Eighth Annual Conference of

Indian Health Economics and Policy Association
(IHEPA)

On

Social Determinants of Health

Conference President

SIR MICHAEL MARMOT

Institute of Health Equity, University College, London

National Institute of Science Education and Research (NISER) Bhubaneswar

P.O. JATNI, KHURDA 752050, ODISHA

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Book of Abstracts

This collection contains abstracts accepted by Indian Health Economics and Policy Association from scholars. This collection is intended for use by the conference participants and others and will be available in the website www.ihepa.in too. Abstracts of past conferences too are on the website. The views presented are those of authors and IHEPA respects the views but the usual disclaimers apply.

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Indian Health Economics and Policy Association (IHEPA) is a professional body registered under the Societies Registration Act 1960. The need to have a formal body which would serve as a platform for discussing and sharing intellectual ideas pertaining to the Indian health sector was strongly felt by a group of like-minded health economists and policy experts. Over a period of four years, this group discussed, met and exchanged ideas towards the formation of an Association. The IHEPA is the culmination of this process, and has been created to enable economists and other social science researchers, policymakers and practitioners to exchange, deliberate and discuss key issues and strategies in the health sector, in India as well as globally.

Vision

A vibrant and dynamic association that encourages and facilitates the exchange and sharing of knowledge, ideas and experience among researchers, policymakers and practitioners working in and on the health sector

Objectives

- To offer a platform for learning, knowledge-sharing and networking to all those interested in contributing towards a more equitable and efficient health sector.
- To bridge the gap between research and practice by bringing together researchers/ academicians and policymakers, both national and international.

IHEPA welcomes young scholars and researchers, grassroots practitioners, the private sector and community-based organizations to become part of the organization, so that all views and experiences can be heard, debated and imbibed, if found useful.

While an Indian association, IHEPA would equally like to reach out to the international community of researchers, experts, managers and policymakers, and include them in its fold to make it into truly global association.

Membership

Membership of the Association is open to all individuals and institutions engaged and interested in contributing towards evidence-based discourse and discussion relating to the health sector. Membership is in the following categories: Individual-Annual, Individual-Life, Institutional-Annual, Institutional-Life and Student.

IHEPA welcomes all to join and strengthen the association to make it a vibrant and productive body of excellence in health research and policy. For membership application form and other details please refer below, and for any additional queries please contact secretary.ihepa@gmail.com or office.ihepa@gmail.com

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National Institute of Science and Research (NISER) Bhubaneswar has been established, under the aegis of the Department of Atomic Energy (DAE), with the aim of embedding scientific rigor within larger pedagogic practices in our country. The Institute is affiliated with Homi Bhabha National Institute (HBNI), Mumbai, a deemed research university that oversees academic programs at Institutions that are part of the DAE structure. NISER campus is situated in 300 acres of land, generously donated by the people of Odisha, in Jatni town, 25 Kms from the centre of the city of Bhubaneswar. For more details, visit https://www.niser.ac.in/

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Eighth Annual Conference of ***Indian Health Economics and Policy Association*** (IHEPA) on **Social Determinants of Health**

National Institute of Scientific Education and Research (NISER) Bhubaneswar

(January 23-24, 2020)

Concept Note

The proposed international conference on Social Determinants of Health intends to have a rich academic discussions based on policy relevant theoretical and empirical research issues on the following major themes: social determinants of health; Ayushman Bharat and other financing schemes, health equity, nutritional outcomes and their determinants, health issues in Odisha and other related health issues such as public health, nutrition, communicable and non-communicable diseases, global health. The conceptual issues and evidence on social determinants have an important bearing on the health status of a population. However, these determinants need to be conceptualised in various socio-economic and cultural contexts and the empirical evidence needs to be forcefully brought in for policy and programmatic interventions. Social determinants encompass various dimensions of people's lives – when and where they are born, grow, work, live and age. Even achieving Sustainable Development Goals critically depends upon a thorough understanding of the social determinants in any country. Both conceptual/theoretical and empirical research papers analysing issues concerning the social determinants of health are welcome.

The National Health Protection Scheme (NHPS) recently announced by the Government of India has considered insurance as an acceptable option to address the health care burden of the poor. Increasingly insurance is being considered as a way of financing health care in India even though empirical evidence on its viability in the Indian context is rare. Ayushman Bharat, the new health insurance initiative by the Government of India, is considered to be a bold step in protecting households from financial risk. However, there is little serious analysis of such attempts on bringing down out-of-pocket expenditure as well as providing a sustainable health care system in the country. Papers dealing with NHPS and health financing issues in general are welcome. The socio-economic factors that influence the health of a person have been a matter of intense research in India over the past several decades. With the availability of many data sources in recent years like NFHS, NSSO and IHDS, a more nuanced understanding of health equity is possible. The concept of equity itself in the context of health needs further refinement in the light of developments in normative theories. Sound analytical discussion are expected under this theme with a definite contribution to the vast literature that already exists.

Nutrition is crucial to the health status of a population and is central to the Sustainable Development Goals. India accounts for a significant share of global burden of undernutrition which also has strong connection with the emerging burden of noncommunicable diseases. Sound empirical analyses are needed for examining nutritional status and inequalities in nutritional outcomes across population subgroups and understanding their determinants. Achievements and Challenges Odisha has made some important strides in health in recent years with rapid reduction in infant mortality, levels of fertility and other indicators. This is despite the fact that Odisha still remains one of the poorest states in India. Analyses of such achievements as well as challenges are necessary to chart out the future course of action. A discussion on these issues will enrich us on various aspects of the health care system and health achievements in Odisha with a focus on the social determinants of health.

Technical Session IA

Social Determinants of Health

Decomposing socio-economic inequalities in full immunization coverage in India: Evidence from National Family Health Survey-4

Vinod Joseph K J, *M.Phil. Scholar, International Institute for Population Sciences, Mumbai*

The importance of immunization in healthy child growth and development has been well recognised globally. Immunization prevents around 2-3 million deaths every year and is considered to be the most cost-effective lifesaver. As per WHO guidelines, children aged 12-23 months who have received one dose of BCG vaccine, three doses of DPT vaccine, pertussis and tetanus; three doses of the polio vaccine and one dose of measles vaccine are considered to be fully immunized. It is widely evidenced that low socio-economic status is associated with child immunization and health care utilization. But the inequalities caused by social and economic factors are poorly quantified. This study aims to explore the association between full immunization and various socio-economic aspects and quantify their contributions in generating inequalities in full immunization coverage in the country. The data used in this study has been taken from the fourth round of the National Family Health Survey. The association between socioeconomic determinants with full immunization coverage is estimated using $X2$ test and binary logistic regression. Concentration indices were estimated to measure the magnitude of inequality. The indices were further decomposed to explain the contribution of different socio-economic predictors to the total inequality in full immunization coverage. The results of $X2$ test and logistic regression shows that uptake of full immunization is highly associated with mother's educational status and household wealth. The odds of receiving full immunization among the richest class are twice that of the poorest counterparts. The concentration index decomposition reveals that inequality is highest among the poor economic groups and among children whose mothers are illiterate. The overall concentration index value shows that weaker socio-economic groups in India are more disadvantaged in terms of immunization interventions. This paper offers several insights to explain the dynamics behind the variations in full immunization coverage and making a solid contribution to the existing literature on health disparity determination in India. The results would help to identify vulnerable populations and bridge socio-economic gaps. Since immunization is given to children free of cost through several interventions, the underlying factors such as accessibility,

vaccine hesitancy and awareness through education play a vital role in accessing full immunization among weaker economic sections. Knowledge and awareness about the importance of immunization need to be disseminated among the vulnerable sections, and more work is needed to generate their interest in the health programs. Programs and policymakers should shift their concern from achieving 'average' lower vaccination coverage to 'distribution' of the schemes among the neediest groups.

Keywords: Full immunization, inequality, Concentration Index, India

Effects of place of living and behavioural factors on adult obesity: Evidence from a 5-year longitudinal cohort study in Australia

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This study aims to investigate the impact of place of living and behavioural factors on obesity amongst Australian adults. The study followed a quantitative, longitudinal research design. Participants: Data for this study came from a cohort consisting of 10,364 adults who participated in the Household, Income and Labour Dynamics in Australia (HILDA) survey. The participants were interviewed at baseline in 2013 and were followed up in 2017-2018. Generalized Estimating Equation (GEE) logistic regression model was employed to examine the impact of place of living and behavioural factors on obesity. The most striking result to emerge from the analysis is that adults living in the most socio-economically disadvantaged area were 1.16 times (OR: 1.16, 95% CI: 1.08-1.25) and those from remote areas of Australia were 1.34 times (OR: 1.34, 95% CI: 1.10-1.64) more prone to obesity compared to their counterparts. The study findings also reveal that adults who consume fruit regularly and performed high levels of physical activity were 6 percent (OR: 0.94, 95% CI: 0.91-0.98) and 12 percent (OR: 0.88, 95% CI: 0.85-0.92) less likely to be obese, respectively, compared to healthy weight peers. Current alcohol drinkers were 1.06 times (OR: 1.06, 95% CI: 1.01-1.12) more likely to be obese compared to their counterparts. This study will contribute to the limited literature regarding the influence of place of living and behavioural factors on adult obesity rates and thus help health decisionmakers to formulate effective obesity prevention strategies.

Keywords: Australia, behavioural factors, place of living, longitudinal study, obesity

Suicide, opulence and happiness: A cross country analysis

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Mental illness is one of the leading causes of premature deaths worldwide in the form of suicide. Suicide and suicidal ideation are important public health problems primarily due to the huge economic burden that they impose on a nation. Suicide behaviour shows wide variation across countries, genders and over time. However, the causes and risk factors of suicide are poorly understood in many parts of the world. This calls for research involving data from both developed as well as developing countries to assure coordinated and comprehensive interventions. Suicide is an irreversible choice of death over life. A person's material and emotional wellbeing might be crucial in determining his suicidal tendencies. In this paper we investigate if besides objective wellbeing measures, subjective wellbeing related to social and economic freedom are key determinants of suicide rate. We also hypothesize that the interactive impacts of subjective and objective wellbeing measures on the mental health of people might differ across the level of economic development and genders. Using a panel of 156 countries over the period of 2007-17 we estimate age-standardized suicide rates controlling for economic status of the countries. Our results show that developed and developing countries differ in their suicide determinants; as do male and female suicides. The pattern of suicide is determined by the level of happiness attained by a country at different points of time. Empirical results establish the hypothesis that objective as well as subjective well-being is essential in order to bring about a check on global suicidal tendencies. These indicators interact differently in determining the trend of male and female suicides in affluent and poor countries. This also proves that there is a satiation in the linear relationship between objective well-being and suicide as suggested by Easterlin (1974).

Keywords: Mental illness, suicide, subjective wellbeing, objective wellbeing, panel regression

Social stigma faced by tuberculosis patient in Rajshahi city, Bangladesh: A cross-sectional study

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Stigma related to tuberculosis (TB) is one of the social problems in developing countries including Bangladesh. In Bangladesh, TB is a major public health problem and the country ranks sixth among 22 high TB burden countries in the world. Stigma related to TB still exists in various forms in the community. Traditional belief, illiteracy, poverty and living in remote areas have a negative impact on TB and sustaining stigma. So, it is necessary to make the community aware that TB is curable, with the patient being non-infectious within two weeks of appropriate treatment, that treatment is available and the patients have rights. The objective of the study was to examine the level of social stigma related to TB as well as to identify the corresponding effect of stigma from a socio-demographic context. A cross-sectional study was conducted among 370 TB patients in Rajshahi city, Bangladesh during June 2011 to February 2012. Data was analyzed using SPSS version 23.00. Chi-square test and binary logistic regression analysis were performed to find out the correlation between level of stigma and socio-demographic variables. 58.9 percent of our sample were males as compared to 41 percent females. . Most patients were >35 years of age (59.20percent), literate (65.10percent), employed (54.60percent), medium income (53.50percent), Muslim(93.20percent), affected by pulmonary TB (74.10percent). 85.90percent of the sample had delayed diagnosis. Among patients, 85.90percent experienced neglect in different forms by their family and community due to stigma. Monthly family income, residence and type of TB were significantly associated with stigma. Stigma was influenced by age, sex and education. A total 79.5percent TB patient faced problem in taking part in social events such as marriages, EID festival, birthday party etc. Similarly, 61.9percent patients were neglected in the work place by their colleagues, 45.9percent were neglected by neighbours, 15.4percent were neglected by family members and relatives and 51.4percent patient faced discrimination while taking a meal with family members. To reduce social stigma, the suggested interventions are strong collaboration with various institutions including government and non-government organizations, private sector, social, cultural and religious institutions to make the community aware and informed regarding the disease and the availability of treatment through mass media, community meetings, advocacy, communication and social mobilization (ACSM) activities. Emotional support by the family and community to remove panic and stigma are also recommended.

Key words: ACSM, awareness, community, stigma, Tuberculosis

Inequality in age at death and the disparity in life span in India and South Asia: An age and causes of death analysis 1996-2016

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India has experienced significant falls in mortality rates over the last three decades. Life expectancy at birth in India for females and males was 70.2 years and 67.4 years, respectively, in 2014. Life expectancy at birth has not increased uniformly across the Indian states. Kerala showed an increase of four years, whereas Uttar Pradesh showed an increase of nine years during 1990-2014 (RGI 1988-92, 2012-16). This study examines the length of life span inequality and life disparity in India, and its two selected states southern state Kerala and northern state Uttar Pradesh; and decomposes the lifespan inequality and lifespan disparity by age and causes of death in India and South Asia during 1990-2016. We use life table Gini coefficient at birth G_0 to measure the length of life span inequality and disparity in life span at birth $e_0^\dagger$ for measuring the gap in the life span. Arriaga's (1984) discrete decomposition method and Shkolnikov et al. (2003) methods have been used to determine the age-specific contribution for the change in life expectancy at birth $\mathbf{e_0}$ and Gini coefficient at birth G_0 from 1996 to 2016. Among Indian males G_0 has fallen from 0.22 in 1996 to 0.16 in 2016 and $e_0^\dagger$ has fallen from 16 years in 1996 to 12 years in 2016. Among females G_0 has fallen from 0.22 in 1996 to 0.15 in 2016 and $e_0^\dagger$ dropped from 17 years in 1996 to 12 years in 2016. Declined infant and child deaths have contributed highest for the decline in lifespan inequality and life span disparity in India and its states Kerala and UP. There is more lifespan inequality as well as disparity in UP as compared to Kerala for both sexes and place of residence.
Keywords: Age at death, causes of death, life span inequality, lifespan disparity

Technical Session IB

Inequalities in Access and Burden of Out-of-pocket Expenditure

How does household health expenditure turn catastrophic? A study in the rural settings of Nalbari District, Assam

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Financial risk arising out of poor health conditions is quantified through catastrophic health expenditure (CHE). The risk grows higher if medical expenses result in the impoverishment of the households. The present study aims to quantify the annual household out-of-pocket expenditure on health care; identify the occurrence of CHE and determine the factors influencing CHE among rural households. A sample of 270 households was chosen from the Nalbari district by a three-stage sampling method and data were collected using an interview schedule. Both descriptive statistics and inferential statistics are used to analyze the data. The extent of CHE is quantified by guidelines mentioned under the WHO methodology discussion paper. Households with CHE were defined as those households whose health expenditures are over 40 percent of the capacity to pay as per WHO guidelines. To determine the factors contributing to the incidence of CHE, a binary logistic regression has been carried out with selected independent variables. The study suggests that the healthcare burden for the rural households of the selected district is noticeably high and approximately one-third of the selected households suffer CHE, implying high financial risk. Key factors affecting CHE in rural settings are the death of a household member during medical treatment, the number of in-patient cases, chronic cases in the household, as well as the number of out-patient cases. The number of in-patient cases and the number of chronic cases in the household both have a strong influence on the incidence of household catastrophes. On the other hand, even though approximately 16 percent of the sample respondents were enrolled under health insurance schemes/health programs, no remarkable impact of any of those policies has been witnessed. In the presence of several health schemes solely focusing on providing financial assistance for the needy, the out of pocket (OOP) health expenses and incurrence of CHE are expected to be lower if not completely abolished. However, the situation is rather alarming in recent times with high OOP health expenses and the high incidence of CHE by the households.
Keywords: Healthcare, health risk, healthcare cost, out-of-pocket health expenses, Catastrophic Healthcare Expenditure, financial protection

Gender discrimination in health-care expenditure: An analysis across age-groups

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This study has attempted to look into how much of the gender gap in inpatient expenditure is explained by the background characteristics of the patients (endowment effect) and how much remains unexplained by the observed factors and solely explained by gender (coefficient effect). The coefficient effect was 50 percent of the total gender gap in hospitalization expenses for all age-groups together indicating the large gender bias against females. The age-specific results brought to notice the even more severe form of gender bias among the elderly as indicated by earlier studies too (Maharana & Ladusingh, 2014) (Saikia, Moradhvaj, & Bora, 2016) and the huge gender gap that exists among the elderly despite the similar ailment pattern for both males and females. Another important factor explaining a large percentage of the gap is marital status. In the age-group 15-30 years, more males stay unmarried in comparison to females, increasing the gender gap. Being unmarried is supposed to give them more financial resources to spend on their own health needs than those with responsibilities of spouses and children. In case of the elderly, more females being widowed/separated compared to males explained a large part of the gender gap. Although the coefficient effect indicates purely gender-bias, a large part of the endowment component in this study can be termed discrimination in implicit form against females in hospitalization expenses. This is because the results have shown that choosing a private provider over a public provider, staying longer in hospital, spending on services like x-ray, surgery, medicine and other diagnostic tests is more among males as compared to females. This increased hospitalization expenses significantly and suggests that female health care needs are lower on the priority list of households, perhaps due to less decision-making power of females. In this study I used the database of 71st round of National Sample Survey (January 2014 to June 2014), on health and education expenditures at household level. Among other things, the dataset provides detailed information on inpatient expenditure for hospitalization during the last 365 days in both rural and urban households. Apart from the descriptive statistics on demographic, socio-economic and health-care related information of the patients in inpatient cases, I have run Oaxaca-Blinder decomposition analysis to look into how much of the mean gap in hospitalization expenditure between males and females was explained by differences in demographic, socio-economic and health-care related factors and how much remained unexplained. The analysis also gave the scope of examining the extent of contribution of the explanatory variables.

