IMPACT OF SOCIO-ECONOMIC FACTORS ON DEATH RATE ACROSS INDIA

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ABSTRACT

In the last 4 decades, a number of factors have affected the death rate across various states in India. Educational Factors like literacy rates have seemed to be the most significant factor impacting Death Rate with a positive outcome, i.e. a state with a higher level of literacy rate accounts for lowering number of death rates making impartment of education the primary goal of the government. Other infrastructural factors like building new hospitals, in both Urban and Rural Areas also seem to be of great importance in order to reduce death rates. Quality is as important as quantity. Even though, number of hospitals have been increasing, the expenditure involved in improving the services has remained low for most of the states degrading its significance in improving the number of death rates across various states. Population control should also become a major priority of states state governments through the implementation of family planning norms as this factors leads to unavailability/shortage of health facilities to every individual hence, increasing the death rate.

Introduction

Protection and improvement of population health is the primary responsibility of any health system. Other goals that it needs to fulfil include is its responsive to people's expectations in non- health domains such as dignity, confidentiality, autonomy, prompt attention, quality of basic amenities and choice of provider. Responsiveness increases patient satisfaction with health care providers which in turn may promote greater utilization of services), ultimately promoting health. Although most current research focuses on aggregate responsiveness it is also imperative to assess whether and to what extent the health system responds differently to various socio-economic groups within a society. Presence of socio-economic disparities in health system responsiveness may be damaging not only from a human rights perspective but also in sustaining confidence in the system. Identifying the extent of such socio-economic disparity can be the first

step in improving the quality of health services and patient satisfaction with services in a given health system.

India's health system is a mix of public and private health care facilities; with the majority of its population (about 80%) using private health facilities for outpatient care due to their better perceived quality of care. The public health facilities, offering low-cost health care, are more commonly used by poor individuals who are unable to pay for private health care. In fact, poor responsiveness is known to be a key reason for the current underutilization of primary health care provided by public health facilities. Within private health facilities, there is also considerable variation in the cost and quality of health care services provided by facilities/providers, resulting in differences in affordability and health care experience by socio-economic status. On the other hand, the existence of socio-economic disparities in responsiveness of public health facilities is contradictory to the basic principle on which this system was founded, that is, to ensure equity in health care access to all irrespective of ability to pay for health services. Hence, determining whether responsiveness of the public health facilities varies systematically by the socio-economic status of individuals provides an assessment of potentially avoidable inequalities in health system responsiveness.

Improvement in health delivery should address the aspect of socio-economic disparities and make the practice of modern medicine for available to the exploited class of people. Understanding community needs, promoting more sustained interaction between the traditional and modem systems, and involving the private sector in health-care delivery programmes may be the way of the future.

Literature Reviews

Bloom (2011) studied the population dynamics in India and implication for economic growth. The main objective of this study was to see the impact of demographic changes on labour supply, savings and economic growth. It critically analysed the policy choices that could potentiate India's realisation of economic benefits stemming from demographic changes. It even aimed at seeing the growth in Indian demography over the years and analyse the patterns of the same. The study was carried out through a quantitative approach where secondary data was extracted from World Bank, United Nations etc. Health has been considered an important factor for driving the economic growth simply for the reason that healthier workforce will lead to a more productive workforce, better educational grades, better cognitive skills and higher saving rates. It was also found that India's population is currently growing at a rate of 1.4% a year. Rapid population growth has been accompanied by a decline in mortality rates and by an increase in income per capita. It suggested that demographic change may provide a boost to economic growth, but

appropriate policies are needed to allow this to happen. The main force driving India's age structure are the maturing of past birth cohorts, upward trends in life expectancy due to increasing survival rates at older ages, and falling fertility. It finally suggests wider and deeper investments in health, promotion of higher income through programmatic and financial commitments to health, vaccines against childhood diseases etc. This is possible through good governance, efficient infrastructure, competitive financial markets and investment and education training.

