data on efficacy tests of all the rotavirus diarrheal vaccines that have been developed until today. The primary aim is to understand the parameters being used for the determination of vaccine efficacy and immunogenicity and to identify potential biomarker (serological or other) which can be further developed to be used as surrogate endpoint to clinical outcomes of development of disease or post-vaccination immunity.

**Approach:** Clinical trial data collection was done from various available published resources of different journal articles and also on WHO Clinical Trial Website.

**Discussion & interpretation:** The first generation vaccines based on Jennerian approach were developed since 1980s and mostly were cell culture attenuated animal rotaviruses administered to humans for prevention of rotaviral diarrhea. Most vaccinated candidates' demonstrated fever as an adverse response 2-4 days. Post immunization due to which most first generation vaccine was never commercialized. One of the commercialized vaccines, Rotashield, also demonstrated fever as an adverse reaction but the major reason for retraction of Rotashield from the markets was due to its potential association with intussusception.

Post withdrawal of Rotashield from the commercial market, the need for an efficacious vaccine against severe rotaviral diarrhea elevated. RotaTeq® developed by Merck, USA, a pentavalent vaccine with five human bovine reassortant expressing outer capsid G1, G2, G3, G4, and P [8] (subgroup P1A) of human origin (Peter et al., 2009). Similarly, the Rotarix® was developed by GSK Biologicals demonstrates efficacy trends similar to RotaTeq®. Rotarix, a monovalent vaccine consisting of human P1A [8] G1 strain, underwent trials worldwide. Although commercially available vaccines demonstrate moderate efficacy and safety, both vaccines have been shown to be associated with nominal risk of causing adverse event (intussusception per say).

Rotavirus vaccines have been demonstrated to induce variable levels of protection (as indicated by vaccine efficacy) in differential economic settings. This can be concluded from the high variation seen in clinical trials conducted in different countries worldwide. For countries with low- or moderate socio-economic conditions, rotaviral vaccine efficacy drops to approximately 30-40% while the same vaccine demonstrates an efficacy of approximately 90-100% in developed countries. Understanding the cause of this peculiar behaviour of vaccines in different economic settings carries maximum weight as development in studies in reference to the same, as indicated by better understanding of virus-host interactions and, environmental factors pre- and post-vaccination,



concurrent gastro-intestinal tract infection in infants overlapping the vaccination time period, etc. would not only make a minor contribution to development of better therapeutics, but also cause a significant public health impact (Clarke & Desselberger, 2014).

All the clinical trials for rotavirus vaccines till date estimate vaccine efficacy based on clinical outcome of vaccination (as prevention or occurrence of disease). Most Phase III clinical trials focus on disease as the primary endpoint, but in some cases infection by vaccine agent may also be considered as a primary endpoint. It is rather tough to determine immunological parameters which correlate not only with the development of immunity, but also indicate immunization against particular etiological agent (Hudgens, Gilbert, Self, 2004). The correlates of protection currently under study after natural and/or experimental infection of rotavirus are rotavirus specific neutralizing antibodies found in intestine and serum (anti-VP4 NA and anti-VP7 NA) & rotavirus specific non-neutralizing antibodies found in intestine, stool and serum (anti-RV IgA in intestine and stool, anti-RV IgA undergoing copro-conversion and anti-RV IgA and IgG in serum) (Coulson, Grimwood, Hudson, Barnes, & Bishop, 1992; Angel, Steele, & Franco, 2014).

Current markers of immunogenicity (majorly the seroconversion rates for presence of serum and stool IgA) although useful cannot be correlated directly with development of protective immune response. They fail to fulfil Prentices' criteria for surrogate endpoints by not completely depicting the nature of clinical outcome. Clinical studies where these surrogate markers have been used to determine immunogenicity of vaccine being administered indicate that serum and stool IgA is not always able to predict development of protective immune response. Prevention of diarrhea with minimal increase in IgA levels and diarrheal cases even with elevated levels of IgA has been observed in clinical trials indicating the inefficiency of these markers to completely predict clinical outcome of vaccination.

**Research implications:** These observations thus lead to the question of development of measurable parameters of protective immunity against rotavirus infection and vaccinations which can accurately predict the development of clinical outcome. Understanding the current scenario of development of rota viral vaccines worldwide and availability of commercial vaccines, it would be a challenge to conduct large Phase III clinical trials with Placebo controls. Thus it becomes imperative to discover surrogate markers correlating with clinical endpoint of rotavirus vaccine administration

**Novelty:** The article tries to compile all the current available data on Rotavirus Biomarkers and demonstrates potential use of such biomarkers in the determination of vaccine efficacy and immunogenicity. Also, the article identifies potential biomarkers which may be further developed to establish diagnostic techniques prior to and post-clinical trials for vaccination.

**Keywords:** Rotavirus, Gastroenteritis, Biomarkers, Immunogenicity, Efficacy, Seroconversion

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## **Community based Research on Malnutrition: A cross section survey in Children of urban slum of Surat (Gujarat)**

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**Background:** The WHO Global Database on Child Growth and Malnutrition seeks to contribute to the transformation of this cycle of poverty, malnutrition and disease into a virtuous one of wealth, growth and health.