Keywords: Gender, Hospitalization expenses, Decomposition analysis, India.

Incidence and intensity of catastrophic health care expenditure: An analysis from 71st Round of NSSO

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Self-financing health expenditures which are generally very high is a common phenomenon in developing countries and India is no exception. Around 67 percent of total health expenditure is incurred out of the household's own pocket and due to severity of illness these expenses are found to be much higher than the ability to pay (National Health Accounts, 2017). This has a distorting impact on the consumption pattern of households and drags them below the poverty line. When the quantum of health expenses reaches a threshold level, it is considered to be catastrophic and in many cases households may experience treatments to be extremely costly. There are several studies both at Indian as well as international levels which compute incidence of catastrophic expenditure and its impoverishing effects. Literature usually classifies households as experiencing catastrophic expenditure if the share of health expenditure is considerably large. The next step is to capture the household's position along the poverty line. The present analysis is a departure from the existing literature which deals with the incidence of catastrophic health expenditure increasing poverty in various ways. The focus is not only on identifying the incidence of catastrophic expenditure but also to measure the intensity. Most of the literature limits itself to measuring the phenomenon of high health expenditure. But it is also important to assess the intensity of it in a context where, due to lack of systemic support, households are bound to incorporate the distortionary impacts of health into their demand function. Note that health expenses are non-discretionary and sometimes high enough for a household to pull away from a smooth consumption line. Catastrophic health expenditure occurs when a household is actually allocating their budget on health expenditure, hence it is important to identify the demand function related to that by identifying important determinants. Our principle objective is to evaluate the incidence, intensity and correlates of catastrophic health expenditure in India.

Keywords: Catastrophe, OOP, impoverishment

Growth and determinants of health insurance/schemes in India (2005-2016)

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Health is an essential constituent of human resource development. Good health is the real wealth of society. Health insurance is a method to finance healthcare; health insurance can help to reduce out-of-pocket expenditures (OOPE). Here we generally write health insurance, but that includes health schemes also. We divided health insurance into four parts: social health insurance, private health insurance, community health insurance, and government-initiated health insurance schemes; but we got data on different health insurance, so we present results that way. The objective of this paper is to assess the coverage of health insurance/schemes in India according to NFHS-3 and NFHS-4 by socio-demographic characteristics and other variables. We also we want to analyze essential determinants of health insurance. Using NFHS-3 and NFHS-4 data, the study conducts bivariate and multivariate analyses (binary logistic regression).. In this paper, for logistic regression, we merge ESIS and CGHS into social health insurance. We found that the coverage of health insurance has increased from NFHS-3(4.9) to NFHS-4(28.7); we found that in rural areas have a significant increase in health insurance in comparison to urban. In religion, increase of health insurance is highest among Christians (7.3 to 44.6) and there is a decrease among Jains (23.7 to 22.7). When we analyze determinants of health insurance, we found that residence, region, education, caste and wealth quantile are essential determinants.
Keywords: Health insurance, OOPE, ESIS, CGHS, PHI

Unmet need for healthcare in India: An analysis of healthcare barriers

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While India has made significant strides in many health indices under the initiative of universal health care access, a notable section of population is deprived of access to medical care. The magnitude of unmet need remains almost stagnant, that is 15.7 percent to 15.3 percent between 2004-05 and 2014-15, which is a matter of concern for policy makers. Research to date in India examines inequalities in healthcare mainly through actual utilisation with little consensus on analysing unmet need. To ensure equality in healthcare access through appropriate interventions, identification of factors contributing to unmet need is important. Given this context, the present study attempts to measure the trends and uncover the association of socioeconomic factors on the different type of unmet need. The data used for the study was drawn from the National Sample Survey 60th (2004-05) and 71st (2014-15) round. Individuals reported being ill within 15 days of survey but could not access services due to various reason was used as the dependent variable. Bivariate and multivariate logistic regression analysis were

used to understand the association of socioeconomic factors on the type of unmet need for care. Despite the rhetoric of universalisation of health care, unmet need remains stagnant and economic inequality among non-users increases as CI value increases from (0.12) in 2004-05 to (0.19) in 2014-15. Acceptability of healthcare was the major barrier for unmet need and it increases significantly in rural areas with a decline in accessibility barrier. Individuals with lower income have higher unmet need irrespective of its subcategories. Unmet need as the study find was concentrated mainly in rural areas, backward regions and among socioeconomically marginalised group. A multisectoral policy approach with strategies to address geographical heterogeneity is required for reducing unmet need for healthcare in India. Moreover, to move towards universal health care and achieve SDG targets, prioritizing the required adjustments in the health system and appropriate interventions to address demand side barriers is important.

Keywords: Unmet need, access, inequality

Long-run trends patterns and prospects of public and private healthcare expenditure in India, 1993-2030

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India is experiencing rapid economic growth and demographic transition, and expecting demographic dividend through investment in health and development. Improvement in longevity increases the proportion of elderly with a substantial need for health care expenditure on them. However, there is an uneven distribution of public and private healthcare expenditure in India, and the increase in out of pocket expenditure on healthcare raises the as to whether the government is spending sufficient fund for public health care expenditure. This study used data from National Accounts Statistics (MoSPI), EPWRF India Time Series, WHO global health expenditure database and 60th and the 71st round of National Sample Survey (NSSO). First, this paper aims to assess the long-run trends and patterns of public and private healthcare expenditure as a percentage share of GDP in India; second, to understand the age pattern of per capita healthcare expenditure by components of healthcare services in India; and third, to explore the effect of aging on prospects of healthcare expenditure in India. This study used the projection method, Johnston and Teasdale method, and Age Composition Index for analysis. The study found that the share of public health spending in 1995 was 26.2 percent of total health expenditure that has increased to 30 percent in 2014. The findings indicate negligible

increment in public health spending, and, a meagre share of GDP goes to health spending. Further, results portray that share of the central government in total public health spending has decreased after 2013-14, while states contribution has increased in recent years. The in-patient and out-patient cost is higher in childhood (0-4 years), decreases in adolescents and then increases and reaches its peak in age 70-74 beyond which it declines. We do not observe significant changes in age pattern of per-capita HCE between two rounds of the survey. However, 20-34 age (maternal age) shows slight increase in per capita HCE by 2014-15. Surprisingly, the per capita delivery cost has declined in the age 15-24 and increased in the age-group 25-29 between 2004-05 to 2014-15. Per-capita post-natal cost and ANC cost has increased in middle age groups of reproductive span. Family planning cost does not show any change in age pattern. The implementation of the National Health Mission has increased the share of public health spending. However, this study suggests that the central government should increase the share of public health spending in total GDP and make some concrete policy to insure the healthy aging in India.

Keywords: Public and private, healthcare expenditure, India

Technical Session IC

Health Policies and Programmes – Assessing Impact

Public health policy in Karnataka: Emerging issues and challenges

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Health is a positive state of wellbeing in which harmonious development of physical and mental capacities of individuals lead to enjoyment of a rich and full life. Health is thus vital for concurrent and integrated development of the individual and community and for socio-economic development of the country. Good health is one of the basic human needs and worldwide recognized goal for faster socio-economic development. Health is an important aspect of human life, at present it has also become an important aspect of any nation's public services and planning. Every country, whether developed or developing, has its own policy or public healthcare delivery system. The data for this study is based on the Karnataka Economic Survey 2016-17. This paper includes the health indicators, Karnataka's socio-demographic indicators and public health expenditure in Karnataka. The health issues or problem have been

studied. The Indian healthcare system is in a dilapidated state. The costs seem to rise everyday which makes it unaffordable for a large chunk of the population. Recently Indian *Health* Progress (IHP) discussed what the Indian healthcare system desperately needs and the steps to improve it. "India is the second most populous country in the world and with an inadequate healthcare infrastructure. A good system of regulation is fundamental to successful public health outcomes. It reduces exposure to disease through enforcement of sanitary codes, e.g., water quality monitoring, slaughterhouse hygiene and food safety. Wide gaps exist in the enforcement, monitoring and evaluation, resulting in a weak public health system."

Keywords: Public health, social demography, expenditure

Health of miners: Rules versus realities

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Mining operations raise serious concerns of environmental pollution in the locality and occupational hazard of mine workers. Being one of the most hazardous peacetime operations, mining workers are frequently exposed to several health issues like bronchitis, jaundice, ARI (Acute Respiratory Infection), gallbladder stone, blood pressure, Tuberculosis, joint pain, asthma, fever, cold, cough and the accidents with loss of bodily parts or life. Mining operations not only present health risk to the mine workers but also to the people living in the surrounding through environmental pollution. The profit maximization behaviours of mine lease holders place a heavy toll on the health and wealth of the mine workers and people living in the vicinity. However, there are several laws that aim to safeguard the mine workers and local people. In this context, this paper has taken up a study in a mineral rich district of Odisha, Keonjhar, to assess the impact of mines on the local environmental and health hazards of mine workers. We find serious violation of rules by the mine lease holders in different forms. Mines cause severe environmental pollution. Very few local people get regular jobs in the mines operation. Most of the jobs are contractual and low paying. Due to insecurity of jobs, mine workers get very little safety protection. The findings of the study raise serious concerns over the present model of mining operations and suggest a number of changes for improving the health of mine workers and local people.

Keywords: Occupational hazards, pollution, mining accident, worker's health issues

Rural sanitation in Karnataka: The real facts of Open Defecation Free (ODF) villages

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Sanitation has become the buzz word of every developing economy. On 25th September 2015, the UN General Assembly adopted the new development agenda: “Transforming our world; the 2030 agenda for Sustainable Development Goals (SDGs)".Out of 17 goals, the sixth goal target by the end of 2030, is to achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations. Environmental sustainability is a central concern of the SDGs (Health in 2015; from MDGs to SDGs). The need of today is to address issues of sanitation like hygiene, latrine facility, drinking water, drainage system and health facilities etc. These are also essential for the development of socio-economic conditions of rural households in the villages. Presently these facilities are lacking in a number of villages and there are also widening disparities from state to state and district to district in rural India and Karnataka. Hence sanitation is one of the most critical issues as it is linked to both human health and basic dignity of individual's life. This paper attempts to examine availability and accessibility of sanitation facilities to the households; to study the occupation wise latrine facility in the study area; and to study the reasons for not having latrine facility in the study area. This present study is completely based on primary data with pre-tested interview schedule. The study has adopted multi-stage stratified random sampling methodology. The data has been collected from eight villages selected from two districts in Mumbai-Karnataka Region (Survey Conducted in February to March 2018).

Keywords: Sanitation facilities, Open Defecation Free (ODF) village, Non-ODF, households occupation, Mumbai-Karnataka

How are Janani Suraksha Yojana and Janani Shishu Suraksha Karyakaram reaching out to pregnant women? A study of rural Punjab

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The development trajectory of any society can be appraised by the quality of its healthcare delivery services in general and of maternal and child health in particular. To increase the demand for maternity services in the country, Government of India introduced Janani Suraksha Yojana (JSY), a conditional cash transfer scheme in 2005. Building on the success of JSY, Government of India introduced Janani Shishu Suraksha Karyakaram (JSSK) in 2011 which envisages free maternity services at government hospitals. The present study is an attempt to analyze the performance of JSY and JSSK in rural areas of Punjab. Using a semi-structured questionnaire, 420 recently delivered women were interviewed from rural areas of seven districts of Punjab. Employing Principal Component Analysis and using data on asset ownership, a wealth index is constructed which divides the respondents into five wealth quintiles ranging from most poor to least poor. Since the benefits under JSY are restricted to women delivering in government or accredited hospitals or women delivering at home, the present study is restricted to 239 respondents meeting the eligibility criteria. Of the 239 respondents, only 38.1 percent respondents received the monetary entitlement under the scheme and some of the respondents had to wait for eight months to receive the incentive. The receipt of incentive was more among women belonging to upper wealth quintiles than women belonging to lower wealth quintiles. ASHA workers, crucial in the implementation of JSY, were found to be over-burdened, receiving incentive not commensurate with the work. Contrary to guidelines under JSSK, respondents were found to incur significant expenses to avail maternity services at public health facilities: on an average Rs. 1866.76 was spent on antenatal care and Rs. 1643.34 was spent on delivery. Although both JSY and JSSK targeted making pregnancy easier for women particularly at the lower economic strata, it is these women who have been worst affected because of glitches in the implementation of schemes. There is an urgent need to address the delays in disbursement of incentive and a strict monitoring of the supposedly free maternity services at government hospitals under JSSK which will enable the government to mitigate the burden of childbirth currently being faced by women in India.

Keywords: ASHA, expenditure, JSY, JSSK, maternal health

Understanding non-Compliance to mass drug administration of Filaria

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Lymphatic Filariasis (LF), the second most common vector-borne parasitic disease after malaria (commonly known as elephantiasis), is a neglected tropical disease. According to WHO, LF is the second most common cause of long-term disability after mental illness. This

is caused by a parasite that gets transmitted by mosquito bites and is then harboured in the lymphatics of the patients, coming into the blood stream only at night. It causes disability by blockage of lymphatics that causes the typical elephantiasis. An estimated 600 million people are at risk of this infection in 250 endemic districts of 20 states/Union Territories in the country. Mass drug administration (MDA)is one of the most potent weapons to combat LF in endemic areas. This is a routine activity done by the government in Filaria endemic areas where the entire population is administered drugs like DEC (Diethyl Carbamazine Citrate) and Albendazole. The drug does not provide long-lasting protection to individuals or give them any perceived benefits as only a small percentage actually carries the disease. It primarily acts on the basis of preventing transmission of the disease. Thus, this is amenable to non-compliance among the subjects. This research is about the causes of non-compliance to MDA in North 24 Parganas in the December 2014 and May 2015 round. The post MDA survey was done with the help of qualitative and quantitative techniques in a multistaged manner taking representations from both municipalities and blocks. The results revealed that urban clusters have poorer compliance, but no other socio-economic factors can be held responsible for poor compliance. On the other hand, time of drug distribution - as in evening - seemed to be an important part of the counselling of the head of the household, who is often not at home when the ASHA workers come to distribute the drug. High pill burden, as evident by the large number of tablets each individual has to take also was a hindrance to the compliance of the subject. Another factor was seen pertaining to social influence, i.e. herd behaviour, where there were clusters of population that did not take the drug in the same area. A detailed Managerial Logical Framework analysis was also done which showed factors like poor collaborating activities and surveillance to be key players in non-compliance.

Keywords: Mass drug administration, non-compliance, behavioural economics

Spill over benefit of social insurance and direct cash transfer for maternal and child health: A Propensity Score Matching Analysis

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Antenatal care services are adopted globally to reduce the risk of child and maternal morbidity and mortality. Share of institutional delivery in total number of child-birth has reached 90 percent in urban areas and 77 percent in rural areas in 2015-16. But considering births in last 5 years, only 45 percent of mothers in rural areas and 67 percent of mothers in urban areas availed

all 4 ANCs or more. Moreover, only 54 percent of mothers in rural areas and 69 percent of mothers in urban areas had their first ANC within 3 months of pregnancy, which is recommended by WHO for healthy pregnancy. Government of India has major policy emphasis on maternal and child healthcare and it is promoted through several government programs and schemes like social insurance schemes and direct cash transfer (like Janani Suraksha Yojana). This study examines the spill over or collateral benefits for mothers covered with insurance schemes as compared to mothers who are getting direct cash transfer. The study employs Propensity Score Matching to remove the selection bias in quantifying the effect of these schemes in encouraging use of antenatal care services. Results show that mothers who have insurance coverage have higher chances of availing at least one antenatal service during pregnancy as compared to those who do not have insurance coverage. But that does not hold true for availing full ANC i.e. first ANC visit within first 3 months of pregnancy, and 4 or more ANC visits during pregnancy. On the other hand, mothers who have received financial assistance from JSY do not necessarily have higher chances of availing at least one antenatal visit during pregnancy as compared to those who did not receive financial assistance under JSY. Similar conclusion can also be drawn for first ANC visit within first 3 months of pregnancy and 4 or more ANC visits during pregnancy. Though the spill-over effect of insurance is found to be more effective in maternal and child care, the coverage of JSY is wider. Suitable policy interventions are required to make the maternal and child care services more inclusive.

Keywords: Maternal and child health, antenatal care, Propensity Score Matching, health insurance, Janani Suraksha Yojana

Technical Session IIA

Health and Nutritional Status in Odisha

Equity in health care: Analysis of the Tribal Health Initiatives run as Public Private Partnerships in the State of Odisha

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It is well documented that 75 percent of health care needs of a community in a country are satisfied by primary health care and ironically this is also the level of care which is most neglected in developing countries especially India. In India, the problem we face in health care is insufficient funds coupled with poor outcomes. Given the available evidence to justify significant allocation of public funds to the health sector, the inability to spend allocated funds or the lack of absorptive capacity is a matter of deep concern especially for the poorly performing countries of the world. Many countries in South Asia and Africa and different State Governments in India have now recently opened up to alternative service delivery mechanisms in health like Public Private Partnerships (PPP) to make health accessible to the poorest of poor in the country. With malnutrition, lack of clean drinking water, poor sanitation, poverty, inaccessibility etc plaguing the tribal community, implementation of health policies becomes a challenge. In the last ten years, PPP were used as a medium to remove social taboo and improve access to health care among the tribals in the country. The objective of this study is to evaluate the effectiveness of various PPPs in tribal health and the lessons learnt. Primary and secondary data analyses were done to evaluate the PPP projects in tribal health in the state of Odisha. The various PPP projects considered for evaluation are PHCs run by NGOs as PPP Models and Maa Gruha (Maternity Waiting Homes) by NGOs. Primary data were collected from the state level and from three tribal districts. The study clearly indicates that the PPP models (Maa Gruha Scheme and the PHCs run by NGOs) in tribal health in Odisha have shown considerable and significant improvements in the health status of the tribal populations but there is still a lot to be achieved. However, the District/State administration needs to carefully select capable NGOs who would genuinely implement innovations and outreach activities. It is not just the private partner that needs to be responsible and accountable for a successful PPP but the public partner also needs to fulfill its duties in a time bound fashion. There has to be better performance indicators and monitoring and evaluation has to be strictly undertaken by the Government.