Goli and James (2017) noted the challenges possessed by India due to demographic changes. It aims to identify the impacts of the socio-economic factors on growth considering closely the widespread inequality in India. Secondary data has been provided through both quantitative and qualitative approach. The paper aims at finding whether literacy has a positive impact on the economic growth and to what extent. The major finding of the paper states that growing income inequality coupled with rising inflation- which together affect the purchasing power of lower and middle-income groups may further threaten savings rate in the future. It highlights the fact that disability-adjusted life expectancy in India is only 53 years compared to an overall expectancy of 67 years. This economic and health burden is mainly due to unprecedented size of the aging population and the increasing disability prevalence among its older population. Another cause of this inequality is interstate migration in search of employment opportunities. Finally, the paper recommends that merely by achieving gender parity in education, health and economic status, India could have an additional $2.9 trillion in real terms by 2025. The paper concludes that although literacy rates are steadily increasing, education of the adult population are far from desirable. 7% of the population has reached the age of 65 or older however, the economy isn't fully developed yet which signifies that the population is not living in comfort. Socio-economic disparities create fewer consumption opportunities for the majority of population. Also, growing income inequality with rising inflation affect the purchasing power of the lower and middle income groups widening the inequality. This may threaten savings rate in the future.

Goli and Arokiasamy (2013) studied the long-term trends in population and health indicators in India and states. It highlights the demographic expositions that emerged from the observed analyses. It aimed at integrating the demographic change with population and health policy shifts and other historical events to assess the temporal dimension of the demographic process. To establish a causal relationship, it compares historical trends and patterns of fertility, mortality and population size by relating the trend to time trajectories of population policies and development strategies as driver of change. It used secondary data- census data, indirect estimates, survey based and other official estimates to assess the long-run trends. Quantitative approach was initiated through the change-point analyses. The paper found that there were major shifts (critical changes) in the four categories that were included in this paper i.e. IMR,

population size, TFR and LEB that reveal multiple critical changes over a long-run period of demographic history in India. These shifts were closely related to shifts in the approach of family welfare programmes. In the Indian context, this study fosters that transition in fertility is initially followed by infant mortality however after the mid70s this was changed due to improvement in socio-economic conditions, family planning and maternal and child health services. The study concludes that critical change points in the population and health indicators in India are associated with the evolution of structural changes in population and health policy framework. The above mentioned factors acted as a driving force of the decline in child mortality and fertility rates.

Due to no study documenting the differences in adult life expectancy in India by education caste or religion, Saikia, et. al(2019) note the socioeconomic disparity in adult mortality (40q30) and life expectancy at the age of 15 (e15). They estimated adult mortality by SES with the orphan hood method and data was extracted from Indian Human Development Survey 2011-2012 and SES was measured by education, caste, religion and income. A consistency analysis between orphanhood estimates and official statistics confirmed a robustness of the estimates. It was found that mortality is higher among adults who are illiterate, belong to deprive caste or tribes, have children with a low level of education, and have a low level of household income. It varies marginally by religion in India. Life expectancy at 15 is about 3.50 and 5.7 years shorter for illiterate men and women, respectively, compared to literate men and women. The parameter e15 also varies significantly by educational attainment of offspring. On average, parents of children educated to higher secondary level gain an extra 3.8-4.6 years of adult life compared to parents of illiterate children. Disparity in e15 by caste and religion is smaller than disparity by education or income. The study concluded that adult mortality burden falls disproportionately on illiterate adults and adults with less educated offspring. Thus, educational disparity in adult mortality appears to be prominent in Indian context. In the absence of adult mortality statistics by SES in India, the paper recommended that large scale surveys should continue collecting data to allow indirect techniques to be applied to estimate mortality and life expectancy in the country.

Concerns for healthcare inequalities is an important driver of health policy in India, however, much of the empirical evidences regarding health inequalities in the country is piecemeal focusing only on specific diseases or an access to particular treatments. Asaria, et. al (2019) observes the socioeconomic inequality in life expectancy in India. This study estimates inequalities in health across the whole life course for the entire population. Population mortality data from the Indian sample registration System were combined with data on mortality rates by wealth quintile from the National Family Health Survey to calculate wealth quintile specific mortality rates. Results were calculated separately for male and females as well as urban and rural populations. The study showed that life expectancy at birth was 65.1 years for the poorest

fifth of households in India as compared with 72.7 years for the richest fifth of households. This constituted an absolute gap of 7.6 years and a relative gap of 11.7 %. Women had both higher life expectancy at birth and narrower wealth-related disparities in life expectancy than men. Life expectancy at birth was higher across the wealth distribution in urban households as compared with rural households with inequalities in life expectancy widest for men living in urban areas and narrowest for women living in urban areas. These findings act as a baseline measure of the level of inequality in lifetime health across the country that can be used to assess the relative extent that the health of different subgroups within the population is improving as India rolls out Universal health Coverage. As India progresses towards it, the baseline social distributions of health estimated in this study will allow policy makers to target and monitor the health equity impacts of health policies introduced.