**Aim:** Assessment of Malnutrition in Urban Slum.

### **Objective:**

1) To assess magnitude of Malnutrition in Urban Slum.

- 2) To study magnitude of malnutrition in different age groups and among boys and girls of urban slums.
- 3) To compare different anthropometric indices.

**Methods:** Study design: Cross sectional study

**Study area:** Aanganwadi centre in urban slum area which is attached to Surat based Aanganwadi Training centre was selected for study.

**Sample Size:** 91 children (0-6 years) of urban slum registered in an Anganwadi Centre in Udhna.

**Inclusion criteria:**

- 1) All children present at Anganwadi.
- 2) Children of the families registered by AWW.

**Exclusion criteria:**

- 1) People not giving consent for the study.
- 2) All closed houses.

**Analysis:** Data was entered and analysed in Microsoft Excel 2010 sheet by using SAM guidelines-latest as per GOI.

UHCRC Surat team took approval for study; appropriate IEC was shorted and Consent was given by parents of children.

**Findings:** Out of 91 children, 41(45%) children were normal. 32% were moderately underweight and 23% children were severely underweight.

Malnutrition as well as severe malnutrition is high among children who most irregularly participating at AWC activities. In this study indices used are Wt/Age to detect underweight children, Wt/Ht and MUAC to detect wasting. Comparative analysis of these indicates that underweight children are more than wasted children. 75% of SAM children are in SUW.

**Conclusions:** The SMC health dept. with its unique infrastructure, AWC network and initiatives like Urban IMNCI, with quality screening for malnutrition and supportive supervision can reduce malnutrition rate as well as rate of SAM responsible for child mortality.

**Limitation:** This study was limited to three months' time period.

Strengths of the study: This study was done as per the SAM guidelines latest as per GOI.

**Funding:** No funding was given by any institute or organization.

**Contributors:** Paresh Surati was only author for this study, under the guidance of Vikas Desai and Dileep Mavalankar, this study was done and they were co-author for this study.

**Conflicts of interest:** "We declare that we have no conflicts of interest".

**Key words:** Anganwadi, nutritional assessment, anthropometric indices

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## Health Status and Treatment Seeking among Elderly in India

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## Abstract

The study lights on the health status and treatment seeking, as the older people mostly have limited regenerative

abilities and are more susceptible to disease, syndrome, and sickness as well affected by the several social issues. The NSSO, 71st round (2014) is used to assess the objectives of the study, whereas STATA and SPSS software will be used to analyse the data and obtain the outcomes in bivariate format. Therefore, elderly has higher health problems especially most of them suffer from chronic ailments and their treatment seeking is hindered by various socio-economic factors. With this backdrop, it is worth studying the number of hospitalized person and their treatment seeking behaviour as well as nature of ailment they have and which type of care they are providing as per their economic status and perception towards their health conditions. During the 365 days preceding the survey and significant risk factors associated with the prevalence of any chronic ailment are increasing age, literacy status, caste, region and perceived poor health status. Nearly one out of every tenth elderly is found hospitalized for any diseases during the 365 days preceding the survey, nearly one-fourth of the elderly in India perceived to have poor health status. Age, sex, literacy status, social groups, region and economic status are found significantly associated with perceived health status of the elderly. The strengths of this study is it provides an update on current status of elderly health and treatment seeking in the country which is important for policy and program perspective, especially given the fact proportion of elderly in India, is growing considerably.

**Background:** The global phenomenon of population aging is directly related to a fundamental health transition means changes that include a shift from high to low fertility, steady expansion of life expectancy at birth and old ages, and a transition from common diseases to the chronic diseases. In recent time, the remarkable improvement in child and adult health status and declining fertility led to population aging in India. However, the percentage of elderly in India has increased to 103.8 million in 2011 that account for 8.6 proportion of the Indian population as against 76.6 million in 2001 which was 7.4 percentage of the Indian population (UNPD-2011). It is evident that rising elderly population raises critical issues related to social security, economic security, and health care. However, only 39% were reported to comply with the treatment. Half of them indicated that it was not needed to take medicine. Non-availability of drugs was the main reason cited while the high cost of treatment and forgetfulness were other grounds for noncompliance to treatment (Sharma et al., 2012). Elderly of age 65 years and above are less likely to receive treatment than those in the age group 60-64 years. Another study found 2 Poverty as a major determinant of health-seeking behaviour and treatment was considered a waste of money followed by a poor attitude of health worker (Adhikari and Rijal 2014).

**Purpose:** The proportion of elderly in India is increasing, and demanding attention for aged health care. Literature reveals higher health problems especially most of them suffer from chronic ailments and their treatment seeking is hindered by various socio-economic factors. With this backdrop, it is worth studying the number of hospitalized person and their treatment seeking behaviour as well as nature of ailment they have and which type of care they are providing as per their economic status and perception towards their health conditions. It is important to have an update on elderly health and their treatment seeking behaviour owing to its importance for policy and programs. Needless to say that it will be an addition to existing knowledge on elderly health.

#### **Research Design: Objectives**

To understand the perceived health status and its associated factors among elderly.