Keywords: Equity in health, Public Private Partnerships, Monitoring and Evaluation, Odisha

Health financing in Odisha: A comparative study of the existing Biju Swasthya Kalyan Yojana with Ayushman Bharat Pradhan Mantri Jan Arogya Yojana

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According to various research reports, India continues to have the lowest health insurance penetration in the world. However, government's focus towards health schemes, new initiatives like Ayushman Bharat Pradhan Mantri Jan Arogya Yojana may ameliorate the situation. Few states like Odisha already had their own state health insurance scheme. The Biju Swasthya Kalyan Yojana (BSKY) was launched in the state on August 15th, 2018. The main aim of BSKY is providing financial assistance for health care to about 3.5 crore people of the state. Ayushman Bharat Yojana or Pradhan Mantri Jan Arogya Yojana (PMJAY) or National Health Protection Scheme aims at making interventions in primary, secondary and tertiary care systems, covering both preventive and promotive health. It is an umbrella of two major health initiatives namely, Health and Wellness centres and National Health Protection Scheme. This study tries to compare the state funded BSKY with PM-JAY and come up with comparisons and lessons for the state of Odisha. The study uses secondary data to review the two schemes . The existing scheme of BSKY in Odisha was studied in detail and compared with the PM-JAY scheme implemented in other states. The data on both schemes were collected and analyzed for various parameters like coverage, package rates, utilization etc. BSKY is a historic step with both APL and BPL families getting health coverage under the state scheme. In Ayushman Bharat only BPL card holders are entitled to get coverage. BSKY covers all people with treatment facilities in premium hospitals outside the state and recently PM-JAY has also included this facility with insurance portability. BSKY is not insurance-based but assurance-based. A beneficiary will now reap direct benefit up to Rs 5 lakh. It will be directly availed from the state government. The Odisha government decided that due to the inherent advantages, they will continue with the existing BSKY scheme and not align with the PM-JAY, and that there was no need to implement Ayushman Bharat PM-JAY in the state.

Keywords: Ayushman Bharat, Pradhan Mantri Jan Arogya Yojana, Biju Swasthya Kalyan Yojana

Access, an important determinant for nutrition: Case study from Angul, Odisha

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Malnutrition is a universal problem affecting all geographies across the world, but most severe in the low- and middle-income countries. There was a shift in the five years between the Lancet (2008) and Lancet (2013) series where the discourse on improving nutrition has evolved. The 2008 series focused on nutrition interventions in the 1000-day window from a woman's

pregnancy to a child's second birthday. But the 2013 series focused on the lifecycle approach with a focus on the adolescent, pregnant and lactating mother and the child. Despite the strong call for investment in nutrition sensitive areas, the discourse has still largely been on nutrition-specific interventions. In India, Odisha has made remarkable progress in improving nutrition indicators and considered a champion. The rate of stunting decline in the state has increased from 1.8 percent per annum to 2.1 percent per annum in the last ten years. While Odisha has much to celebrate in reducing under-nutrition over the last decade, one needs to be cognizant of the persistence of the issue, where 34.1 percent of the children under 5 continue to be stunted, 20.4 percent are wasted and 34.4 percent are underweight (IIPS 2017). There are marked disparities in the nutritional well-being among different populations, with the Scheduled Castes (SCs) and Scheduled Tribes (STs) being nutritionally worse off. We carried out a study in the Angul district of Odisha to understand how this determinant works in the context of two Government schemes namely Supplementary Nutrition Programme (SNP) and Mamata, a conditional cash transfer scheme. We examined the accessibility of these two schemes to the most marginalised communities whose dependence on government services is high. We analysed factors which constrain access on the demand and supply side of these schemes and potential solutions to overcome these bottlenecks. We define access as amalgamation of several parameters which determine whether an individual is able to avail and use the services provided on time and as per the stipulated norms. While Odisha has made progress in nutrition over a decade, access to nutrition services under the SNP and Mamata remains a challenge among SC and ST communities, especially those residing in hard to reach areas. The factors that restrict this access exist on both the demand and supply side and include ecosystem factors as well.

Keywords: access, scheduled tribes, nutrition, ICDS, Odisha, PVTGs

Health status in Odisha: An analysis of achievements and challenges under the National Health Mission

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Health is an essential input for development of human resources and quality of life and in turn the social and economic development of nation. National Rural Health Mission (NRHM) was launched on 17th June, 2005 in Odisha. It seeks to provide quality healthcare to the rural population, especially the vulnerable groups. The main components of NRHM in Odisha included Reproductive and Child Health (RCH), immunisation and national disease control

programme. The activities undertaken under NRHM in Odisha are: Accredited Social Health Activist (ASHA), mainstreaming of AYUSH, untied funds to subcentres, formation of Rogi KalyanSsamities, mobile medical unit, strengthening PHC/CHC to Indian Public Health Standards. The objective of the study is to look at the achievements, innovations and challenges of Odisha state under the implementation of NHM and provide recommendations for improvement. The study was mainly based on secondary data. The study reviewed the major activities of the different schemes under NHM and assessed the progress and also responses from key stakeholders in NHM Odisha to understand the innovations and challenges under NHM. There are various schemes which are run by the state and NHM like Mamata, BKKY, BSKY, Ama clinic, Maa Gruha etc. The budget allotted for healthcare in 2007-08 was 3.3 percent. After a decade in 2017-18 it was 4.9 percent. For 2018-19 Odisha has allotted 5.1 percent of total expenditure on health, which is higher than the average expenditure of 18 other states (4.8 percent). The analysis of NHM budget showed that overall budget for NHM Odisha increased substantially from 2007-08 to 2018-19. The new innovations in Odisha under health included management of PHCs by NGOs, post training supervision and monitoring of IMNCI-trained personnel by NGO, community monitoring, application of GIS technology etc. The geographical coverage is a blot on health care in Odisha due to regional disparities. The human resources management with acute staff shortages in numerous districts, unsatisfactory promotion avenues, low morale, and high absenteeism were major obstacles. There is still lot of progress required in modernising health services, reducing out of pocket expenditure which has great consequences for the poor. It can be concluded that health care system in Odisha is in transition .The state is investing in health technology to promote scientific evidence-based scientific decision-making and efficiency; and shift the role of vertical programmes that are aimed at a particular disease. This is combined with greater availability of qualified and trained manpower, enforcement of standard treatment guidelines and referral protocols to ensure quality of healthcare.

Keywords: Health status, Odisha, National Health Mission

Constructing the District Level Hunger Index for Odisha

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Odisha has been considered one among the poor states of India. Although the state has

abundance in natural and mineral resources, issues like poverty and undernutrition still form the primary problems for the state to be solved. The situation has further worsened by the frequent natural calamities in recent years. In addition, wide-spread hunger across the state has been a misery over years. In the State Hunger Index formulated in 2009, the state had a rank of 12 out of 17 states. The rank mirrored the lower performance of the state in terms of eradication of hunger, malnutrition and other nutrition related figures along with child mortality. The score of the state was below the national average at that time. Currently, while the state administration is trying to implement effective policy measures to eradicate hunger across the state, this study has made an attempt to estimate the prevalence of hunger at district level. The methodology formulated by the Global Hunger Index has been used and the study follows the State Hunger Index in its theoretical propositions. The calculated hunger indices for the districts show that there is wide range of regional disparities across the state. The disparity is evident from the highest index score (85.25) of Kandhamal in Central Odisha, that is more than double of Jagatsinghpur, a coastal district, which has the least score (38.70). Further, the existence of regional imbalances is supported by the ranking of the districts where the entire coastal region has managed to establish itself at the top, but the whole Western part lags behind. Interestingly, no districts apart from the coastal or Eastern part is found in the 'low' category. The outcome and the correlation analysis also reveal that the measures taken for the development of the Western districts (the "KBK Districts" in particular) have been proven insufficient. Again, the positive correlation between the Hunger Index with the proportion of farmers as well as the proportion of Scheduled Tribes is a matter of concern.

Keywords: Hunger Index, regional disparity in Odisha, undernutrition, poverty and illiteracy

Out-of-pocket expenditure and distress financing in rural Odisha

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The aim of this paper is to analyse healthcare spending in public and private healthcare treatment in rural households and it variation across the district in a poorer state like Odisha; and to determine the factors associated with high burden of healthcare for the rural poor. This study tests the hypothesis that households from developed district in Odisha are spending comparatively more on health while households in backward districts face greater distress due to healthcare burden. What were the factors influencing health spending and distress financing in districts of Odisha? What were the sources of income for health treatment for the rural

households at the district level? The study used primary data collected from 405 rural households from three villages each in three districts of Odisha during 2013-14 viz Cuttack, Bargarh and Balangir. Districts were selected based on socio-economic and health indicators and village and households were selected by using simple random sampling. Chi-square test and Analysis of Variance was used to understand the factors association and variation in mean across the socio-economic groups, caste, education and type of treatment. We found that income class and income loss are important combined factors to explain the burden of health spending. Rich households were spending more on health along with high income loss compared to poor households, while 87 percent of health expenditure of poorer households was managed through borrowing at high rate of interest. Poor households are borrowing money from private money lenders at high rate of interest, losing their assets and falling into indebtedness. Broadly this study concludes that households of more developed districts were spending more on health but distress financing was high among the households of the backward districts of Odisha. However, along with central government it is essential that state and local governments intervene to reduce financial burden in rural Odisha. The state needs to evaluate all the programs to understand how effective they are. Ambulance services should be free even for long distance and all medicine should free for all the poor people.

Keywords*:* Distress financing, poor, out-of-pocket expenditure, rural Odisha

Technical Session IIB

Gender and Health

Gender Inequality in the Provisioning of Health Care and empowerment

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Provisioning of adequate health care to all perhaps is very important for ensuring attainment of a minimum good quality of life for all people. At the same time, empowerment through providing opportunity of education, right to express views and employment are also equally necessary for good living and sustaining the pace of human development. Again, it is not simply the totality or average that is important, distribution is a matter of serious concern also. Inequity in various forms in health care provision and empowerment in India seems growing at an alarming rate. This paper attempts to look into the issue of gender inequality in respect of health care provision and empowerment. Based on slightly modified formulation of gender

inequality index proposed by Seth (2009) and elaborated in UNDP's technical report on Human Development (2006), an attempt is made here to capture the pattern and nature of interstate variation in gender inequality in India and also to account for the above. To focus attention on health care facilities relevant for women, performance of various states in provisioning of reproductive health care facilities has been isolated to assess the degree of gender inequality in health care provisioning. Parameters like Maternal Mortality Ratio (MMR) and Adolescent Fertility Rate (AFR) have been treated as core parameters and used to compute gender inequality in the provisioning of health care for various states of India (based on datasets for the years 2007-8 and 2015-16). Kerala has been found to be the best performer among the states of India, where gender inequality has been lowest. Both MMR and AFR are significantly lower compared to those of other states of India for both the years 2007 and 2015. Among other states, West Bengal and Tamil Nadu perform well though West Bengal's AFR is alarmingly high and has worsened over the period 2007-2015. As far as female empowerment is concerned, we have considered the following (i) Percentage of female representation in democratic bodies like Legislative Assembly/Parliament; and (ii) Percentage of female enrolment in the higher classes of schools. In assessing the status in the labor market, (i) Participation of females (and also males) in the labour force; and (2) Female wage gap (female wage as ratio of male wage) have been considered in the formulation. We observe substantial variation among states in respect of gender bias/gender neutrality. In obtaining precise measure of gender inequality for any state we have followed five sequential steps elaborated in the main body of our paper. Finally, we have obtained a set of composite indices of gender inequality incorporating inequalities in (i) health facility access; (ii) empowerment; and (iii) labour market status together. Again, here also ranked by composite index, Kerala demonstrated a consistently low gender inequality. In our earlier exercise (2012), based on only 2007 data, we did not consider female wage gap in the labour market in assessing labour market access status. Perhaps this is an improvement in the methodology incorporated in the present exercise. Unfortunately, though we planned to incorporate male-female variation in untreated morbidity in obtaining gender inequality in access to health care facility, it was not possible due to paucity of relevant data for our reference periods.

Keywords: Gender, Inequality, Health Care facility, Empowerment, Labor Force Participation, Maternal Mortality

Women empowerment and child stunting in India: An investigation

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Among the seventeen Sustainable Development Goals set by the United Nations, the second is 'Zero Hunger', i.e. to end all forms of hunger and malnutrition by 2030. This goal includes the achievement of internationally acceptable targets of stunting among children under five years of age. This paper aims to describe the trends and variation of various dimensions of child stunting using data from NFHS-3 and NFHS-4. It also aims to find the determinants of child stunting with special focus on the effect of women empowerment on child stunting. The stunting variable for this analysis is based on the variable given in the NFHS. We have selected four dimensions of women autonomy for our study based on the indicators, of which three are given by Gupta & Yesudian, 2006. Apart from indices to gauge women's empowerment, other characteristics related to women were also used including age and the level of education, among others. The chi-square tests suggest association exists between different types of women empowerment and child stunting. The increase in the financial autonomy of the women decreases the odds of the child being stunted. Female child has lower odds of being stunted as compared to the male child in 2005-06 but the difference became insignificant in 2015-16. Also, as the age of the child increases so do the odds of stunting. Increased birth order of the child also increases the odds of child stunting indicating neglect on the part of the parents towards their child's nutritional requirement as the number of children in the family increases. The child born in Muslim households had higher odds for stunting in 2015-16 as compart to the children from Hindu households. Also, children from the general category households have lower odds of stunting as compared to SC household children. Odds of stunting significantly decreases as the households' wealth level increases. In 2005-06, with the increase in age of women, odds of stunting have decreased but in the case of 2015-16, the difference became insignificant. Women education levels plays an insignificant role in determining stunting in 2005-06 but in 2015-16, the odds decrease for the women with more education as compared to the women with no education. Occupation of the women does not play any significant role in determining their child's stunting. Education of the husband/partner plays a role very similar to the respondents' education level, with increases in education level reducing the odds of child stunting. In 2005-06, states with higher per capita GDP have lower odds of child stunting as

compared to the states belonging to the lowest quartile but the results became insignificant in 2015-16.

Keywords: Women empowerment, stunting, India, NFHS

Association of obesity with childlessness and infertility among women: Evidence from NFHS 4

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Obesity and overweight are strong predictors of several well-established risk factors for increased morbidity and mortality. Changing lifestyle, consumption of junk food, a sedentary lifestyle are all directly or indirectly associated with a higher prevalence of non-communicable diseases. Apart from other morbidities, obesity and overweight also have consequences on reproductive health. Not only this, there are increased chances of maternal, perinatal complication and miscarriage due to it. Almost all the health and nutrition policies in developing countries emphasize undernutrition, but at the same time, the rising prevalence of over-nutrition is now a serious health threat. The main objective of this paper was to assess the association between reproductive health problems and obesity among women in India. Data from NFHS round 4 has been used for this study. Findings from the study were that primary infertility was highest among women who were morbidly obese while it was moderately high for women whose BMI was between 30 – 39. Childlessness follows a similar trend. Women who were morbidly obese had the highest proportion of childlessness, followed by women with grade 2 obesity. Women in the obese category showed a higher proportion of miscarriage compared to women in the normal BMI range. This study found that there was a positive association of primary infertility, childlessness and miscarriage with overweight and obesity among women. Women with grade 2 and grade 3 obesity have a substantial risk of facing reproductive issues and experience one or more of the above-mentioned issues.

Keywords: Obesity, childlessness, miscarriage

Is hysterectomy a new threat for Indian women?

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Hysterectomy among women is one of the major public health issues. Primarily it was known as a major surgical gynaecological procedure among women in developed countries, but slowly and steadily it has started shaping itself in the developing countries as well. In India, women's

attitudes towards menstruation are a significant driver in seeking hysterectomy. Therefore, this paper has attempted to study the prevalence, determinants as well as reasons for hysterectomy among ever married women in India using the data from NFHS-4 carried out during 2015-16 . This study has utilized the information regarding hysterectomy from ever married women aged 15-49. Appropriate univariate, bivariate and multivariate analysis has been carried out. This study has revealed that the prevalence of hysterectomy in India is 4.1percent at a median age of 33.4 years. Among the states, Andhra Pradesh has shown the highest prevalence while Assam has the lowest prevalence of hysterectomy. In the present study, factors like high parity, high body mass index, older age, early age at first cohabitation, illiteracy increase the likelihood of hysterectomy. Excessive menstrual bleeding has been found to be the leading reason for hysterectomy in this sample. Hysterectomy has shown an upward trend over the years and also it has been emerging as a threat for women in India. This may have adverse effects on the physical, socio-psychological and reproductive health of women. Therefore, it is essential to promote high-quality prevention and treatment choices for women rather than permanent but potentially inappropriate solutions.

Keywords: Hysterectomy, women, India

Socioeconomic and rural-urban differential: How does it affect maternal health in High Focus States of India?