Continuing the path of urban-rural disparities in health, Singh (2019) noted the shortages and inequalities in the distribution of specialists across community health centres in Uttar Pradesh from 2002- 2012. The study uses data from the three latest rounds of the District-Level Household Survey, covering a period of 10 years. Inequalities were measured using Gini and Theil Indices. It was found that the current shortage of specialists stands at 80.7% of the total requirement. Currently, 62.1% of CHCs are functioning without a specialist. Decomposition analysis revealed that the contribution of within-district inequalities to overall inequalities remain high (85.4% of total inequality). About 50% of within district inequality is contributed by only 20 districts. The analysis of factors affecting the distribution of the current specialist workforce revealed that the number of available specialists of CHC is positively associated with the availability of residence for doctors and regular electricity supple, and negatively associated with CHC location and the distance of the CHC from the district headquarters. The findings suggest that Uttar Pradesh not only needs to recruit more specialists, but it also requires proper implementation of deployment and retention policies to ensure equitable access to specialist care for rural populations. Ensuring availability of quality accommodations and basic amenities at all CHCs, as well as adequate transport and rural allowance, could help increase the chances of specialists staying in rural and far off CHCS.

States in the southern part of India have always shown low level of socio-economic inequalities when compared with the rest of the country. Subramanyam and Subramaniam (2011) researched on social inequalities in health in India. It aimed at interpreting the presence of magnitude of social inequalities in Kerala. Data was collected from a prospective cohort study based in the peri-urban areas of Thiruvananthapuram, Kerala. The study reports that low, compared to high socio-economic status groups had lower life expectancy at the age 40 (about 1.5 to 2 year less). The study also found that SES disparities were wider among men than women. The paper concluded that a significant progress in prevention of disease, as well as the persistence of socio-

economic inequalities in health, suggest a need to re-examine the theory and practice of public health in India by explicitly incorporating a social determinants perspective. . It also suggested inclusion of societal trends in such researches because if the fundamental cause of incidence of stroke are not addressed, strategies will fail to focus on prevention. It points towards a multilevel conceptualization where factors ranging from international and national policies to community-level resources to individual-level genetic predisposition are given importance. Reversing accumulation of generations of health disadvantage requires massive input of resources and it might be best to begin with measurable and achievable, if smaller, steps in that direction.

In the context of health, Ramani and Mavalankar (2006) objectified the status of India's health system and critical areas of management concerns. It aims at identifying the roles and responsibilities of various stakeholders for building health systems that are responsive to the community needs, particularly for the poor. World development report, 2004 was extracted from World Bank to conduct the analysis. It was found that the macroeconomic scenario of the Indian Health sector is not very encouraging. The total annual expenditure on Health is around Rs. 110,000 crores, and it accounts for 5.2% of our GDP. Many states do not have a clear health policy and there is no systematic effort at the state level to plan and monitor the delivery of health services. Public health infrastructure concerns include non-availability of staff, weak referral system, recurrent funding shortfalls, lack of accountability for quality of care and poor logistics management of supple of medicines and drugs. This has led to forcing the poor also to seek healthcare support from the private sector. Only 20% of outpatient out of 45% for inpatient care is obtained from government health infrastructure while the rest is obtained from private sources. Public transportation between PHC/CHC to the District/State hospitals is irregular and infrequent while private transport is expensive. Hence, health system in rural sectors has become very unreliable and undependable for access to healthcare facilities especially in emergencies. The paper concluded that health sector is complex involving several stakeholders, multiple goals and different beneficiaries. Hence, health reforms have to be carefully designed and implemented i.e. there is a need for behavioural change.