To examine the prevalence of any chronic illness, hospitalization and its associated risk factors among elderly.

To study the pattern of treatment seeking and its associated factors among elderly. Data Source and Methodology

The present paper has used the data from 71st round of National Sample Survey (NSS), Scheduled No. 25.0 'Social Consumption: Health' conducted during January to June 2014. NSS is a nationally representative survey carried out with specific objectives during different rounds. The 71st round aimed to generate necessary quantitative information on the health sector. Moreover, this study provides information about the socio-economic status of the elderly. And their economic situation, the perception of health status, details of ailments from which they are suffering, whether they have any chronic disease, whether they hospitalized and taken any treatment before hospitalization, the nature of treatment if any and level of care. This paper specifically used the data of 30012 people aged 60 and above. Both bivariate and multivariate analysis have been carried out to fulfil the study objectives. The bivariate analysis had been done to show the level and differentials of the chronic ailment, hospitalization, hospitalization by nature of the illness, treatment on medical advice before hospitalization, and perceived health status of the elderly by various socio-economic and demographic characteristics.

**Results & discussion/Findings & interpretation:** The poor health status increases with increasing age. Female

aged has recognized adverse health status as compared to their male counterparts. The education level of elderly has an operative relation with applicable state of health. Widowed have worst relative health condition than currently married old. As per religion elderly following Islam has worst health status than Hindu elderly and others. In social groups, ST people has 5 percent excellent health status as compared to SC, and General has 7 percent excellent health status and good and poor condition are nearly same in all social group. A Higher percentage of elderly who are literates, those older from the non-Hindu/Islam category, and those elderly entirely dependent on others economically have any chronic ailment than their respective counterparts. Among the social groups, old from SC (21%), OBC (25%) and General (29%) category have any chronic ailment compared to those from ST (11%). Ten percent of the elderly with perceived superior health status have any chronic illness. The corresponding figure is 40% among those perceived to have poor health status. Nearly two-thirds of the elderly found to have availed the services from private hospitals while one-third of them have accessed it from public hospitals. About three percent of the elderly have availed it from a PHC/Dispensary/CHC/Mobile unit. Among those elderly treated on medical advice before 3 hospitalizations, 46% treated in private hospitals followed by another 26% availing medical

information from a private doctor/clinic. Twenty-three percent of the elderly availed the medical advice from public hospitals while another four percent have accessed the medical information from PHC/Dispensary/CHC/Mobile unit and one percent from HSC/ANM/ASHA/AWW. Among the literates, 49% have availed the advice from a private hospital, 25% from a private doctor/clinic and 20% from a public hospital while the remaining from other public facility/provider. The corresponding figures among illiterates are 45%, 26%, 23% respectively. A relatively higher percentage of the elderly with financial independence have availed the services from a private hospital (47%) than those who are economically dependent on others (44%). In financial independent relative risk ratio significantly less likelihood in excellent as compared to weak category and good health status as compared to poor that is less likelihood.

**Research implications:** The study found that one out of four senior citizens in India is suffering from any chronic ailment during the 365 days preceding the survey and significant risk factors associated with the prevalence of any chronic disease are increasing age, literacy status, caste, region and perceived poor health status. Nearly one out of every tenth elderly is found hospitalized for any ailment during the 365 days preceding the survey, and the hospitalization pattern varies by different individual and community level characteristics. Increasing age, being female, literates, Non-STs, those from Western or Southern region and have perceived poor or good health status are more likely to be hospitalized. Infection/injuries followed cardiovascular, respiratory, musculoskeletal and diabetes are found to be the ailment cited as a reason for hospitalization. Nearly two-thirds of the elderly hospitalized for any ailment during last year preceding the survey have availed the services from private hospitals while one-third of them have accessed it from public hospitals and a few remaining have availed it from a PHC/Dispensary/CHC/Mobile unit. Almost all the elderly hospitalized during last one year preceding the survey have undergone allopathic treatment. Moreover, two-thirds of the elderly hospitalized during last one year preceding the study have undergone treatment on medical advice before hospitalization, and again almost all are found to have used allopathic medicine. Private hospitals followed by private doctor/clinic are the primary sources found to been employed by the elderly treated on medical advice before hospitalization. An older female, those literates, those from OBC/general caste, those from The West region, and are economically independent are more likely to be treated on medical advice before hospitalization. Nearly one-fourth of the elderly in India perceived to have poor health status. Age, sex, literacy status, social groups, region and economic status are found significantly associated with perceived health status of the elderly. To conclude there is a high prevalence of chronic ailment among elderly and a sizable percent of the elderly have undergone hospitalization during one year preceding the survey. Moreover, a significant percent of elderly has not taken any treatment on medical advice before hospitalization. There are regional differentials in the prevalence of chronic ailments, hospitalization and also in treatment seeking before and during hospitalization. The results suggest the need for new strengthening the existing geriatric policy/programs to meet the health care need of the elderly. Any government initiative to cater such as health insurance of elderly care will undoubtedly enhance the health care utilization of the elderly. The limitation of this study is that besides the variables included in the analysis other programmatic/non-programmatic variables may influence the prevalence of any chronic ailment, hospitalization, and treatment seeking a pattern of the elderly which this study count not capture owing to data unavailability.