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Since the past several years, efforts to reduce inequalities in utilization of basic health care services have been focused on the overall improvement of maternal health in developing countries. But the existence of socioeconomic and rural-urban difference and not being able to identify this difference appropriately hinder the process of improvement in maternal health. The study examines the socioeconomic and rural-urban differential in maternal health considering the complications that a woman usually faces in her reproductive cycle viz. antepartum, intrapartum and postpartum. We used data from the fourth round of the National Family Health Survey 2015-16. Concentration index and Oaxaca decomposition were used to examine the effect of the socioeconomic and rural-urban differential on maternal health. Logistic regression was also used to assess the adjusted effect of determinants of maternal

health. The study shows the higher concentration of burden of maternal complications during antepartum, intrapartum and postpartum period among the households with higher socioeconomic status in both rural and urban areas. The estimates of Oaxaca decomposition also show the existence of the effect of the rural-urban differential on the burden of maternal complications. Prior caesarean delivery, multiple births, terminated pregnancy are the major factors elevating the risk. Institutional delivery, assistance by skilled personnel during antenatal care and delivery lower the risk. A reduction in inequalities in access to maternal health care viz. prenatal care, skilled birth attendance, and postnatal care on various economic, geographic and social scales is necessary to reduce the burden of poor maternal health.

Keywords: socioeconomic, maternal health, complications, rural-urban, India

Technical Session IIC

Health and Well-being of Elderly

Economic independence, living arrangement and self-rated health: A study of elderly in West Bengal

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This study has attempted to explore and understand the changing pattern in economic independence, living arrangements and self-rated health of the elderly in West Bengal using National Sample Survey data over the last two decades (1995-2014). The study utilized quantitative information from NSS unit-record data (52nd round: 1995-96; 60th round: 2004; 71st round: 2014) for West Bengal. Descriptive statistics have been used to explore the socio-economic and demographic variables on three rounds of NSS data. The study conducted detailed analysis of the distribution of elderly population with respect to their economic independence, living arrangement, physical mobility and self-rated health. Further pooled logistic regression has been carried out to estimate the association between selected socio-economic and demographic predictors of self-rated health over time. Among the elderly, the share of young elderly (60-69 years) and old elderly (80 years and above) increased between 1995-96 to 2004 in both rural and urban areas. The share of elderly belonging to age group 70-79 years increased from 2004 to 2014. The share of currently married elderly increased over the years. The education status has also improved for the elderly over the years. Financial

dependency is found to be more common among the female elderly than male elderly and the economic dependence on spouses is higher among the female elderly than elderly males. Living with spouse is more common among the male elderly than the female elderly. The percentage of elderly living with spouse shows an increasing trend for the female elderly. The elderly females are also found to be less physically mobile than the elderly males. Results from pooled logistic regression shows female elderly are more likely to report good health status than the male elderly (OR = 1.17, CI= (1.10, 1.24), and with increasing age, the likelihood of having poor health increases. With *60-69 years* as the reference category, it is found that elderly aged *70-79 years* are less likely to report good health (OR = 0.64, CI= (0.60, 0.67), which decreases further for the those aged 80 and above (OR = 0.46, CI= (0.42, 0.50), The likelihood of good self-rated health has been found to be significantly lower among elderly having education below secondary (OR= 0.81, CI= (0.73, 0.90)) and illiterate (OR= 0.86, CI = (0.78, 0.95)) than among the elderly having educational level secondary and above. Elderly who were partially dependent on others were less likely to report good self-rated health compared with economically independent elderly (OR=0.72, CI= (0.66, 0.78), Elderly people living in urban areas are more likely to report good self-rated health compared to the elderly living in rural areas, With 1995-96 as a reference category, likelihood of good self-rated health in 2004 and 2014 was higher (OR= 1.24, 1.42). However, with a growing elderly population, more important insights can be gained with a multidimensional analysis of demographic trends, health policy and health outcomes of the elderly over time. Also, the deprivations of the elderly vary with respect to their socio-economic and demographic position in society. In this regard, policy prescriptions targeting various sub-sections of the elderly population need to be designed.

Keywords: Economic independence, living arrangement, physical mobility and self-rated health.

Psycho- social status of elderly farmers in Wayanad, Kerala: A qualitative study

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The aim of the study was to explore the psycho-social status of elderly engaged in farming, specifically among small holder farmers in Wayanad, Kerala. Methods: Participants included

36 farmers who are above age 55 and are taking care of their farm land. Data were collected through semi-structured in-depth, key informant interviews, FGDs and participant observations. The sample consisted of elderly farmer population who may differ from young potential farmers in facing multiple risks. Some of them presented mixed attitudes towards psycho-social conditions, while others' attitudes were more systematically negative. The extent of perceived risk was compensated for by the satisfaction factor; most participants seemed to be concerned about the future of their farm. Regarding ergonomics, they seemed to be aware of the emerging issues in farming along with age related problems. The physical demands of working in old age and having to perform a multitude of tasks that contribute to physical stress were issues of concern. This is one of few studies that explores psycho-social problems among elderly farmers. Although participants reported very few actual issues, the study identified relevant intrapersonal and behavioural factors that may increase or reduce the risk of mental stress. Results also point to the need for research that focuses on the psycho-social and contextual factors that may contribute to stress among elderly farmers.

Keywords: Psycho-social status, elderly, Kerala

Social security, social support, and their association with subjective well-being of the elderly in India

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Subjective wellbeing is an important component of wellbeing that benefits people by influencing their subjective feelings. Using the Building Knowledge Base on Population Ageing in India (BKPAI2011) survey data, the study attempts to assess the different socio-economic & socio-demographic factors associated with social support and availing of social security schemes and their linkages with the Subjective wellbeing (SWB) of elderly in India. Social security variable is constructed based on all the elderly who are availing benefits of any government social security scheme (IGNOAPS, IGNWPS or Annapurna scheme). Varimax rotated factor analysis loaded onto a separate factor from “poor”, “average” and “good” is used to construct our variables Social Support and Subjective Wellbeing. Bivariate analysis revealed that the elderly in the ‘richest’ wealth quintile are most likely to have good SWB and have received ‘good’ social support. All these factors indicate that wealth and education are the most important determinants of whether elderly will receive “good” social support and will have a

"good" subjective wellbeing. While using Binary Logistic Regression, we established that those elderly with the most years of schooling (8+ years) and those in the highest wealth quintile are least likely to avail social security schemes. Using Predicted Probabilities of multinomial logistic regression, we find that elderly availing social security schemes have a higher probability of having "poor" SWB, and those elderly who received good social support are most likely to have a "good" subjective wellbeing. Since the monetary benefit of most of the social security schemes in India is at most Rs 200 ($3) per month, the elderly who opt for these either belong to lower wealth quintile or belongs to the low education group. So, to have a larger base of the elderly utilizing social security schemes, monetary benefits should be increased to a respectable amount, which holds some real monetary importance.

Keywords: Social security, social support, subjective wellbeing and elderly in India

Gender inequality in health status and access to health care among the elderly in India

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Gender has been identified as an independent social marker of health inequity. In developed countries, gender differences in health status are reported to decrease with age. However, in developing countries like India, limited evidence is available regarding gender difference in health status among older adults. This study examines female disadvantage in health status as well as access to health services for populations aged 60 plus in India. Using the unit level data of NSSO 71st round on Health and Morbidity, this study tries to establish the fact that females do face disadvantage both in terms of health status and access to health services in old age. Logistic regression analyses were used to identify factors associated with health status as well as utilisation of inpatient care. Results indicate that females in old age, even after controlling for various socio-economic factors, have higher chance of reporting poor health as compared to males. Using hospitalisation as a dependent variable, females were found to have much less chance of being hospitalized as compared to males after controlling for various socio-economic factors that enable utilisation of health services.

Keywords: gender inequality, age inequality, health status, healthcare utilization

Examining the validity of self-reported morbidity and self-rated health among the aged in India

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Both self-reported morbidity (SRM) and self-rated health (SRH) have been questioned on the grounds of reliability and validity, particularly in the context of developing countries such as India. It has been argued that indicators of self-perceived health often do not move in tandem with objective indicators of health and are not reflective of socioeconomic inequalities in health. However, while some studies using recent data have demonstrated a socioeconomic gradient in self-reported morbidity, some others have shown that self-rated health is strongly associated with different health dimensions in India. We do not know of any study that systematically examines the validity of SRH and SRM using the same dataset. This paper attempts to do so, analysing data for the aged population from the latest health round of the Indian National Sample Survey. We consider two indicators of SRM: chronic and acute, and test their association with different positional parameters such as economic condition, educational attainment and availability of healthcare facilities, using multivariable logistic regressions. We also test the association of SRH with these parameters and SRM, using ordered probit regression. In an alternative specification, we replace the general indicators of acute and chronic morbidity with the presence of specific diseases and health conditions, and examine the validity of SRH. While self-reported morbidity is typically lower for people who are disadvantaged in terms of different socioeconomic parameters, the latter are more likely to report worse self-rated health. However, we cannot be entirely dismissive of SRM, since SRH is strongly associated with it. Self-reported presence of specific diseases and health conditions also significantly increase the likelihood of giving poorer ratings for SRH among the aged in India.

Keywords: Self-rated health, self-reported morbidity, chronic morbidity, acute morbidity, health dimensions

Technical Session IIIA

Assessment of Household Expenditure

How do farm households spend their non-farm incomes in rural India? Evidence from longitudinal data

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Using nationally representative longitudinal data of farm households in rural India, this article contributes to the literature by investigating whether additional income obtained from rural non-farm enterprises (NFEs) help farm households in enhancing their dietary and expenditure diversity. Additionally, it investigates the impact of NFEs income on farm investment to comprehend how NFE income competes or complements agricultural production activities. We discuss the theoretical conditions where access to NFE income may affect farm investment, dietary and expenditure diversity in a farm household model followed by panel data analysis. The issue of potential endogeneity associated with NFE income is overcome by using over-identified instrumental variable strategy. Socio-economic and demographic factors, agroecological zones, and household structures are included in the models as control variables. The present study finds that NFE income significantly increased the food intake in general and it also helps farm households to shift from less nutritional to high nutritional foods which contribute to greater household dietary diversity. It also raises expenditure on non-food items and durable household assets, resulting in greater household expenditure diversity. In addition, we have also observed that NFE income has a positive impact on farm investment which contributes to reform the farm sector. Findings provide insights into how farm households increasingly engage in rural non-farm enterprises. This has significant policy implications for livelihood diversification and diversification in consumption expenditures, particularly for marginal and small farm households.

Keywords: Non-farm enterprises, dietary diversity, expenditure diversity, farm investment, instrumental variable estimations, rural India

Patterns and determinants of medical expenditure due to infectious and communicable diseases in India

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Global health trends have followed a pattern characterised by the epidemiological transition, where a decrease in mortality is followed by a slowdown in fertility, creating larger older populations. Infectious diseases today continue to pose a significant burden on health and society. The increased mobility of people and goods has contributed to the persistent and ever-changing impact of infectious diseases. A large number of outbreaks of epidemic infectious diseases (EID) have happened in India in the recent past, many of which are zoonotic, with the majority of the infectious agents being virus. We know that out of pocket health expenditure of infectious and communicable diseases is increasing all over the world. This paper provides the idea about the pattern of the medical cost of hospitalization for inpatients with infectious or communicable diseases and important factors which decide the medical expenditure of inpatients. The study is based on the data from the National Sample Survey (60th and 71st rounds). Log-linear regression and mean are used as statistical tools for analysis. While 93 percent of the health expenditure for Tuberculosis is contributed by medical expenditure, it was 88 percent and 94 percent respectively for diarrhoea and acute respiratory infections. Age, medicine, insurance premium, hospital stay duration, other diagnostics, diagnostics (ECG, SCAN, EEG), ward type and level of care have a significant effect on medical expenditure for infectious or communicable diseases in 99 percent confidence interval.

Keywords: Infectious diseases, communicable diseases, medical expenditure, hospitalization

Health gains and financial risk protection afforded by public financing of selected malaria interventions in Ethiopia: an extended cost-effectiveness analysis

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Malaria is a public health burden and a major cause for morbidity and mortality in Ethiopia. Malaria also places a substantial financial burden on families and Ethiopia's national economy. Economic evaluations, with evidence on equity and financial risk protection (FRP), are therefore essential to support decision-making for policymakers to identify best buys amongst possible malaria interventions. The aim of this study is to estimate the expected health and FRP benefits of universal public financing of key malaria interventions in Ethiopia. Using extended cost-effectiveness analysis (ECEA), we estimate the potential health and FRP benefits, and their distributions across socio-economic groups, of publicly financing a 10% coverage increase in artemisinin combination therapy (ACT), long-lasting insecticide- treated bed nets (LLIN), indoor residual spraying (IRS), and malaria vaccine (hypothetical). ACT, LLIN, IRS, and vaccine would avert 358, 188, 107 and 38 deaths, respectively, each year at a net government cost of $5.7, 16.5, 32.6, and 5.1 million, respectively. The annual cost of implementing IRS would be two times higher than that of the LLIN interventions, and would be the main driver of the total costs. Nearly 50% of the averted deaths would occur among children below five years of age and mainly be concentrated in the poorest two income quintiles. The four interventions would eliminate about $4,627,800 of private health expenditures, and the poorest income quintiles would see the greatest FRP benefits. ACT and LLINs would have the largest impact on malaria-related deaths averted and FRP benefits. ACT, LLIN, IRS, and vaccine interventions would bring large health and financial benefits to the poorest households in Ethiopia.
Keywords: malaria; Ethiopia; equity; financial risk protection; extended cost-effectiveness analysis.

Costing health care diagnostic services and measuring relative share of cost drivers

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Health care services are an essential element of human life. A healthy environment of health care infrastructure of a nation is one in which it ensures both quality as well as affordability in health care interventions. The state of Kerala is regarded as a model to the rest of world since

the state has exhibited great achievements in lowering mortality and ensuring basic health care facilities within the reach of community. Affordability of medical care facilities is a major concern in Kerala medical care setting rather than quality in services. Before analyzing the affordability of medical care, the actual cost of such services should be appraised. This particular study is an attempt to identify the major cost drivers and to determine the relative share of each component in the unit cost of health care diagnostic services. Step Down Costing Method (SDCA) has been used to derive the per test costs by analyzing the data collected through primary survey from selected medical laboratories across Kerala. A structured interview schedule was used gather data from diagnostic service providers. Total cost of diagnostic services is allotted to each testing centre. Unit cost of each component of service was identified and per test cost analysis was used to determine the relative share of each component and the overall results reveal that the major share of cost in providing diagnostic test is capital cost followed by labour cost. Capital cost accounts for a 48 percent of unit cost and 34 percent can be attributed to Labour. Economies of scale: The study suggests that the accounts of cost per tests and the share of each component can serve as a better tool to rationalize the allocation and utilization of diagnostic resources. The findings and results could be utilized to bring prudential health care reforms to formulate better policies and guidelines about the provisions and prices of diagnostic health care services in Kerala .

Keywords: Health Care Diagnostic Services, cost drivers, Step Down Costing Method

Progressivity of public spending on health care: analysis of incidence of benefit in Tamil Nadu and Bihar

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India’s per capita health expenditure is among the lowest for developing countries. Total spending on health care remains low at 4 percent of GDP. Government spending on health care is only 1.1 percent of GDP and contributes 29 percent of total health care spending of the country. Success of public spending on health care depends on the extent to which it reaches the poor and vulnerable, especially when the spending is scarce and insufficient. Benefit Incidence Analysis (BIA) has become an important tool to measure progressivity of public spending on health care. Effectiveness of public spending to provide health care in India remains a relatively elusive empirical issue, especially at sub-state level. Tamil Nadu and Bihar are two extreme points in the health care sector in terms of their health indicators. This study

is the first attempt to examine progressivity of public spending on health care at district level in these two states. Most of the BIA analyses on public expenditure on health care are bounded at state level, mainly because of unavailability of disaggregated data at district level. This study uses disaggregated data on public spending on health care and utilisation of spending by different income groups obtained from account of District Disbursement Officers (DDO) and polled NSSO 71st round data of Tamil Nadu and Bihar. Tamil Nadu exhibits a pro-poor benefit distribution for in-patient (IP) and outpatient (OP) care overall as well as different level of public facilities. However, in Bihar benefit distribution for IP is pro-poor but that for OP is pro-rich. Primary level facilities utilise 65 percent of total health budget in Bihar; but higher-level facilities serve 88 percent total IP care (in days) and 59 percent of total OP visits, in the public health system. There is a considerable amount of variation across districts in Tamil Nadu and Bihar. Tamil Nadu also has scope for reshaping its public health system to make it more progressive at the district level. Bihar not only needs to increase its spending on health care but also needs to focus on pro-poor distribution of the benefits of IP as well as OP care.

Keywords: Health financing, Benefit Incidence Analysis, public spending on health, Bihar, Tamil Nadu, India

Technical Session IIIB

Paradox of Undernutrtion in India

Imbalances in macronutrient consumption in Indian households

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Malnutrition in India has always been synonymous with undernutrition; however, this perception of malnutrition might need to be placed under scrutiny. The association between diet and health is underpinned by an interdependent relationship between dietary patterns, foods, and food components, including nutrients (Tapsell et al., 2016). Diets are composed of foods, which in turn are composed of nutrients and other food components. Low consumption of the right nutrients can lead to undernutrition and at the same time overconsumption of macronutrients can lead to obesity. Hence, there can be both types of effects equally relevant. This paper aims at assessing the mismatch in macronutrient consumption amongst Indian households using NSS "Household Consumption Expenditure, 2011 - 12" 68th round data. It documents the mismatch in consumption pattern among households of various groups and

socio-economic backgrounds. Mismatch has been taken from a standard benchmark using ICMR-NIN dietary guidelines. The preliminary findings suggest that 15 percent of the rural households are extremely deprived of calories, while on the other hand 39 percent of urban households are consuming fats remarkably higher than the required levels. It has also been observed that income plays a huge role in determining the gaps in nutrition intake. The expenditure class 1 households as per NSS are extremely deprived of both calories and protein. Regional variation in the mismatch of macronutrients consumption was also observed. In India, for every 5 households which are not getting the required levels of calorie and other macronutrients, there is 1 household which is consuming extremely high levels of these macronutrients from the standard benchmark requirement. Keeping in mind that India is a country which is already experiencing a double burden of disease, it should consider both ends of nutrient intake to avoid the double burden of malnutrition in the near future.

Keywords: Nutritional intake, macronutrients, malnutrition

Nutritional outcome among women and pre-school children in India, with particular reference to Kerala: Evidence from NFHS

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India has been discredited not only with a large number of malnourished children but also glaring disparity across the states and regions. The study proposes to do an exploratory analysis, using anthropometric indicators, to examine the trends and patterns in child malnutrition at all India and state level based on NFHS 3 and 4 reports. States are ranked on the basis of (a) the percentage of underweight children as per the NFHS 4 and (b) the short fall reduction in the proportion of underweight children as between NFHS 3 and NFHS 4. States with highest and lowest percentage of underweight children, and good and poor performer states (in terms of short fall reduction) are then compared in terms of child and women nutritional indicators, maternal care, delivery care, child immunization, and child feeding practices. There is a wide disparity among states and even within regions. States with lowest percentage of underweight children were not good performers in short fall reduction between the two periods. Variation in nutritional status is explained by the differences in access, and coverage of health parameters, such as immunization, institutional deliveries and schooling of parents etc. Analysis of emerging issues in the health sector of Kerala is also attempted. Increased incidence of non-communicable diseases, privatisation of inpatient care and the

greater proportion of underweight children in marginalised communities in Kerala are some emerging issues that might result in a health crisis.

Keywords: Nutrition, underweight, NFHS 4, access

Food security and nutritional status of children aged 5-9 years: Evidence from Jharkhand

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Substantial regional variation in poverty, food insecurity, and malnutrition exists in the country. Even though Jharkhand has covered 87 percent of its rural population under state Food Security Act, the nutritional status of children is not satisfactory. The state has the highest levels of underweight (48 percent) and wasting (29 percent) among children aged 0-59 months in India. Malnutrition is the most serious consequence of food insecurity. This paper attempts to explore the issue of household food security and to identify the correlates of food insecurity and malnutrition among children aged 5-9 years. To address the objectives an exploratory study was conducted in selected rural villages of Chandankiyari, Bokaro district of Jharkhand. A cross sectional study, including questionnaire and anthropometric measurements, was carried out at household level in order to access nutritional status, diet diversity and food security prevailing in the area. Household food security was measured using the tool developed by FANTA. The questions in the survey were asked only to person responsible for food preparation. Children between 5-9 years old from sampled households were also targeted in order to access the prevalence of malnutrition. Overall 78.82 percent of the households were in the very low food secure category, 5.88 percent in the highly food secure category, 4.71 percent in the marginal food secure category and 10.59 percent in the low food secure category. A higher percentage of the children (55.29 percent) were assessed to have very low food security. Very few children come under the category of highly food secure i.e. 30.59 percent. Children from tribal community are found to be highly food secure (42.85 percent) as compared to children from non-tribal community (18.6 percent). Very few children from non-tribal community come into the category of very low food secure (45.24 percent). Around 43.6 percent of the total sample falls below the <-2 z-score in the global acute malnutrition category; and prevalence of severe acute malnutrition (-3 z-score) among the sample is 29.1 percent which is very high as compared to the reference population. Prevalence of severe malnutrition is more among boys i.e. 32.1 percent as compared to girls i.e. 25.9 percent which is quite surprising. The boys are found to be more severely stunted (17.9 percent) in comparison to girls where only 3.7 percent of girls are in this category.

Keywords: Food security, nutritional status, dietary diversity

Socio-economic inequality in malnutrition among under-five children in India

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In India, Scheduled Caste (SC) and Scheduled Tribes (ST) comprise the vulnerable with worse health conditions as compared to the rest of the population. The study focuses on the prevalence of child malnutrition among SC and ST communities, as well as an analysis of the health inequality among them. The fourth round of the National Family Health Survey (NFHS-4) has been used for this study. The univariate analysis and simple chi-square test were conducted to test association and further Blinder-Oaxaca (1973) decomposition method to measure the inequality by the groups. The prevalence of underweight has state-wise disparities among different caste groups. Mother's education, household wealth, and media exposure have a positive association with underweight children among all the caste groups. The disparities by wealth are high between the poorest and richest people. The mother's body mass index and mother's age are the major determinates that affect the child underweight. To conclude, the study shows the level of malnutrition decreases in the context of India but among SC and ST groups there continues to be a high prevalence of malnutrition children aged below five years. Also, it is found that the contribution of wealth, body mass index, mother's education, and children ever born are major contributing factors to the explained variance in malnutrition in children among SC/ST groups and others in India.

Keywords: Socio-economic, inequality, child malnutrition.

Nutritional status of children in India: Explaining the determinants and impact of ICDS program

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The aim of the study is twofold. First, we attempt to understand the association between socio-economic determinants and one program intervention - Integrated Child Development Services

(ICDS) on child nutritional status. Second, we attempt to evaluate the impact of ICDS on the nutritional status of children across Indian states. We have used data from the National Family Health Survey round 4 (NFHS-4: 2015-16). The nutritional status of the child was measured through three anthropometric indicators - stunting, underweight and wasting. The determinants of nutritional status considered for the analysis were age, sex, birth order, mother's current age, mother's age at marriage, mother's education, breast feeding, wealth index, caste, religion, media exposure, household size, number of under-five children in the household, region, place of residence and one intervention variable (ICDS). A multivariate logistic model was employed to analyse the first objective and to conduct the impact evaluation of the ICDS program on nutritional status. We have adhered to Propensity Score Matching, Mahalanobis Distance Matching. The results from logistic models for stunting, wasting and underweight found that most of the variables significantly determine the changes in nutritional status of the children. Children belonging to poor households, SC or ST, living in rural areas, having any kind of common childhood illnesses were found more vulnerable towards malnutrition. Media exposure and mother's education had shown lower odds, which means that if the mother is educated and well informed then the child is less likely to be malnourished. Also, it is found that the chance of being malnourished increases for under-five children who have received ICDS benefits. The impact evaluation of the ICDS program on nutritional status also showed a similar result. The treatment effect on treated (ATT) for outcome variables - stunting, wasting and underweight have shown that who avail ICDS are more likely to be stunted, wasted and underweight (2 percent, 5 percent and 2 percent, respectively).

Keywords: Malnutrition, determinants, ICDS

Technical Session IIIC

Women's Health

The Effect of Cessation of Menstruation on physical health: A study of Indian women

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Variations in hysterectomy rates have been associated with women's socio-economic and demographic characteristics. Hysterectomy is the most frequent gynaecological procedure performed after caesarean section worldwide. The incidence of hysterectomy, like caesarean

section, varies between and within countries. Unit level data from NFHS-IV,(2015-16) has been used to examine the spatial distribution, socio-economic and demographic determinants of hysterectomy and its Impact in India. Multilevel logistic regression, Local Moran's Index, LISA techniques and Propensity Score Matching (PSM) techniques were used. The prevalence of hysterectomy was 3.2% in India; highest in south Indian states especially in Andhra Pradesh (8.9%) and lowest in Assam (0.9%). The mean age at hysterectomy was 34 years. Moran's-I (0.58) indicates the positive auto-correlation for the prevalence of hysterectomy among districts; total 207 districts had a significant neighbourhood association. Variation in prevalence of hysterectomy was attributed to the factors at PSU, District, and State level. Parity, age at sterilization, low age at first cohabitation, wealth, insurance and empowerment were positively associated with the prevalence of hysterectomy. Majority women underwent the operation in Private hospitals. The primary reason was excessive menstrual bleeding. The prevalence of selected morbidities, i.e., hypertension, asthma, thyroid, cancer, obesity, heart diseases, and diabetes, was higher among women with hysterectomy than menopausal and menstruating women. Results of PSM highlights the increasing risk of developing morbidities if women undergo hysterectomy; for example, the value of ATE (2.32) indicates that the chances of diabetes increased by 23% if women have hysterectomy operation. The finding of this study concludes that the Prevalence of hysterectomy varies according to socioeconomic, demographic and geographical location. The Main reason for hysterectomy is excessive menstrual bleeding. Hysterectomies women have more risk of morbidities. Women who had more facilities are more prone to had hysterectomy. Unnecessary hysterectomy may deteriorate the quality of life of women.

Keywords: Hysterectomy, Insurance, Morbidities

Challenges of financing health for women in Mumbai Metropolitan Region

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Female work participation in India is relatively lower as compared to other countries since, due to various socioeconomic and cultural factors, women face the double burden of domestic work and work outside the house. Hence, it is very important to understand the health seeking behaviour of these women which in turn affects their health status. It is also pertinent to

examine how economic, social and familial pressures influence their choice of funding health care service. Here we aim to find out if financial dependence/independence has any influence on choice of financing healthcare and its utilisation. The main objectives of the study are: (i) To understand and examine the relationship between occupational status and health seeking behaviour of women; (ii) To examine the level of awareness about different options of health financing among women; and (iii) To examine the demand for health insurance among women and understand the factors influencing demand. The current study is based mainly on primary data which is collected from a sample of women in the age group of 18-59 in Mumbai and Navi Mumbai. A structured questionnaire was prepared for this and the sample size was 531. Secondary data from NSSO 71st. round and NFHS 4, Focus Group Discussions (FGD) were also used for the study. Ordinary Least Square, logistic regression, Principal Component Analysis (for health deprivation score), Z tests were used for data analysis. The main hypothesis in the study are (i) Awareness can increase the demand for health insurance; (ii) Occupational status can be significant for health care decisions of the respondents; (iii) There is no difference in family income of women with health insurance and no health insurance. Based on the analysis, a Health Deprivation Score was calculated. Family income, higher education are significant and positively related to demand for health insurance, the awareness of health insurance is significantly but negatively related. Husband's savings were used by employed and unemployed women for hospital bill payments

Keywords: Health financing, health insurance, out of pocket payment, health status, Health Deprivation Score

The effects of 4Es on maternal health care services utilization in India: A conceptual approach

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The aim of this study is to investigate the effects of Education, Employment, Economic Status and Empowerment (the 4Es) on maternal health care services utilization in India. This study also examines the role of socio – demographic factors that affect the aforementioned health outcome. This study used data from the most recent National Family Health Survey (2015 – 16) on married women (aged 15 – 49 years). Separate logistic regression models are fitted for four or more antenatal care visits, skilled birth attendance and postnatal care to understand the effects of 4Es on utilization of maternal health care services in India. The results show sluggish

progress in use of four or more antenatal care and postnatal care. The 4Es are positively associated with the utilization of maternal health care services. The findings indicate positive effects of education on antenatal care, skilled birth attendance and postnatal care; the effects of higher education are even stronger in case of antenatal care. Education leads to employment, economic status and empowerment, all of which are significantly associated with use of antenatal care and skilled birth attendance. However, with respect to postnatal care, while controlling for economic status and empowerment, the effects of education vanish. Overall, level of education, women's employment, greater economic status and empowerment emerge as the most reliable predictors of use of maternal health care. Improvement of employment, economic status and empowerment through education enhance the likelihood that women will receive antenatal care, skilled birth attendance and postnatal care. This needs parallel investment in education, jobs creation, poverty reduction and women's empowerment.

Keywords: 4Es, education, employment, economic status, empowerment, antenatal care, skilled birth attendance, India

Community delivery centers: Drivers for basic obstetric care among the islanders of Indian Sundarbans

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A Community Delivery Center (CDC) – a public private partnership between a Non-Government Organization and government, is a basic unit for obstetric care in hard-to-reach tiger forest Sundarbans region in Eastern India to provide safe delivery. This initiative intends to achieve third Sustainable Development Goal (SDG) of ensuring healthy life and promoting well-being. In LMICs like India where maternal deaths still account for the highest share of Disability Adjusted Life Years (DALYs), such an innovative service delivery model contributes to the seventeenth SDG of revitalizing the partnership for sustainable development. Given geographical inaccessibility and sub-optimal presence of public facilities in the forested area, this implementation research along with one implementer as its research partner, explores the role of CDCs by examining facilitating and hindering factors outlining the differential utilization from providers' and communities' perspectives in the Indian Sundarbans. Using qualitative participatory action research methods, including Most Significant Change (MSC) and pair-wise ranking and scoring (PWRS), this research sought to capture changes in the health seeking behaviour for safe delivery and priorities in choosing health facilities, both among beneficiaries, non-beneficiaries and service providers. A total of 36 PWRS and 62 MSC

activities were done using maximum variation principle where the data were analyzed using software NVivo10. The majority of respondents ranked CDC as their first priority for safe delivery followed by higher tier government facilities; private for-profit facilities ranked far below due to their high cost. Deliveries by untrained private providers, such as informal providers or untrained birth attendants, are the bottom two choices for delivery. MSC stories resulted in four domains of change – service, managerial, human resources and other external factors. From the beneficiaries' side, facilitating factors to facility use included good physician and staff behaviour, availability of free medicines and ambulance services; while barriers to facility use included delay in timely referral. Absence of caesarean facilities and system factors such as delay in fund disbursement, renewal of contracts, and retention of human resource were challenges from the providers' side. Under challenging geographical constraints, CDC certainly brings the basic obstetric care to the doorsteps of mothers from Indian Sundarbans. However, uncertainties of delayed fund disbursement and contract renewal posit an indecisive environment among the private service providers. Addressing the barriers and facilitating the positive factors can act as a catalyst for strengthening of CDCs towards SDGs by promoting healthy well-being of child and mother in Indian Sundarbans.

Keywords: Participatory, obstetric, Sundarbans

Maternal health inputs and consequent child mortality in West Bengal

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In India, as well as in most of the developing countries, predictably, pregnancy care and delivery care are not yet institutionalized and hence lead to pregnancy complications and high-risk delivery. Prenatal care is mainly crucial for detecting high-risk pregnancies. This would not only reduce the risk to maternal health from pregnancy induced factors, but at the same time would take care of birth-related complications of the child. Furthermore, institutional delivery might also reduce the chance of complications related to child-birth. So, demand for both prenatal care (PC) and hospital delivery (HD) are very important factors to have long lasting influence on child mortality (CM), and hence on economic development in general through human capital formation. We use data from a nationally representative survey in India-NFHS-4 (fourth round of National Family Health Survey, 2015-2016). However, we consider only the ever-married group as given the social structure maternal health issues are associated with these women only. So, in a sense the study concentrates only on women of child bearing age. Furthermore, in this paper we confine our analysis to West Bengal. The primary reason

for such a choice is lack of serious health research for this part of India. Conditional Mixed Process is used to estimate the effects of prenatal care, hospital delivery, and child mortality. It has been observed that the religion of the mother, standard of living in terms of wealth, educational level of women and the birth order of the child are covariates that remarkably increase the demand for both the maternal health inputs. However, the whole analysis becomes futile if we do not identify the factors that can expose mothers and the households to the hazards of child mortality. We find that hospital delivery translates to lower child mortality. Age group of the mother, her educational level and also her place of residence, along with the wealth status of her family has an important bearing on child mortality. Birth order of the child and its size at birth also influences child mortality. Access to toilets also reduces child mortality to a considerable extent. Basic results give us a general impression that infrastructural facility, supply of health professionals, workers, educational attainment of women have to be emphasized as standard of living, per se, cannot be raised in the short-run with sector-specific (health or education) plans only. At the same time standard of living largely depends on economic, infrastructural and educational achievements. So, policy makers should focus on physical infrastructure development that reduces the hazards of accessing and availing health service and education, encouraging girls to pursue education and to make sure that the drop-out rates after primary level is reduced to a negligible level. Again, mothers should be encouraged to opt for institutional delivery to reduce child mortality.

Keywords: Child mortality, health inputs, conditional mixed process

Determinants of contraceptive usage and utilization of antenatal care among adolescent women in India: A comparative study

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The study aims to identify the socio-economic correlates of choice of contraceptive methods (from the available alternatives of modern and traditional methods versus no usage) and utilization of antenatal care (from the available alternatives of adequate and inadequate antenatal care versus no antenatal care) among adolescent, non-adolescent and older women in India so that certain specific steps towards policy can be taken. Unit level data of National Family Health Survey 4 (20015-16) have been used. Out of the sample of 44576 women, 1092

are regarded as adolescent (current age within the age group 15-19 years) and 33,519 women are regarded as non-adolescent women and 9,965 women are older. Descriptive statistics and multinomial logistic regression are used. The women were asked detailed questions about their health seeking, present fertility, antenatal care and contraception behaviour, along with the socio-economic characteristics of their households. NFHS-4 also asked them several questions about their decision-making and financial power. Religion does play a crucial role in determining the choice of contraceptives, especially modern methods among non-adolescents and older women. Though income of the family is an influential parameter, we found that the couple's income has less impact on the choice of modern contraceptive and adequate antenatal care among adolescent women. Only highly educated adolescents have the propensity to utilize adequate antenatal care but education does not create any impact on usage of contraceptive methods. Husband's higher education has an even lower influence on adolescent's contraceptive usage and utilization of antenatal care. Even with increasing age gap between husband and wife, usage of traditional methods increases significantly among adolescents. Most importantly, empowerment indicators do not have a significant influence on adolescent choice of contraceptives and antenatal care with respect to other age groups. The results should compel policy makers to refocus family planning and maternal healthcare programs: for example, enrolment in antenatal care should include not only the adolescent but also her husband and other family members, as adolescent's higher education or income is not enough to ensure choice of any family planning method or the proper uptake of antenatal care. Prohibition by the family on different parameters creates a lower demand for medical facilities mainly for adolescent whereas meeting with health worker increases the demand. This portrays an immediate need of refocusing the contraception and maternal health care policy away from just being supply-side oriented to a more broad-based, community related intervention matrix. As adolescent women live in a world of family restrictions, religious boundaries, lack of communication with husbands and absence of empowerment, the focused policy network involving men's awareness should be introduced to bring this most vulnerable age group in the net of health care.