**Novelty/Originality:** The strengths of this study are it provides an update on current status of elderly health and treatment seeking in the country which is important for policy and program perspective, especially given the fact

proportion of elderly in India, is growing considerably. In addition to existing knowledge, it further highlights the scope for an in-depth understanding of pathways for care to address the health concerns of elderly more effectively.

**Keywords:** Elderly, Health Status, Treatment Seeking, Socio-Economic factors.

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### **Students Satisfaction with Reference to Healthcare Facilities at Educational Institutions**

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**Abstract:** Most of the educational institutions have transformed the way they offer the education to the students. In the earlier days, there used to be mostly day scholar students. But the current trend is towards hundred percent residential education programs, which entails the students to reside in the campus throughout the duration of the course, be it a two-year, three-year or any program as such. Most of the campuses are located in remote areas, away from the city. Hence, the importance of health care centers/ facilities becomes all the more vital part of the campus life. This study tries to probe the satisfaction level of students with regard to Healthcare Facilities on the campus. The study is based on primary data which is collected by administering a questionnaire to a sample of 150 students based in Hyderabad.

**Keywords:** Student satisfaction, Healthcare facilities, Educational campuses.

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### **Healthcare challenges in rural areas**

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**Abstract :** India is poised to undertake transformation in healthcare through the introduction of various structural reforms and by devising new policies and programs for enabling access to healthcare and improving the quality of healthcare services. This is evident from the manifesto of the Government of India's twelfth five year plan where the government wants to accelerate the reforms suggested by the World Health Organization [WHO] through the Universal Health Coverage. One of the major challenge is the expenditure on healthcare as percentage of India's GDP - currently it is 3.8%. This is the lowest amongst the BRIC countries and much lower than the developed countries. There is an acute shortage of medical professionals, paramedical and administrative professionals thereby many patients especially those living in rural and semi urban areas are still receiving services from unqualified practitioners. Also a big challenge for India is the healthcare in rural setting as rural India comprises around 67% of the country's population. The new government at the centre drafted the new health policy in Jan 2015 which has suggested programs to strengthen the primary health care network all over the country and consider health as a fundamental right of all citizens of the country. Against this background, this study has been undertaken with the objectives of understanding the current levels of physical healthcare infrastructure, healthcare staff in a rural setting, study the public health and sanitation scenario and identify the prevalence of any communicable diseases in the village, determine the awareness levels of health parameters in the rural population and ascertain the important health parameters in the village population to compare with normal levels and official recommendations by the Indian health authorities and the WHO, determine the access to and the availability of healthcare facilities and services and understand the current practices, understand the functioning of the public health centres [PHCs], identify the gaps in healthcare parameters. To understand this a primary research study was



undertaken by this study group along with a medical practitioner in a real life rural setting at a village Kavnai in Igatpuri taluka, Nashik district in the state of Maharashtra, 120 km from Mumbai the capital city of the state. The study group undertook field visits to this village in the first half of the year 2016. The team studied the health status of the village population and the healthcare infrastructure and related services in Kavnai. This included: the measurement of all important representative physical health parameters of a sample population from this village, interviews with the sample population and the influential people in the village, and investigation and identification of their health status. These included clinical parameters, historical disease profile, malnourishment in children, habits like smoking, chewing tobacco, dietary habits, and population demographic data. The preliminary results demonstrated near absence of healthcare infrastructure in the village, very low awareness of their health status and government health schemes amongst the village population, aberrances in various physical health parameters as compared to normal in the population, deficiencies in primary [basic] and secondary [specialty] healthcare facilities and services in the village and absence of any professional healthcare services. Although the PHC existed, it was almost non-operational. None of the villagers in Kavnai were covered by health insurance. Poverty, low health awareness, lack of active governmental support and low educational levels could lead to poor health standards amongst the villagers of Kavnai. The measurement of various parameters indicated the presence of various chronic disorders like hypertension, hyperglycemia which can lead to cardiovascular complications, respiratory problems, and even severe complications, such as loss of organ functioning. High secondary expenditure such as transportation facilities and far-off distances to neighboring towns with better healthcare infrastructure, can add to the burden of healthcare expenditure. These could result into loss of work days, decrease in productivity, lesser disposable income for meeting other personal needs or expenditures leading to poor quality of life. The study group will recommend to the policy makers and the Ministry of Health, Government of India various measures to reduce out-of-pocket expenditure on healthcare and strategies and programs for better healthcare within the existing rural setting and infrastructure.



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***KNOWLEDGE BYTES***

## One-third of total maternal deaths in 2015 from India

The latest Lancet series on maternal health reveals that nearly one quarter of babies worldwide are still delivered in the absence of a skilled birth attendant. Further, one-third of the total maternal deaths in 2015 happened in India, where 45,000 mothers died during pregnancy or childbirth while Nigeria shouldered the maximum burden of 58,000 maternal deaths.