Keywords: Contraceptive choice, antenatal care, socio-economic correlates, awareness, mobility, decision making power

Technical Session IVA

Burden of Non-communicable Diseases

Overweight and obesity as a public health problem in India: A systematic review of evidence for potential interventions

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Current trends show rapid rise in overweight and obesity in India when it is already burdened with undernutrition. Considering the varying socioeconomic categories in the country, what interventions would potentially suit the Indian context, with the backdrop of the dual burden of malnutrition, to inform a comprehensive approach is the question the present review is trying to address. A systematic review of potential interventions was conducted with the criteria that the literature should be addressing overweight and obesity in adults in middle and lower-income countries or lower socioeconomic levels in high-income countries. The findings of the review were supplemented with expert interviews. At the biological level, the research papers suggested drug therapy such as sibutramine and orlistat with growth hormone replacement, bariatric surgery including gastroplasty. At the micro level, the research papers suggested culturally tailored interventions with motivational counselling sessions by trained professionals for dietary changes and increased physical activity in different settings, with follow up sessions. At the meso level, suggestions included putting up stairway signs, cafeteria signs, farmer's markets, organising walking groups, workshops, educational displays, distributing newsletters and print materials, evaluation of existing policies, funding research in nutritious and better tasting food, regulation of advertising, facilitating physical activity through community design, schemes rewarding catering outlets, improving of food skills, multisectoral cooperation, taxation of high sugar and salt ready to eat food, refinement of public information, creating shared value between stakeholders and institutional assistance to lower socioeconomic groups. At the macro level, suggestions included need for agricultural practices encouraging people to grow local foods that are sold in local markets and available at affordable prices, making them accessible to people. Present research highlighted certain emerging issues in research related to overweight weight and obesity in middle- and lower-income countries and the lower socioeconomic groups of high-income countries. Importantly, it points to obesity related interventions at all levels representing a huge research gap in developing countries. Present review contributes to understanding critical issues and limitations of the available literature on

interventions and allows for demarcation of the complexity of issues in the Indian context as well as to recognize the limitations of systematic review as a tool for public health policy and planning that has to be contextually rooted. Therefore, it provides leads for the dimensions that still need to be addressed.

Keywords: Overweight and obesity, potential interventions, systematic review

Determinants associated with non-communicable disease among men in India

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NCD epidemics and their associated risk factors are increasing, and it is now a global health challenge. It not only affects individual lives but also imposes a socio-economic burden. In 2010, NCDs contributed nearly 35 million (two-thirds) of the 53 million global deaths. The contribution of NCDs to the burden of morbidity has also grown since 1990. This paper aims to study the prevalence of selected NCDs (asthma, diabetes, hypertension, and heart disease), their risk factors, and to quantify the Population Attributable Fraction of these diseases. The NFHS-4 dataset has been used for the analysis. Bivariate, logistic regression, and Population Attributable Fraction has been calculated. Non-modifiable risk factors are taken as confounders in calculating adjusted Population Attributable Fraction. The results of the study show that age of male population is a prominent risk factor for reported NCDs as with increasing age the chances of these diseases increases as well. Further, it is found that the risk of asthma and heart disease was higher among poor people as the likelihood of reporting of these diseases decreased with an improvement in the wealth quintile. However, in the case of diabetes and hypertension, the risk of disease was lower among poor people as compared to people with higher wealth quintile. Smoking and alcohol consumption emerged as key modifiable risk factors with a significantly higher burden of asthma and heart disease. However, in the case of diabetes, hypertension and any NCDs, overweight/obesity emerged as a significant modifiable risk factor with consumption of non-vegetarian food in second place. This attributable fraction holds true even after adjusting the effect of non-modifiable risk factors. There is a need to improve public health policy in India for effective interventions to control tobacco use and to educate the general public to maintain proper BMI levels for reducing NCD burden in India.

Keywords: Non-communicable disease, risk factors, Population Attributable Fraction, prevalence

Chronic disease burden and household vulnerability: An analysis of NSS data (1995-2014)

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India is currently undergoing an epidemiological transition with rapid change in the disease profile of its population. It is thus important to identify the population who is at a higher risk to face illness shocks as households are not able to foresee illness, which makes them more vulnerable in the future. While previous studies have explored the trend, incidence and financial risks of various illnesses, no study in the Indian subcontinent has explored vulnerability due to non-communicable diseases/ chronic ailments. This study is an attempt in this direction. Using three rounds of (52^{nd}, 60^{th} and 71^{st}) National Sample Survey Organization (NSSO) data, the paper attempts to estimate vulnerability of the households due to illness shocks and its variation across major Indian states. We have analyzed the vulnerability profile for select chronic ailments by employing the vulnerability to expected poverty approach of Chaudhuri and others (2002). The results show that there has been a steady rise in the share of vulnerable households in the sample over the 3 time points. The study finds that cancer, joint/bone related ailments, heart disease and diabetes induce more vulnerability on the households. Exploring vulnerability due to ailment shocks among households with varying socio-economic and regional characteristics also reveals that the burden of diseases lies largely on the disadvantaged groups such as rural households, ST and SC groups, lower economic quintiles, casual labourers and less developed regions like east and north-east India. Although mean vulnerability is not uniform among major Indian states, a pattern is quite evident. There has been an increase in mean vulnerability in the less-developed states such as Bihar, Chhattisgarh, Jharkhand, Odisha, Assam and Uttar Pradesh over the survey years due to illness shocks. On the contrary, the southern states like Kerala and Tamil Nadu experience a gradual fall in mean vulnerability either over the years or in the last decade. Incorporating the impact of health insurance in vulnerability estimation shows that mean vulnerability due to illness shocks is higher in 2014 as compared to 2004 for households having insured members. Hence, role of insurance in protecting the households from being vulnerable to illness shocks is nullified. The findings of the study mark the importance of vulnerability in the context of

ailment shocks and also identify those ailments that are likely to affect future net household consumption. Incorporation of these ailments during policy design and implementation will be an important step towards improving household welfare status and overall development.
Keywords: Chronic illness, ailment shocks, vulnerability, NSS, India

Trends and determinants of primary infertility among men

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WHO clinically defines infertility as "the inability of a sexually active, non-contracepting couple to achieve pregnancy in one year." The relationship of lifestyle factors such as diet, physical activity, smoking, and alcohol intake, to chronic diseases is well known. In this study we want to explore how socio-demographic, lifestyle factors and diseases affect infertility primarily among men. The data used for the study is of the third (2005-06) and fourth (2015-16) round of National Family Health Survey (NFHS) for analysing the overall trend and the recent round for the rest of the study. Statistical analysis such as bivariate and multivariate analysis is used for the study. Drinking too much leads to obesity and obesity is an important cause of infertility. Obese and overweight men tend to be more infertile as compared to normal or underweight men. Thyroid is having a significant association with male infertility, and this can be related to the fact that obese men tend to be more infertile. Diabetes is an important factor that affects male infertility as it affects erection in men.
Keywords: Infertility, lifestyle, socio-demographic factors

Health effects of sustained exposure to fine particulate matter: Evidence from India

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Owing to their peculiar topography and location, the Indo-Gangetic Plains belong to the most polluted regions of the world; nine out of ten most polluted cities in the world lie here. The valley traps the particulate matter generated in the region and is hence exposed to two to four

times higher fine particulate matter [particulate matter smaller than 2.5 μg/m3 (PM2.5)] than the rest of the country. This study utilises the "valley effect" as a basis for a natural experiment. An exogenous threshold is drawn from geographical literature and is based on the lower boundary of the Indo-Gangetic Plains. Results obtained by using a regression discontinuity design in this study provide first causal estimates on the health impact of long-term exposure to PM2.5 by using data from India. PM2.5 exposure is found to be 49 percent higher and life expectancy is 2.6 years lower in the Plains relative to other districts in the sample. Early life mortality is found to be positively and significantly affected by sustained exposure to PM2.5. It is also found that life expectancy at birth reduces by 1.2 years due to additional 10 μg/m3 of PM2.5 exposure, ceteris paribus. Around 5.2 years of life can be saved in the Indo-Gangetic Plains if the national standard for PM2.5 is met in the region. The life years saved rise to 8.8 years when the WHO standard is met. India can raise life expectancy by 1.7 and 5.3 years if the national and the WHO standards for PM2.5 are met, respectively.
Keywords: Fine particulate matter, sustained exposure, India, life expectancy, early life mortality, regression discontinuity

Technical Session IVB

Emerging Disease Profile

Evaluation of clinical relationship and influence of social determinants of health on medication adherence in cancer patients: A hospital-based quantitative study

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A pill to cure illness has become an agenda of health. In chronic diseases like cancer, there is a surfeit of medications. The significance of adhering to the drug therapy is essential in long term disease management. But there may be innumerable barriers to medication adherence in cancer patients in terms of social determinants of health which play a vital role in determining the health status of an individual. These non-medical determinants are known but ignored while planning for the treatment modalities. Thus, evidence is required to prove the depth of the

relationship between social determinants of health and adherence of chemotherapy and supportive therapy in order to understand their influence in improving medication adherence, self-efficacy and quality of living in patients suffering from cancer. The objective of the study was to quantitatively determine the measure of association of social determinants of health and medication adherence in cancer patients. On Ethics Committee approval, a 6 months prospective study was carried out in 90 cancer patients receiving chemotherapy admitted in the Oncology Department of a tertiary care hospital. The data related to defined criteria like occupation (non-professionals and professionals), socio-economic status (rich, middle-class and poor), patient health education (along with awareness on financial schemes) and marital status (single or married) and medication taking behaviour of prescribed cytotoxic drugs as well as ancillary supportive drugs were collected in well-developed, customized and validated data collection form. Further, the recorded data were correlated and the relationship between the parameters was produced and their influence was interpreted. The quantitative analysis proved the statistical and clinical significant relationship of social determinants on medication adherence at $p<0.05$. The study establishes the strong relationship between non – medical determinants in improving chemotherapy as well as supportive drugs adherence in cancer patients in order to achieve better therapeutic outcomes in the critical healthcare sector.

Keywords: Social determinants, medication adherence, cancer care, healthcare sector, measure of association

Triple burden of disease across agro-climatic regions of India: evidence from self-reported morbidity survey

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The demographic structure of India is showing a significant increase in aged population. Over the past 50 years, improvements in standards of living (income, nutrition, and education) and health care (curative and preventive medicine) have resulted in a significant enhancement in life expectancy for adults as well as for the elderly. India has already been undergoing a dual burden of disease, and is now shifting towards a triple burden of disease, that is lifestyle diseases (LD) due to food consumption as well as modern lifestyle behaviour. By accessing the snapshots of LD burden at the regional level, this study tries to examine the prevalence of LDs in rural as well as in urban India along with the consideration of space during the decade

(2004-14).The present study has also attempted to incorporate the changes of time-survival of people suffering from various LDs in India over the selected time-period. Using NSSO (60th &71st Round) survey data, prevalence rate of LDs per lakh persons was calculated for the last 365 days. Univariate Moran's I and Spatial Autoregressive Model (Spatial Lag & Error Model) as well as Ordinary Least Square regression model were generated to assess the spatial autocorrelation and clustering at region level. Kaplan-Meier Survival Function has been used to estimate the survival time probability of selected LDs. Southern India displays a higher prevalence of LDs during 2004-14. Spatial model suggested that LDs were highly correlated with the elderly and urban population. Spatial autoregressive models show more significant results than OLS in explaining spatial heterogeneity and clustering. Survival probability has decreased with the increase in hospitalization. With a remarkable transformation in the age pattern of morbidity and mortality, a large gap exists in LD prevalence between men and women. This study has revealed the effect of space, which was found to be significant between 2004 and 2014 while illustrating a robust and long-term implication of LD to burden of diseases by understanding human vulnerability to improve life expectancy and wellbeing. The present study has a far-reaching role so that government officials, policy planners and researchers can get not only a better insight about epidemiological transition & escalating burden of LDs but also can strengthen existing policies and programs and implement new strategies at the national as well as regional levels.

Keywords: Lifestyle diseases, agro-climatic regions, survival time, India

Multimorbidity pattern in the women aged 15 to 49 years: evidence from a cross-sectional study in India, 2015-2016.

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Specific knowledge on multimorbidity for women aged 15-49 is missing despite knowing women's higher share in multimorbidity in old ages. From the policy perspective, the identification of vulnerable groups of women aged 15-49 years with significantly affecting multimorbidity help in the selection of programmatic focus. The present study aims to estimate the pattern of multimorbidity based on biomarker measurement data at the national level in India and possible determinants of multimorbidity among women aged 15-49 years in India. The study used the data from the fourth round of the National Family Health Survey (NFHS)

conducted during 2015-16. NFHS is a cross-sectional survey with a nationally representative sample size for all the states and union territory of India. A two-stage stratified random sampling frame is used to collect the demographic, health indicators and biomarker measurements. Women's health outcomes in the form of multimorbidity (grouped as no morbidity, single morbidity, multimorbidity) is measured using body mass index, blood pressure level, random glucose measure and haemoglobin level. Multinomial logistic regression was applied to explain probable predictor factors in women's multimorbidity. Women with a higher prevalence of multimorbidity had a combination of hypertension and overweight/obesity. The risk of being multimorbid was predominantly high among 30 plus women compare to younger women. This risk of being multimorbid was high among women with no education or lower level of education, ever married, other than Hindu women and women from higher wealth, consuming tobacco. The finding from the study supports the prevalence of multimorbidity even in women aged 15 to 49 years and overweight/obesity and hypertension as the most critical morbidity combination among these women. Preventive public health interventions are needed for adult women in order to reduce the burden of multimorbidity among older women . This will contribute to the achievement of the sustainable development goals of healthy lives and wellbeing for all.

Keywords: Women multimorbidity, women NCD, overweight/obesity, socioeconomic pattern, multinomial

Untreated morbidity and treatment seeking behaviour among elderly in India: A Heckman approach

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The changing demographic structure in India and worldwide brings with it a gamut of problems and opportunities. According to the Census of India, the proportion of elderly in the overall population rose from 5.6 per cent in 1961 to 8.6 per cent in 2011 and is expected to rise to 20 percent in 2050. Therefore, the main aim of the study is to find essential determinants contributing to untreated morbidity among the elderly. Also, the paper examines treatment-seeking behaviour for infectious and chronic diseases among the elderly in India. Data from 60th and 71st round of NSSO has been used for the analysis. Relative differences have been calculated along with logistic regression to study the objectives. The Heckprobit model has been used to carve out the treatment-seeking behaviour among the elderly in India. The overall decrease in relative decadal difference was 41 percent for untreated morbidity. In both the

rounds, it was observed that the elderly living below the poverty line had 42 percent and 50 percent more likelihood of untreated morbidities respectively in comparison to elderly not living below the poverty line. The paper also emphasises the impact of socio-economic factors on untreated morbidity. The study indicates that elderly who were living with a spouse had less likelihood to have untreated morbidities as compared to those living alone. Also, it was observed that elderly from rural areas and those belonging to SC/ST population had a greater disadvantage in terms of seeking treatment than their counterparts. A similar analysis has been drawn for the elderly with lower levels of education. Similar inequalities were observed in treatment-seeking behaviour as well, where it was found that elderly belonging to rural areas and those below the poverty line are less likely to seek treatment. Linking results from the Heckprobit model, this study provides evidence that social and economic factors play a significant role in affecting both untreated morbidity and treatment-seeking behaviour of elderly in India.

Keywords: Untreated morbidity; Heckprobit; treatment-seeking; older people; NSSO; India

Assessing exposure from cooking with solid fuels and respiratory diseases among different socio-demographic groups in India

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Use of solid fuels in household cooking is a major contributor of indoor air pollution which causes more than 4 million deaths around the world annually. Its use varies with the level of development which ranges from 0 percent in high to more than 80 percent in low- and middle-income countries (LMICs). Three billion people (more than 40 percent of the global population) are still dependent on solid fuels like firewood, dung cakes, coke, coal, wood and agricultural residues in these countries. This study aims at analyzing the association between different respiratory diseases (Tuberculosis (TB), acute upper respiratory infections (AURI), chronic obstructive pulmonary diseases (COPD), and bronchial asthma) and the use of solid fuels for cooking by different socio-demographical groups in India. 71st round of National Sample Survey (NSS) conducted in 2014 on "*Social Consumption: Education and Health*" has been used in this study. In total, 54,985 inpatients who had received medical treatment from any medical institution during the 365 days preceding survey and reported various diseases

such as infections, cancers, blood diseases, cardio-vascular diseases, respiratory diseases etc. have been included in this analysis. Out of these inpatients, 2513 persons who have reported TB, AURI, COPD and bronchial asthma as inpatients are the dependent variable in this study. Exposure to type of fuel used as a primary source of energy is the main exposure variable recognizing the dependence on energy. Multinomial logistic regression has been used to explain the association. Results reveal a significant association between solid fuel use and respiratory diseases in India. Overall, more than 60 percent of the population is using firewood and cow dung as their primary source of energy for cooking and are at a higher risk of TB, COPD and bronchial asthma. In rural areas there is a high dependence on solid fuels (80.5 percent) and people are also at a higher risk of these respiratory diseases than their urban counterparts where people are less dependent on solid fuels (22 percent). Among different socio-demographic groups, the dependence on solid fuels is highest among scheduled tribes (STs) (87.42 percent) followed by scheduled castes (SCs) (74.78 percent) and other backward classes (OBCs) (64.47 percent). Results reveal that STs are at higher risk of TB followed by SCs and OBCs respectively. Persons exposure to solid fuels for cooking increases the potential risk of TB, COPD and bronchial asthma. Access to clean and efficient fuels for cooking is essential to reduce the burden of various respiratory diseases. There is a need to increase the penetration of clean fuel in households especially among socially disadvantaged and marginalized groups to reduce the burden of respiratory diseases in India.