Each year, about 210 million women become pregnant and about 140 million newborn babies are delivered. Ahead of the U.N. General Assembly, The Lancet has published a new series of papers on maternal health which reveal that while progress has been made in reducing maternal mortality globally, differences remain at international and national levels. In all countries, the burden of maternal mortality falls disproportionately on the most vulnerable groups of women. This reality presents a challenge to the rapid catch-up required to achieve the underlying aim of the Sustainable Development Goals [SDGs] — to leave no one behind.

According to the academic papers, there are two broad scenarios that describe the landscape of poor maternal health care — the absence of timely access to quality care (defined as ‘too little, too late’) and the over-medicalisation of normal and postnatal care (defined as ‘too much, too soon’). The problem of over-medicalisation has historically been associated with high-income countries, but it is rapidly becoming more common in low and middle-income countries, increasing health costs and the risk of harm. For instance, 40.5% of all births are now by caesarean section in Latin America and the Caribbean.

### Lack basic resources

While facility and skilled birth attendant deliveries are increasing in many low-income countries, the authors say that phrases such as ‘skilled birth attendant’ and ‘emergency obstetric care’ can mask poor quality care. Additionally, many birth facilities lack basic resources such as water, sanitation and electricity. The authors warn that measuring progress via the current indicator of skilled birth attendant coverage is insufficient and fails to reflect the complexity of circumstances. It is unethical to encourage women to give birth in places with low facility capability, no referral mechanism, with unskilled providers, or where content of care is not evidence-based. This failing should be remedied as a matter of priority.

In high-income countries, rates of maternal mortality are decreasing but there is still wide variation at national and international level. For instance, in the U.S., the maternal mortality ratio is 14 per 1,00,000 live births compared to 4 per 1,00,000 in Sweden. The sub-Saharan African region accounted for an estimated 66% (2,01,000) of global maternal deaths, followed by southern Asia at 22% (66,000 deaths). However, the authors warn that not all care is evidence-based, and improved surveillance is needed to understand the causes of maternal deaths when they do occur. Additionally, they point to new challenges in delivering high quality care, including the increasing age of pregnancy and higher rates of obesity.

According to the study, in sub-Saharan Africa, a woman’s lifetime risk of dying in pregnancy or childbirth remains an astounding 1 in 36 compared with 1 in 4,900 in high-income countries. There are still too many parts of the world where too many women are dying and when women are seeking care, they are often getting poor quality care and not at the right time, that is, too little, too late, and poor quality care also is when you get things too soon, too much or too many. The big discovery of this series is this problem of quality.

## **AIDS deaths in India down 55% since 2007**

Deaths caused by AIDS declined nearly 55% in India in the past eight years, whereas new HIV infections came down by 66% since 2000. In 2007, India had recorded 1,48,309 such deaths; in 2015, the figure stood at just 67,600, according to latest statistics presented by health ministry at an ongoing high-level United Nations meeting in New York. The conclave is evaluating the implementation of the UN AIDS control programme. Globally, such deaths declined 41% between 2005 to 2015.

Between 2000 and 2015, new HIV infections in India dropped from 2.51 lakh to 86,000 - compared with a global fall of just 35%.

The UN General Assembly has proposed to fast-track implementation of AIDS control strategies to end the epidemic across the world by 2030. Countries must adopt the target and collaboratively work to achieve it. At the high-level meeting on ending AIDS, Member States adopted the new political declaration that includes a set of time-bound targets to fast-track the pace of progress towards combating the worldwide scourge of HIV and AIDS over the next five years and end the epidemic as a public health threat by 2030 highlighting the importance of affordable medicines to tackle the prevalence of AIDS and India's role in making such drugs available worldwide, to ensure global access to affordable medicines.

India, which faced the spectre of disastrous consequences on account of AIDS epidemic 15 years back, has been able to manage the challenge effectively. Targeted interventions based on close collaboration and empowerment of communities and civil society with appropriate funding from the government have helped deliver key life saving services to the affected population. This is the time for developed countries to do more, not less, and enhance their commitments.

The National AIDS Control Programme has been walking a tightrope with international funds drying up over the last three years. This has led to fears about recurrence of new HIV cases. Estimates show a reduction of almost 90% in funding from various multilateral, bilateral and philanthropic donor organisations over the last three years. The government is, therefore, trying hard to seek continuous funding for the programme as it is currently at a critical juncture.

Indian firms like Cipla and Dr Reddy's Laboratories supply 80% of the generic drugs used worldwide for treatment of AIDS. However, many of them have been facing tough regulations in several countries because of patent litigations.

### **Foreign trips of doctors and their spouses by the Pharma Company cannot be accepted as legal:- Mumbai bench of the Income-Tax Appellate Tribunal (ITAT)**

The Mumbai Bench of the Income-Tax Appellate Tribunal (ITAT) has nipped the 'unholy' doctor-pharma nexus whereby medical practitioners are offered various incentives, like overseas trips, to encourage them to prescribe specific medicines or lines of treatment.

It has done so by upholding a disallowance of Rs 76.55 lakh, made by an I-T officer at the assessment stage. The expenditure was incurred by Liva Healthcare (a pharma company specialising in skincare formulations) towards overseas trips for doctors and their spouses.

The immediate impact of the order is a higher I-T liability for the pharma company for financial year 2008-09, to



which this case pertains, as the disallowed expenditure will be added back to the taxable component of income. In addition, the order will act as a reminder to pharma companies to adopt practices that are above board. The maximum rate of income tax on companies currently is 30% plus applicable surcharge and cess.

The ITAT's September 12 order observes, "The payment of overseas trips of doctors and their spouses for entertainment, by the pharma company, in lieu of expectation of getting patient referrals from doctors for its products so as to generate more business and profits, by any stretch of imagination cannot be accepted as legal. Undoubtedly it is not a fair practice and has to be termed as against the public policy."

Section 37 of the I-T Act, which is a residual section, permits a business entity to claim as a deduction revenue expenditure incurred by it, 'wholly and exclusively for the purpose of the business'. However, an explanation to this section provides that expenses incurred for any purpose which is an offence or is prohibited by law shall not be deemed to have incurred for the purpose of the business. Consequently, such expenditure cannot be allowed as a deduction from taxable income.

The code of conduct prescribed by the MCI debars doctors from receiving favours in return for referring, recommending or procuring of patients for medical, surgical or any other treatment.

### **Global Hunger Index: India ranks 97 out of 118 countries; 15% of country's population undernourished**

India ranked 97th out of 118 countries on the International Food Policy Research Institute's (IFPRI) Global Hunger Index (GHI) in 2016, behind Nepal, Sri Lanka, Bangladesh, among others, but ahead of Pakistan and three other Asian countries. It was positioned at 80 out of 104 countries the previous year.

While India has improved its score on various parameters over the past few years, two out of five children below five years of age are stunted in India. Stunting measures chronic malnutrition and affected children's height would be considerably below the average for their age. Besides, the country was still rated with 'serious' hunger levels in the 2016 Index. The hunger index ranks countries based on undernourishment, child mortality, child wasting (low weight for height) and child stunting (low height for age).

The country had only the fifth highest rank in the whole of Asia, better than only North Korea (98), Pakistan (107), Timor-Leste (110) and Afghanistan (111). Nepal (72), Sri Lanka (84), and Bangladesh (90) had higher ranks among 96 countries than India's. Also, India had the lowest rank among BRICS nations, with Brazil in the top 16, Russia at 24, China at 29 and South Africa at 51.

If hunger continues to decline at the same rate it has been falling since 1992, around 45 countries, including India, Pakistan, Haiti, Yemen, and Afghanistan will still have 'moderate' to 'alarming' hunger scores in year 2030, far short of the United Nations' goal to end hunger by that year.

In 2013, India's position was rated as "alarming", but, it has shown some improvement in recent years, the report noted. In 2016, India scored 28.5 on the GHI index, up from 36 in 2008. Since 2000, the country has reduced its GHI score by a quarter.

"India is slated to become the world's most populous nation in just six years, and it's crucial that we meet this milestone with a record of ensuring that the expected 1.4 billion Indians have enough nutritious food to lead healthy and successful lives. India is making tremendous progress – but we have significant challenges ahead.

GHI is based on a country's performance on indicators such as the proportion of the undernourished in the population, prevalence of wasting in children under five years, prevalence of stunting in children under five years and the under-five mortality rate.

Data presented in the report showed that on each of these indicators, India has made progress over the past few years. At the end of 2016, around 15 per cent of the country's population was undernourished, down from 17 per cent at the end of 2009. Similarly, prevalence of wasting in children has declined from 20 per cent in 2010 to 15 per cent in 2015. Stunting in children below the age of five has also declined from 48 per cent to 38.7 per cent, while the under-five mortality rate has declined from 6.6 to 4.8 over the same period.

But, despite this improvement in score, which reflects an improvement on hunger and nutrition, the report argued that even if hunger were to decline at the same rate as it has since 1992, India will still have 'moderate' to 'alarming' hunger scores in 2030.

Simply put, countries must accelerate the pace at which they are reducing hunger or we will fail to achieve the second Sustainable Development Goal. Ending global hunger is certainly possible, but it is up to all of us that we set the priorities right to ensure that the government, the private sector and civil society devote the time and resources necessary to meet this important goal. Globally, the Central African Republic, Chad, and Zambia were estimated to have the highest levels of hunger. For the developing world, the GHI score is estimated to be 21.3 which, according to the report, is at the lower end of the 'serious' category. According to the report, there are some "bright spots" in the fight to end world hunger. It estimates that the level of hunger in developing countries has fallen by 29 per cent since 2000, with 20 countries reducing their GHI scores by around 50 per cent each since 2000.

At the current rate of decline, more than 45 countries - including India, Pakistan, Haiti, Yemen, and Afghanistan - will have "moderate" to "alarming" hunger scores in the year 2030, the authors of the index said.

### **Health in India: Where the money comes from and where it goes?**

National Health Accounts (NHA) monitors the flow of resources in a country's health system and provides detailed data on health finances. The NHA estimates for India for the financial year 2013-14 were published earlier this week, after a long void of almost a decade. The previous estimates were for the year 2004-05.

In 2013-14, the Total Healthcare Expenditure (THE) of India was Rs. 4.5 lakh crores, which amounts to 4 per cent of the Gross Domestic Product (GDP).