Keywords: respiratory diseases, Tuberculosis, bronchial asthma, solid fuels

Technical Session IVC

Child Health

Behavioural changes in the utilisation of maternal and child health care in India

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Sustainable Development Goal 3 aims to ensure good health and wellbeing to all by 2030. It aims to reduce the global Maternal Mortality Ratio to less than 70 per 100,000 live births. It also seeks to end preventable deaths of newborns and children under 5 years of age, with all countries aiming to reduce neonatal mortality to as low as 12 per 1,000 live births and under-5 mortality to as low as 25 per 1,000 live births. This paper tries to understand the transformation

that has taken place in the utilization of maternal and child health care (MCHC) from public health facilities in India. The launch of National Rural Health Mission and subsequently National Urban Health Mission have brought dramatic improvements in the utilization of MCHC. Better utilization of MCHC has also brought in significant improvements in maternal and infant mortality indicators. The paper uses data from NFHS, DLHS, HMIS and interviews of Accredited Social Health Activist (ASHA) and Anganwadi workers to understand the macro- and micro-level changes that have taken place in MCHC. It uses the insights from behavioural economics to explain why the utilization of MCHC was so low before the launch of NHM and how it saw a turnaround. It explains the role of ASHA, Anganwadi workers, Auxiliary Nurse Midwives, Rogi Kalyan Samities, institutional innovations, and financial incentives in bringing the behavioural changes to avail MCHC. The positive results of NHM provide a number of lessons for effective implementation of many other development policies.
Keywords: Maternal and child health care, National Health Mission, behaviour change

Caste differentials in childhood feeding, health care and nutritional status: a regional analysis in central tribal belt of India

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This study examines the caste gaps in selected indicators of childhood complementary feeding, health care practices and nutritional status in seven central Indian states which have a greater proportion of Scheduled Tribes (ST) and Scheduled Caste (SC) population. The study is based on analysis of unit level data from the fourth round of National Family and Health Survey (NFHS–4, 2015-16) . Complementary feeding included: timely initiation of solid, semi-solid and soft food; minimum dietary diversity; minimum meal frequency; and minimum acceptable diet. Health care practices were assessed based on full immunization, diarrhoea treatment, and fever/ARI treatment. Undernutrition was measured using three indicators: stunting, underweight, and wasting. Absolute and relative caste differentials were measured and graphically compared for a better visualization on the caste gaps in child health care practices and their health outcomes. Further, for each of the outcome variables, a separate logistic regression model was employed to understand the association between caste groups and the outcome variables. The results show that tribal children from central states of India are exposed

to higher level of undernutrition and poor complementary feeding, immunization coverage, medical treatment during infectious diseases. Overall, children belonged to SC and other backward classes (OBCs) categories are at medium and low risk of undernutrition respectively. The caste differentials pattern for the selected indicators varied across the geographic regions. This paper clearly shows that caste differentials in child health care practices and child health outcomes are partly due to differences in socio-economic conditions but in some states differentials persist even after controlling the effect of socio-economic factors. Result of this study suggest that there is a need to develop community-based interventions particularly for deprived households as a short-term solution. Furthermore, providing health education to the mothers through orientation of Auxiliary Nurse Midwives (ANM) and Accredited Social Health Workers (ASHA) focusing on health care, basic vaccination, child feeding and healthy diets would be effective in increasing immunization coverage as well as reducing the incidence of undernutrition and several infectious diseases.

Keywords: Child health care practices, caste gap, regional variation, tribal health, India

A cross country study of household air pollution exposure and associated child health

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Household air pollution is usually measured indoors and arises from domestic activities of cooking, heating, and lighting. Around 3 billion people still cook using biomass fuels (such as firewood, agricultural waste, charcoal, coal and cow dung). These cooking practices are hazardous and produce a wide range of health-damaging pollutants causing high level household air pollution (HAP). Women and young children who spend most of their time near the domestic hearth are comparatively more exposed to a toxic amount of HAP every day. There is also evidence of an association between solid fuel use and chronic bronchitis (Jindal et al., 2012).Solid fuel was classed as "probably carcinogenic to humans" in a publication from the International Agency for Research on Cancer (2010). Therefore, the purpose of this study is to (i) Assess the association of household air pollution on child morbidity; and (ii) Examine the effect of HAP on premature births. The data source used was the Demographic and Health Survey (DHS). Recent available Standard DHS-VIII data of selected seventeen countries of Sub-Saharan African region have been taken. The present study considers information from currently married women aged 15-49 years of selected Sub-Saharan African countries using

recent DHS data of the respective countries. Following countries are included viz. Angola, Benin, Burundi, Ethiopia, Ghana, Lesotho, Liberia, Madagascar, Malawi, Mozambique, Rwanda, Senegal, Sierra Leone, South-Africa, Tanzania, Togo, Uganda and Zimbabwe. In order to meet (MDG-4) or Sustainable Development Goal 3, to reduce under-five mortality, prompt attention should be given to various factors affecting the equal distribution of resources and facilities to everyone in these countries.

Keywords: Ambient air pollution, Probit Model, cross country

Covariates of the gap between preferred and actual birth interval and its implications for child health

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The hiatus between two consecutive births and the interim time span happens to be one of the most important and emphasised aspects of maternal health. It receives massive attention in demography and public health research because of its substantial implication on fertility and impact on both maternal and child health. Hence, information on birth interval is important as it provides an insight into birth spacing patterns which affect fertility directly. The purpose of this study is to: (i) Examine the effect of gap of preferred and actual birth intervals (PBI and ABI) on new born care practices; and (ii) Explore the association between existing gap of preferred and actual birth intervals on child mortality. We used National Family Health Survey (NFHS-4) data for analysis purpose. The dependent variables were use of delivery kit, wiping and weaning of the baby and using a clean blade to cut the umbilical cord separately. We further examined the possible interaction between X and Y in relation to the existing gap between PBI and ABI and new-born care practices. Multiplicative interaction was examined by adding a product term between X and Y into the regression models. The primary focus of this study has been on documenting the significant effects of gap between intervals. We have found that nationally, a preference of PBI being larger than 3 years was higher among urban women as compared to rural. It was seen that there was a large differential in the gap between PBI and ABI in urban and rural areas. This shows a lack of commitment or the failure to maintain the desired gap even among urban women.

Keywords: Preferred birth interval, actual birth interval, child health, India

Survival among children under-five in India: A Parametric Multilevel Survival Approach

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Child mortality is a crucial phenomenon in the overall development of health of any country. In India, the under-five mortality rate is a significant health problem and has been declining steadily. Around 50 per 1000 live births are dying within 59 months of life. It is essential to reduce under-five mortality to attain SDG 4. The aims of this study are two-fold: (i) to determine significant variation in the risks of under-5 deaths across regions of India; and (ii) to determine the individual- and community-level factors that explain disparities. Data used in this study is obtained from the fourth round of the National Family and Health Survey, 2015-16. For the analysis, we employed Multilevel Parametric Cox Proportional Hazards Model. Distribution of deaths was also checked, after which Proportionality Hazard assumption by plotting the Schoenfeld residuals was applied for graphical assessment. Results found that the variation remained significant across communities, with Intra-Class Correlation (ICC) associated with risk of death estimated at 3.88 percent, which is decidedly less than to be expected, across state level. Findings of this study reveal that risk of death during childhood was because of both individual and community-level factors, and also due to the effects of exogenous factors at those levels. ICC shows that individual and community-level variables were significant in explaining regional variations in under-five mortality in India. Apart from the place of residence, other community-level characteristics found to exert significant effects on under-five mortality in India include place of residence, community health care services and community hospital delivery. For instance, considering the place of residence, under-five mortality is likely to be higher in rural areas in comparison with urban areas. This is perhaps partly due to the differentials in the distribution of health care facilities between rural and urban communities.

Keywords: Parametric Survival Analysis, multilevel, under-five, India

Technical Session VA

Public Health System in India

Quality of healthcare in tertiary hospitals of West Bengal: Patients' perception

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Healthcare services have two dimensions: quantity and quality. While the literature on the former has been exhaustive, the same for the latter is scanty, primarily owing to measurability issues. The National Family Health Survey-4 (2014-15) reveals that at the all-India level, though there has been a sustained and significant improvement in utilization indicators, the health status improved only by a fraction of the rate, pointing towards under-performance in terms of the other dimension, namely quality. However, for West Bengal both these indicators have moved in tandem. Hence the focus shifts to measuring quality of health care in West Bengal. According to seminal contribution by Donabedian (2003), among others, three dimensions of quality of health care are amenities of care, organizational factors and patient practitioner relationship. They remain as three concentric circles with the last one lying at the centre of the discussion. In order to measure the quality of health care offered in public hospitals in West Bengal, a primary survey on 300 indoor patients from four tertiary hospitals, two urban and two rural, was undertaken for three departments, namely medicine, maternity, and orthopaedic. To construct the three indices for amenities of care, organizational issues and patient-provider relationship, principal component analysis (PCA) was carried out. Finally, OLS regression was run to find the influence of various socio-economic factors, individual level characteristics and health care level characteristics on each of these indices. Results indicate that non-poor patients perceive quality of care as measured by the three indices to be lower than poor patients. Though gender of the patient, her level of education and her exposure to media do not determine the way in which the patients rate the quality of care, reading the newspaper and having a bank account do. Thus, more aware patients succeed in receiving better quality of health care, violating the basic norm of natural justice and equity. Finally, patients seeking care in urban hospitals perceive quality of care, particularly for amenities and patient practitioner relationship, to be better than those seeking care in rural hospitals pointing towards an urban bias.

Keywords: Quality of healthcare, amenities, patient practitioner relationship, organizational factors

Demand for maternal, newborn and child health care in some Eastern states of India.

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This paper examines the patterns and determinants of the utilization of maternal, newborn and child health care across different social settings in some eastern states of India. Here we have taken the states of Bihar, West Bengal, Jharkhand and Orissa to carry out our analysis. We have used the data of National Family Health Survey-4 (NFHS-4) to conduct our study. Maternal health is so important that care should be taken before the birth of a child because of malnutrition of pregnant mother. Socio-economic condition of the family, social status of the mother etc are very important for the health of both the foetus and the mother simultaneously. Proper health care policy can ensure a healthy baby, which is the major precondition for human capital formation and sustainable economic development. So, both antenatal care and postnatal care are complementary in nature. Without sufficient good quality prenatal care, the newborn baby and the mother herself may not be free from any life-threatening problem. The newborn child is highly susceptible to infection and other health related problems. Failure to utilize proper delivery care may lead to antenatal, postnatal and child mortality. Therefore, we have observed differential impact of health outcomes and utilization of health care services with respect to various socio-economic factors. In this paper we focus on the transitional process between antenatal and postnatal care –child birth. We emphasize the determinants of both the prenatal and place of delivery characterized by required counselling, maternal care, safe delivery mechanism, trained doctors and health professionals, an environment conducive to develop sufficient immunity for the newborn. Conditional Mixed Process estimation is used to estimate the demand functions for prenatal care and hospital delivery. We jointly estimate both these equations to control for selection bias in the use of health care services. Exogenous estimation results are also provided. It is observed that the place of residence, standard of living, and educational level of women are covariates that remarkably increase the demand for both the maternal health inputs. An impression we derive from the analysis is that the infrastructural facilities, supply of health professionals, workers, educational attainment of women have to be emphasized to contain the undesired problems during pregnancy and child-birth. At the same time access to information and whether the women can keep some money for their own use raise the demand for quality care associated with pregnancy. This also indicates a linkage between mother's autonomy and healthcare utilization behaviour.

Keywords: Demand for maternal and newborn health care, antenatal care, hospital delivery, Government policy

Technical efficiency of public healthcare systems in Uttar Pradesh and Maharashtra: A Data Envelopment Analysis.

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Health is both a social and economic necessity. A basic level of health care needs to be assured to every citizen of the country to ensure physical and mental well-being of all the people. Technical efficiency is defined as the effectiveness with which a given set of inputs is used to produce an output. Technical efficiency addresses the issue of using given resources to maximum advantage; the productive ability to choose different combinations of resources to achieve maximum health benefit for a given cost. This study has attempted to measure the technical efficiencies of health care facilities in all the districts of Uttar Pradesh and Maharashtra using Data Envelopment Analysis (DEA). DEA is used to measure the efficiency of public health facilities. DEA is used to measure the district-wise efficiency of the healthcare system. DEA, as an analytical tool, has flexibility in handling multiple inputs and outputs, which makes it suitable for measuring the efficiency of hospitals that use multiple inputs to produce multiple outputs. The findings suggest that only 13 percent of the healthcare facilities were acting as fully efficient facilities in the districts of Uttar Pradesh and 28 percent in Maharashtra. There are various districts which have an efficiency score of more than 1 indicating the fact that the facility must increase its output levels to become efficient. The findings suggest that there exist individual districts who have efficiency less than 1. To become efficient, these districts should be able to reduce their inputs without having to reduce their outputs regardless of the price of inputs. An important case is the district of Ratnagiri in Maharashtra; it is fully efficient in two out of the three health facilities regarding ANC, IFA tablets, delivery conducted and post-natal check-up. However, the provision of all above mentioned services are very low. The results obtained in the study quantify the efficiency of various services provided at public health sector at district level. However, participation of some districts of Uttar Pradesh and Maharashtra was low.

Keywords: Technical efficiency, Data Envelopment Analysis, ante-natal care, Iron Folic Acid tablets, post-natal check-up

Assessing spatial distribution of public and private health establishments in India

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Economic reforms in the 1990s have enhanced India's economic performance which has boosted the performance of the health sector as well. The health conditions of the Indian population in terms of reducing the infant mortality rate and increasing life expectancy at birth has improved over time. Still, the outcome and the infrastructure are confined to urban areas and are not distributed consistently across states and socio-economic groups (Bhat, 1993, 1999; Joe et al., 2003; Gwatkin et al., 2007; Baru, 2005; Baru et al., 2010). The literature on health inequality in India is vast but mostly focused on the availability of health workers, availability of human resources for health, and size, skill, composition and distribution of health workers (Rao, et al. 2011; 2012). Despite the size, composition and qualification of the health workers in India, the literature is silent in terms of health infrastructure, like numbers of health care services available, and spatial distribution of the public and private hospitals in India. To fill this lacuna, this paper attempts to study the availability of the health infrastructures in terms of private and public hospitals in India with the help of the ROHINI (Registry of Hospitals in Network of Insurance), 6th Economic Census and Rural Health Statistics database. This paper exclusively tries to assess spatial access to public and private hospitals in India and if they coexist. Further, this paper will try to find out possible determinants of the coexistence (if any) of public and private establishments and will find out some solution to make the healthcare access for all.

Keywords: Private health provider, hospital activities, health workers

Can the euphoria of strategic purchase be the panacea for a fragile health system?

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The newly launched Pradhan Mantri Jan Arogya Yojana (PMJAY) scheme of Government of India's Ayushman Bharat programme is popularly known as world's biggest health assurance initiative towards Universal Health Coverage (UHC). The scheme is modelled after several state-level experiments run since 2005. On one side, the policy debate is hovering around issues regarding the effectiveness of the scheme. On the other side, political manoeuvring is noticeable with regard to the popularity of the scheme. In both the policy and the political debate, the impact of the scheme is central to the discussion, but not the scheme's operational method as well as merit. The PMJAY-like scheme is based on the design of strategic purchase that splits provider from purchaser. Strategic purchase in health system planning and policy is a financing mechanism to organise health care service delivery. However, it is important to

understand that though strategic purchase is categorised as a financing mechanism, the primary role of this mechanism is to organise health care service delivery. Thus, it is argued that contextualisation of PMJAY or any other strategic purchase scheme is set on the wrong premise of health financing, because it functions as an alternative to provide service delivery in an operative health system. The Suvarna Arogya Suraksha Trust (SAST) model is one such strategic purchase model in Karnataka, and initially served as a nodal agency for PMJAY to provide requisite technical support. The paper critically assesses the development as well as modus operandi of SAST as a strategic purchase model and the viability of running a health protection scheme like the Vajpayee Arogya Shree (VAS) in the present-day complex health system context as exists in Karnataka. It is found that SAST functions in a vertical approach that devalues the integrative model of health care service delivery. SAST's purchase of care often gets disrupted because of crises in financing and private sector regulation as evident in the Karnataka context. A scheme like VAS or PMJAY is looking at the service delivery aspect by outsourcing care under the principle of competition. The schemes have failed to develop any innovative financing avenue (for example, taxation/sin tax) in order to match with the risk pooling criterion to ensure the sustainability of such a scheme. It is argued that these schemes may create euphoria in the short run but a potential cause of threat to disrupt the health system equilibrium in the long run.
Keywords: Strategic purchase, health system, health financing, Universal Health Coverage

Technical Session VB

Infant and Child Mortality

Socioeconomic correlates of under-five mortality in Odisha

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Under-five child mortality rate is one of the main indicators of the standard of living or development of a population. One of the Millennium Development Goals was the reduction of under-five mortality by two-thirds by 2015. In order to achieve this goal, efforts are concentrated at identifying cost-effective strategies as many international agencies have advocated for more resources to be directed to the health sector. In Odisha, the under-five

mortality rate was 45 deaths per 1,000 live births (NFHS-4). The higher rates of under-five mortality in Odisha imply that, despite decline in mortality, one in 15 children still die within the first year of life, and one in 11 die before reaching the age of five. Over population and poverty are widespread in Odisha causing health threat and morbidity. From the above background, the present study makes an attempt to examine the trends and analyze the socio-economic determinants affecting under-five mortality in Odisha. Region-wise differences in the trends and determinates of under-five mortality will provide important insights as to why under-five mortality rates are high in this state. The study was based on birth histories from the National Family Health Survey-4 (2015–2016). The Cox Proportional Hazard model was employed to examine the effect of various socio-economic, environmental, maternal and demographic factors on under-five mortality in Odisha. In addition, the Blinder-Oaxaca technique (Fairlie 2005) was used, as appropriate for binary models, to decompose the two-time factor in under-five mortality risk into contributions that can be attributed to different factors. The results suggest that low birth weight and female education play the dominant role in increasing the under-five mortality in Odisha. The lack of health care facilities is a major cause of high under-five mortality in different parts (Western, Southern) of Odisha.