The Draft National Health Policy 2015 recognises this to be a problem. It says: "Global evidence on health spending shows that unless a country spends at least 5-6 per cent of its GDP on health and the major part of it is from government expenditure, basic health care needs are seldom met." Of the total amount of Rs. 4.5 lakh crores, Current Health Expenditure (CHE) constituted Rs. 4.2 lakh crores (93 per cent). Rs. 31.9 thousand crore (7 per cent) went to Capital Expenditure.

Where do the financial resources come from?

Households continue to be the dominant contributors (73 per cent of CHE) to health finance in India. The bulk of the total money circulating in Indian healthcare – around 69 per cent – comes from Out Of Pocket (OOP) payment by households. OOP is the money which individuals pay out of their own. Myanmar country and India have huge OOP

in entire world. This is a huge concern. High OOP spending is a result of abysmally low government spending on health, constituting just 1.15 per cent of GDP and 30 per cent of CHE – the lowest among the BRICS nations.

It has long been argued that government spending on health should increase to 2.5 per cent of GDP, a figure also envisaged by the Draft National Health Policy 2015. But there are challenges. There is not much point in saying that government expenditure on health should be increased to 2.5 per cent of GDP, unless somebody also explain where those extra resources will come from. Whether the extra resources for healthcare would come from the removal of tax exemptions, increasing the tax base or by switching expenditure from other development heads to health.

Which healthcare providers get the money?

A third of all money Rs. 1.5 lakh crores (35.7 per cent) was spent in pharmacies. Rs. 88.5 thousand crores (21 per cent) was spent in private hospitals, almost double compared to that of government hospitals which consume 41.7 thousand crores (9.9 per cent). Around Rs. 28 thousand crores (6.7 per cent) was spent in labs and medical diagnostics.

What goods and services are being consumed?

Outpatient care is when a patient doesn't stay in the hospital overnight – spends less than 24 hours. When care of patients requires them to get admitted to the hospital, it is called inpatient care.

Around 45 per cent is spent on outpatient care (including both general and special treatment) as compared to 35 per cent in inpatient care.

Overall, the current expenditure on curative care is estimated at Rs 3.4 lakh crores (80.4 per cent) whereas. In contrast, a meagre 9.6 per cent – Rs. 40.6 thousand crores – is spent on preventive care. All the government-funded national health programmes such as the National Disease Control Programmes are covered under this category. However, it does not include spending on sanitation or providing access to clean drinking water.

Rs. 19 thousand crores (4.5 per cent) was spent in patient transportation.

### **HIV and AIDS Bill Amendments approved, rights of the patients safeguarded**

Union Cabinet has approved amendments to the HIV and AIDS (Prevention and Control) Bill, 2014, on 5-10-2016 in a meeting chaired by Prime Minister..

The bill makes it obligatory for the Central and State Governments to provide for Antiretroviral Therapy (ART) and management of opportunistic infections. It prohibits discrimination by the state or any other person, against HIV infected people, or those living with such people. Life of many such HIV positive patients will soon improve due to these amendments.

The Bill lists various grounds on which discrimination against HIV positive persons and those living with them is prohibited. These include the denial, termination, discontinuation or unfair treatment with regard to employment, educational establishments, healthcare services, residing or renting property, standing for public or private office,

and provision of insurance (unless based on actuarial studies).

The requirement for HIV testing as a pre-requisite for obtaining employment or accessing healthcare or education is also prohibited.

What relief do these amendments bring?

As per the Bill, from now onwards, no person shall be compelled to disclose his HIV status except with his informed consent, and if required by a court order. Establishments keeping records of information of HIV positive persons shall adopt data protection measures.

The Government has made Anti Retroviral Therapy (ART)-the use of HIV medicines to treat HIV infection-a legal right of all HIV positive patients.

This Bill seeks to address the issue of stigmatisation towards AIDS/HIV positive cases and the discrimination meted out to them. The second motive is to give such persons an enabling environment so that just like any other citizens they can work and have the right to every facility.

As far as punitive and preventive measures are concerned, the bill seeks to ensure that no environment of hatred or discrimination is disseminated in the society. Every organisation which has got 100 people working under it must have a complaint officer who will look into the grievances. Health institutions, where there are even 20 people, will also have to keep a complaint officer. The punishment under this have been proposed at a minimum of three months to a maximum of up to two years of imprisonment, and a fine of up to Rs 1 lakh. At every stage people infected with HIV are facing discrimination. Now, with the Cabinet approval of amendments in HIV and AIDS bill, the rights of the people with HIV will be protected. India has 21 lakh people living with HIV and 10 lakh on treatment. But, till date there was no law for providing ART to the patients. The new amendment will allow the HIV infected people to get the treatment at the hospitals.

### **Karnataka joins the list of 13 states where integrated medical practice is legal**

Karnataka has reportedly joined the list of 13 states, including Maharashtra, Tamil Nadu, Gujarat, Punjab, Uttar Pradesh, Bihar, Assam, and Uttarakhand, where integrated practice of modern medicine by AYUSH medical practitioners is legal.