Keywords: Millennium Development Goals, socio-economic factor, cox PH model, Fairlie model

Twin births and neonatal mortality in India: Trend and patterns, 1992-2016

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The proportion of twins to total births is low; however, compared with singletons, twins experience a higher risk of adverse peri-natal outcomes. The burden of twin mortality needs to be carefully investigated in India since reducing the burden of twin mortalities can aid India in achieving the Sustainable Development Goal (SDG) commitments of the Government of India. Against this backdrop, this paper uses NFHS data to a) understand the trends and patterns in mortality among twins as well as singletons over the period 1992-93 to 2015-16; b) analyse

socioeconomic inequalities in mortality rates in twins and singletons; and c) estimate the share of mortality burden associated with twinning vis-à-vis singletons. We find that the percentage of twins in total sample is higher in NFHS-4 (1.63 per cent) as compared to earlier rounds. The neonatal mortality among singletons declined from 44.1 per 1000 live births (95 %CI: 42-46.1) in 1992-93 to 27.2 per 1000 live births (95 % CI: 26.3-28.1) in 2015-16. Among twins, the neonatal mortality rate declined from 332.5 per 1000 live births (95% CI: 292-373.1) to 156.5 per 1000 live births (95% CI: 142-171) over the same period. Our results indicate strong association between neo-natal mortality and certain socio-economic characteristics. The odds of child surviving more than 28 days are lower if the households lie on a lower socio-economic platform. The chances of survival of the second of the twins are very low as indicated by a very high odds ratio. Wealth and education are important determinants of neo-natal mortality. Neonates belonging to higher quintiles and educated mothers have higher chances of surviving after 28 days. The odds of survival of male child are less as compared to females. And, the chances of survival are less in case surgery is not performed for delivery.

Keywords: Twins, neonatal mortality, child mortality, India, NFHS

Sex differential in under five mortality in India

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Under Five Mortality Rate (U5MR) of a nation is widely accepted and a long-standing indicator of the health of their children. In 2017, the sex-specific under-five mortality rate was 39 in 1,000 live births for male and 40 in 1,000 live births for females. India's under five mortality rate deaths per 1,000 live births has come down to 39 in 2017 from 124 in 1990. According to NFHS, U5MR was 109 in 1992-93, 95 in 1998-99, 74 in 2005-06 and 50 in 2015-16. Sex differential in U5MR was 6, 7, 11 and -8 according to NFHS series. Sex differential in U5MR is increasing till 2005-06, after which it decreases. Sex differential in U5MR decreased in most of the southern part of the country among illiterate, urban, Hindu, SC/ST and in non-SC/ST between 1995 and 2015. It has decreased the most in rural India and in non-Hindu communities. It has decreased across India except in Maharashtra, Karnataka, Chhattisgarh, UP and West Bengal. Mother's age at child birth is negatively significant in OLS, RE for male and OLS and FE for female U5MR. First birth order is negatively significant in OLS, RE and FE for male

and female U5MR. Being Hindu is positively significant in OLS, RE and negatively significant in FE for male and female U5MR. Full immunization is positively significant in OLS, RE and FE for sex differential in U5MR. Predictor variables explain 63 percent in male, 65 percent in female and 15 percent variation in sex differential in U5MR. Proportion of overall unexplained variation in the model is only 2 percent by RE and 72 percent by FE for male U5MR, 13 percent by RE and 81 percent by FE for female U5MR and 21 percent by RE and 52 percent by FE for sex differential in U5MR.

Keyword: U5MR, sex differential

Contribution of Adverse Birth Outcomes to Neonatal Mortality in India

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Adverse birth outcomes such as preterm birth (before 37 weeks gestation) and low birth weight (below 2500 g) are important predictors of maternal health and nutritional status as well as the healthy growth and development of infants. Globally, each year approximately 15 million preterm birth (PTB) and more than 20 million low birth weight (LBW) infants are born. The worldwide prevalence of PTB is 10.6%, 37.6% in South Asia, while it accounts for 28% of neonatal deaths globally. In India, the estimated number of PTB is 3,519,947 in 2010, constituting 23.4% of all births, highest in the world. The study was based on the National Family Health Survey (NFHS), a national population-based sample of 699,686 women. A total of 259,627 children were born between 2010 and 2016, among them 182,210 last birth was taken for the study. The Kaplan Meier method has been used to compare the age wise survival probability of preterm birth and low birth weight babies. The Cox's Proportional Hazard Model was used to estimate the effects of adverse birth outcomes on neonatal mortality. There were a total of 12,222 preterm birth in the sample, with 856 were neonatal deaths; and 25,030 LBW babies of whom 1,112 died within a month. The results from Kaplan Meier revealed that PTB is more responsible for neonatal deaths as compared to LBW. The preterm babies had about 3 times higher likelihood of dying within 30 days of their birthday in comparison to term birth (HR=3.11, 95% CI: 2.87-3.37). Children with low birth weight were more likely to die within the first year in comparison to children with normal birth weight (HR=2.32, 95% CI: 2.11-2.55). Female children had a greater likelihood of survival than male children in the present study. Children who were breastfed had higher chances of survival. The risk of mortality was found to increase with mother's age at delivery. LBW infants with caesarean delivery had higher chances of mortality. This study could help in policy making to reduce the prevalence of adverse birth outcomes. Government needs to improve the program of Kangaroo Mother

Care (KMC) in India and should take care about antenatal care and postnatal care with improved facilities for preterm birth and low birth weight children in public hospitals.

Keywords: Adverse birth outcomes, preterm birth, low birth weight, antenatal care, Kangaroo Mother Care

Changing pattern of Public expenditure on health and infant and under-five mortality in India

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Though it is necessary to increase public expenditure on health care from a policy perspective, earlier pieces of literature gave a mixed picture. The present study revisits the effect of public health spending to reduce infant and under-five mortality. The study investigates India's journey of public-health expenditure through health and macroeconomic policies from (1985-2016) using four cross-sectional rounds of the National Family Health Survey. The whole study period (i.e., 1985-2016) is divided into three sub-periods: 1985-1994, 1995-2004 & 2005-2016. Two-Stage Probit regression is used for the multivariate analysis, and state-level per capita gross fiscal deficit is used as an instrument to model. Regional disparities in public health expenditures have increased over the past years. After adjusting the other state, household and individual variables, regression analysis explains that in the initiation of the second National Health Policy, 1 percent increase of public health expenditure reduced 0.53 (95% CI:-0.82,-0.23) of infant deaths and 0.49 (95% CI:-0.77,-0.22) of under-five deaths. Post economic reforms of 1991 and with the initiation of National Rural Health Mission (2005), public health spending had increased significantly. The finding suggests that the impact of public health expenditure on infant and under-five deaths was minimal during 2005-2016. The study suggests a balanced allocation of public health expenditure among states and systematic monitoring will lead India to achieve SDG health goals in targeted time.

Keywords: Public health expenditure, infant mortality, under-five mortality, Two-Stage Probit Model, NFHS-4, India

Technical Session VC

Urbanisation, Migration and Health

Sources of support and challenges related to social determinants of health among the urban homeless and health migrant populations in Delhi

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Given unregulated urbanisation in India, the urban poor live in relative disadvantage, with limited access to basic amenities, and greater exposure to hazardous working and living environments, leading to greater vulnerability to diseases. Much of the emphasis of research and policy has been on urban slum-dwellers, to the neglect of other residentially-vulnerable populations, like 1.77 million homeless and persons who migrate in the course of health-seeking, or health migrants, numbering about 641,000. The evidence around determinants of their health-seeking behaviour is limited. A qualitative study was undertaken to understand factors associated with the health status and health-seeking of the homeless and health migrants in Delhi, India. Based on criterion and convenience sampling, in-depth interviews were conducted with 20 health migrants, 22 homeless people, and 15 health and welfare providers. Five focus group discussions (FGD) with homeless persons and observation were also undertaken. Individual written informed consent was taken prior to each interview or FGD. Data were analysed using a grounded theory approach using Atlas.TI. Persistent challenges related to the social determinants of health (SDH) affected health and health seeking, particularly for those with recurring and extended illness. These factors included lack of stable accommodation for recuperating patients in addition to the risk of contracting infectious disease in shelters. Monetization and restrictions on usage of washrooms placed additional burdens. Some challenges were specific to urban poor groups. The lack of an identity proof for the homeless hindered employment opportunities, and getting back to work was reported to be a challenge after recovering from stigmatized diseases like tuberculosis. For the health migrants, back and forth travel between the hometown and Delhi added an additional layer of expenditure to health and accommodation. Various forms of support were provided by not-for-profit organisations, usually in informal arrangements and at times with the formal endorsement of government departments. This support was reported by participants to be insufficient: being connected with networks of care or located in areas where forms of support

services existed did not guarantee access to care of quality that would fully address health burdens. Services addressing the health and SDH needs of the homeless and health migrants were found largely based on ad hoc arrangements. As a result, gaps in health-seeking and health outcomes were observed. These networks of support could be made more comprehensive, their impact studied more extensively, and where effective, their role acknowledged and formalised in health systems.

Keywords: Urban poor, homeless, health migrants, social determinants of health, social support, health-seeking challenges

Does parental out-migration affect health status of children left-behind? A study of West Bengal

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Since the 1980s, India has experienced an unprecedented level of migration with volume of migration for economic reasons increasing from 33 million in 2001 to 51 million in 2011. During this process, children may suffer due to the disruption caused to their family life, access to health care and education. However, due to economic constraints and transitory nature of work, many migrants often choose to leave their children behind in the countryside where they can be taken care of by single parents or by other family members, such as grandparents. Although migrant remittances are expected to improve children's nutritional level, quality of health care and education, the changing family structure could also have psychological implications for the child. The present study is a modest attempt to understand the relationship between parental out-migration and its effect on child's nutritional health status and psychological behaviour. The study is conducted in 4 districts of West Bengal i.e. Jalpaiguri, Birbhum, Murshidabad and Nadia and includes 19 villages (16 Primary Sampling Units with 987 households) of which 38.33 per cent are inter-state migrant households, 11.15 per cent are intra-state migrant households and 50.52 per cent are non-migrant households. The study is conducted among 1636 children of whom 779 (47.65 per cent) are boys and 856 (52.35 per cent) are girls. The study finds that a substantial proportion of children in rural West Bengal were living separately either from one or both parents due to parental internal out-migration. Parents migration is found to have affected the nutritional status of children; however, the relationship is not significant. Underweight is found to be more among children of intra-state migrant households i.e. 30.5 per cent and among girls. 28.2 per cent. Overweight is found to

be more among the children of non-migrant household i.e. 10.4 per cent and among boys (11.43 per cent). Child age and sex, low educational level of mothers, remittances received, who is receiving the remittances, and poor hygiene practices are significantly associated with underweight in the children. Children of inter-state and intra-state migrant households are found to be more affected by psychological health problems than that of the children living with both parents. It is also revealed in the study that children of 12 to 14 years of age, girls and children who see their parents only once in 6 months or more are more likely to be affected by psychological health problems.

Keywords: Parental out-migration, left-behind children, nutritional health status, psychological behaviour

Migration status and child nutrition: Using decomposition technique to explicate inequities

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Between group differences play an important role in a diverse country like India. While caste and religion have typically been the primary axes of inequality, greater population differentiation in urban areas creates additional basis for it. Migration status is one of the key population characteristics that might shape nutrition outcomes for children in urban areas. Recent research on nutrition inequalities has shown the importance of (caste) group differences in child malnutrition. However, except for sporadic qualitative reflections, there are scant attempts to explain differences in nutrition outcome by migration status. This paper explores malnutrition inequalities – specifically, the inequality in probability of child underweight - by maternal migration status in context of urban India and decomposes the same between two main group i.e. non-migrants and migrants. Using the nationally representative Demographic and Health Survey (DHS) 2015-16 data for India, this paper estimates the predicted probability of child malnutrition across various migrant groups. These estimates are based on Probit regression conducted on around 49,000 children aged 0-5 years in urban India, after controlling for known socioeconomic variables and maternal characteristics. The results reveal that maternal migration status has independent association with child's probability of being underweight such that the child of a migrant mother has around 6 to 7 percent higher probability of being underweight than the child of a non-migrant mother. Furthermore, this association varies by child's age, though it remains almost invariable across household wealth class and

caste. The migrant and non-migrant probability difference in child's underweight is then decomposed into two components using the Oaxaca-Blinder technique. The first component explains the difference in terms of endowments i.e. difference in various determinants of underweight between the two groups- migrants and non-migrants. The second component is the difference due to coefficients i.e. the difference between actual probability of child underweight among migrants and the probability of child underweight among migrants at the coefficient of non-migrants. In terms of percentages, around 34 percent of the probability difference of child underweight between the non-migrant and the migrant group is explained by non-endowment factors, that is by the difference in coefficients. This difference represents the role of unexplainable factors beyond individual's own characteristics and is often attributed to social barriers and systemic issues.

Keywords: Malnutrition, inequality, migration status, underweight

Determinants of care-seeking decisions in Indian slums

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Due to the complex and multifaceted nature of healthcare delivery in urban India, decision-making towards healthcare seeking among urban poor is simultaneously affected. The objective of the paper is to perform a systematic review of the existing evidence on healthcare seeking decisions and identify the factors influencing such decisions. A total of 31 articles from existing online open access databases on healthcare seeking behaviour for the period of 2000 to 2018 were reviewed. The literature review identified factors influencing three major areas in decision-making by the urban poor that contribute to delays in seeking healthcare: those are: (i) Delay due to perception of illness: decision on delay in seeking care is mainly due to home remedy and self-medication practices. But many times illness is being perceived as normalcy and decision on not to seek care is high. Further, who and how urban poor take healthcare decisions at family level have a gendered perspective, with dependency of women on men over decision making and other resources. Decision on disclosure of an illness under socially constructed pressures also cause delay in seeking care, but it has a gender role which is culturally and socially mediated; (ii) Delay due to perception of healthcare provider: decision on selection of type of health provider portrays a combination of factors such as service quality, cost, convenient time, distance from residence etc. adding to the severity of the illness, which contributes to selection of formal and informal care. Government healthcare is perceived as

only a treatment centre for communicable diseases, maternal and child health and minimal laboratory investigations and drugs. This is one of the reasons to switch to government health provider as the first point of contact for urban poor; (iii) Delay in the provision of adequate care: there was negligence from private doctors in terms of providing symptomatic treatment without getting the laboratory test done. Provider shopping while switching to another provider was found to be the main concern from patients that causes delay in adequate care. The findings of the review reveal that there is a need for more concrete evidence to improve access to universal urban healthcare and coverage as every slum represents a unique composition. It should not only bridge the knowledge gap in understanding such preferences with respect to the general urban poor population but also allows health policy planners to achieve more effective care that matches with the individuals' preferences.

Keywords: Care-seeking behavior, Social determinants, Slums, Urban Healthcare

Layers of health vulnerabilities of in-migrant workers in Kerala: A preliminary analysis

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The State of Kerala receives a large number of in-migrant workers from different parts of India mostly from Assam, West Bengal, Bihar and Orissa. Gulati Institute of Finance and Taxation (2013) estimated that there are more than twenty-five lakhs of in-migrant workers in Kerala who are working in different occupational sectors of Kerala, most in the unorganized sector. Interestingly, at the same time, there were as much as 24 lakhs out-migrants from Kerala to various parts of the world in 2014 (Kerala Migration Survey, 2015). Kerala is reported to be facing a labour scarcity in manual labour, and this might explain the reason for labour scarcity in the state (Narayana and Venkiteswaran, 2013). Migrant workers are identified as the most vulnerable population of the receiving country. They face several factors which explain the vulnerabilities and how these vulnerabilities are linked to health vulnerabilities. For understanding the vulnerabilities, Luna F (2009) introduced the concept of Layer Metaphor, the structure and functioning of vulnerability, in which he proposed that the concept of vulnerability is the idea of layers. It suggests that there may be multiple and different strata and that they may be acquired, as well as removed, one by one. This framework will help to understand and identify the general and health vulnerabilities of in-migrant workers in Kerala. Vulnerability of the migrants cannot be understood in a monolithic form. Scholars has

specifically identified health vulnerabilities within the general vulnerabilities of the migrant workers. The present study draws from the fieldwork conducted among 300 in-migrant workers from various places of Kozhikode district of Kerala state. A major part of the analysis in this paper depends on the open-ended questions on their understanding, experience and ramifications of vulnerability, which continues from the place of origin and spreads across various spheres of their life in the destination areas. We have also specifically looked at their health vulnerability and its changes in the place of destination. Besides, some of the quantifiable data on various markers of vulnerability in general and health vulnerability in particular are included in the paper. The findings imply that the in-migrant workers come to Kerala with a baggage of vulnerabilities as they are often voiceless, exploited, less skilled and educated and above all marginalized along the markers of class, caste, religion and ethnicity. Additionally, they suffer the burden of the vulnerable position as migrant in the destination. They often stay in Kerala with limited housing, water and sanitation facilities. Most of them were not covered under any medical insurance scheme. They prefer to work as much as possible to earn additional income. Their health and treatment seeking depend on all these.
Keywords: migrants' health, health vulnerability, Kerala