Despite objections by some groups, including the Karnataka Medical Council and Indian Medical Association, a committee, headed by the State Drugs Controller, set up by the health department to study the feasibility of allowing AYUSH doctors to practice allopathy, has given its go-ahead, reports.

This effectively means practitioners of AYUSH (Ayurveda, Yoga, Unani, Siddha and Homeopathy) appointed in Primary Health Centers (PHCs) in rural areas of Karnataka can now practice allopathy “during emergencies” after undergoing a six-month crash course under senior doctors in district hospitals. A government order to this effect was issued on 5<sup>th</sup> January, 2017.

According to official sources in the health department, the move was essential as the department had repeatedly failed to attract adequate number of MBBS graduates for its PHCs. Health department already has nearly 800 AYUSH practitioners recruited against the posts of General Duty Medical Officers.

## **National Green Tribunal asks Hospital to pay fine of Rs 15 Crores**

Hon'ble National Green Tribunal (NGT), New Delhi recently has imposed an Environmental Compensation of Rs 15 crores on Human Care Charitable Medical Trust, a hospital in Sector 6, Dwarka for beginning construction without environmental clearance (EC).

The building has a total built-up area of more than 46,000 sq metres on a plot of 9,545 sq metres. The one Notification of 2006 makes it mandatory for all construction projects above 20,000 sq. meters to obtain a prior Environmental Clearance. But this project claimed it was not aware of such requirement. Last year, the State Expert Appraisal Committee (SEAC) had found that the project was in advanced stages without obtaining the environmental clearance.

The State Environment Impact Assessment Authority (SEIAA) in its meeting January 2016 had decided to prosecute the trust under Section 19 of the Environment Protection Act. The trust had already constructed more than 39,000 sq. meters till January, 2015 and also increased its FAR.

The trust applied for an EC to the SEAC in April, 2015. At that time, there were three office memorandums (OM) by the Environment Ministry dated November 16, 2010, December 12, 2012 and June 27, 2013 that said environmental clearance could be granted in cases where the construction activity had already started.

But in July, NGT through its order in the case of SP Muthuraman Vs Union of India has declared all these OMs "ultra-vires" and quashed them making prior EC mandatory. National Green Tribunal have applied the principles laid down in the SP Muthuraman case to the present case and the bench observed, adding that this was to control ecological damage under the precautionary principle.

NGT also constituted a committee to submit an inspection report within four weeks. The trust has been directed to stop all constructions for now. The environment compensation amount will be deposited with DPCC and utilised for restoration of the environment.



# ***WELLNESS QUOTES***

# WELLNESS QUOTES

- **Train Your Core**

Core exercises improve your balance and stability

Core exercises train the muscles in your pelvis, lower back, hips and abdomen to work in harmony. This leads to better balance and stability, whether on the playing field or in daily activities. In fact, most sports and other physical activities depend on stable core muscles.

- **Walk Off Fat: The Hill-Climbing Workout**

Best for: Toned legs, healthy heart

Why its a fat blaster: Adding hills to your workout ups your calorie burn like crazy and gives you a fast cardio boost. Plus, its a great way to sculpt your legs and butt.

- **Slow down on yoga poses in summer**

Any physical activity increases body temperature. That is why it's best to avoid excessive or strenuous asanas when it is extremely hot. Hence, early in the morning or late in the evening are the best times to practice yoga postures during summer. Yoga poses practiced gently and meditatively balance the mind and body and are beneficial at any time of the year. Shavasana and meditation are especially good in summer.


- **You'll decrease your risk of injury in the back and spinal column**

Doing planks is a type of exercise that allow you to build muscle while also making sure that you are not putting too much pressure on your spine or hips. According to the American Council on Exercise, doing planks regularly not only significantly reduces back pain but it also strengthens your muscles and ensures a strong support for your entire back, especially in the areas around your upper back.



- **Myth: Exercise is stressful because of the toll it takes physically**

Truth: Exercise is an excellent way of managing stress since it responds to every level of the model,




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A Posture Number™ of zero means the body is in a neutral alignment and that the pull of Gravity is evenly distributed throughout the body, especially the spine and its supporting muscles.

As a person's Posture Number™ increases so do the physical effects of Gravity.


18



The spine is now asked to carry loads for which it was not designed. Symptoms from this additional stress can range from tension headaches to chronic low back pain.

If left untreated, a high Posture Number™ can lead to spinal immobility and degenerative joint disease.

30



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- **Vitamin A plays a key role in immunity, reproductive behavior, and vision.**

The highest concentration of vitamin A is found in sweet potatoes, spinach, carrots, milk, fish, liver and eggs.

- **Vitamin B1 promotes the health of the nervous system, cardiovascular system, skin, hair, eyes and mouth.**

It also improves the body's ability to withstand stress and is often called the "anti-stress" vitamin. The richest sources of Vitamin B1 are whole-grain, cereals, potatoes, mushrooms, spinach, green peas, beans, sunflower seeds, tomatoes and non-vegetarian food.

- **Consume an adequate amount of fiber daily.**

Fiber provides a sense of satiety without much calories. Increasing fiber intake helps stabilize blood sugar, control cravings, and prevent overeating — all things that help promote weight loss and flatten belly.

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