Balarajan, et. al(2012) identify key challenges to equity in service delivery, and equity in financing and financial risk protection in India. These include imbalanced resource allocation, limited physical access to quality health services and inadequate human resources for health; high out-of-pocket health expenditures, health spending inflation, and behavioural factors that affect the demand for appropriate health care.It was found that adoption of equity metrics in monitoring, evaluation and strategic planning, investment in developing a rigorous knowledge-base of health systems research; development of more equity-focused process of deliberative decision-making in health reform, and redefinition of the specific responsibilities and accountabilities of key actors. The implementation of these principles, together with

strengthening of public health and primary care services, provide an approach for ensuring more equitable health care for India's population. There is a cogent moral, social and economic argument for investing in achieving equity in the health care of Indians. Recent rapid economic growth provides for a unique opportunity to increase financial commitments to support the public health system and health systems research. India can also draw on the knowledge capital of its booming technology sector to innovate and strengthen the development of health information systems, which has already begun. Furthermore, there is the opportunity to harness the capability of the domestic pharmaceutical industry by inducing it to take greater responsibility for delivering equity in health care.

Continuing in the context of provision of healthcare facilities, Pallikadavath, et. al(2013) noted the human resource inequalities at the base of India's public health care system. This paper examines the extent of inequalities in human resource provision at India's Heath Sub-Centres (HSC)—first level of service provision in the public health system. The inequality measures used in this analysis are Gini and Theil T. 'Within state' inequality explained about 71% and 'between state' inequality explained the remaining 29% of the overall inter-HSC inequality. The Northern states had a lower health worker share relative to the extent of their HSC provision. Contextual factors that contributed to 'between' and 'within' district inequalities were the percentages of villages connected with all-weather roads and having primary schools. Analysis demonstrates a policy and programming need to address 'within State' inequalities as a priority. The states belonging to the central and northern regions such as Uttar Pradesh, Madhya Pradesh and Chhattisgarh must make efforts to recruit more health workers and must also strive to allocate them in districts that have the greatest need in terms of their share of HSCs. The study concluded that financial incentives and awards are not likely to be enough. Effective interventions must recognise the set of key determinants for retaining health professionals in remote areas, and will need to address local contextual factors along with financial incentives. As HSCs are designed to provide basic health services to the rural population, equitable human resource distribution may be considered a justifiable aim without reference to prevalent disease patterns or other socio-economic considerations.

Health expenditure, private (% of GDP) in India was 3.28 as 2014. Since, India is the second most widespread country in the world and has widespread socio-economic patterns that have been drawing global attention in recent years, Bhukta and Patra (2019) aimed at analysing the accessibility of healthcare system in India and the pattern of healthcare expenditure on healthcare sector in India and Odisha. Secondary data had been collected from various issues of economic survey, Government of India. It implied that the health expenditure in India has increased over time but not satisfactory. Health Expenditure Total (% of GDP) has decreased from 4.03 to 3.66 in the year 2000-16. Public expenditure on health in India is both inefficient and inequitable. It is

inefficient because allocated health expenditure does not yield significant health benefits for the majority of the population. Public expenditure on preventive and basic health care accounts for a small proportion of the total health budget. Speaking about Odisha in specific, the average annual allocation for health is around 4-5% of the total expenditure of the state. Besides the allocation made by the Government of Odisha, a substantial amount is being spent on EAPs outside the Budget in health sector every year. The share of the public sector in the total health expenditure was 20.2% in 2004-05, which increased to 23.6% in 2013-14. In a nutshell, the paper suggested that the allocation for the health sector should be increased in the union budget, to fulfil the Government's commitment to increase the health expenditure to 2-5% of GDP. The study suggests creating abroad framework for public-private partnership (PPP) model to meet the demand-supply gap in healthcare.

Choudhary and Nath (2012) studied the estimates of health expenditure for India from 2005-2011 to provide the State level estimates of health spending in the country and the relative contribution of the Centre and State. Primary source of secondary data was Finance Accounts of the Centre and States (Quantitative approach). It was seen that while estimation, grant-in-aid flowing from Centre to States from centre's expenditure were excluded to avoid overestimation. Public Spending on health in India was about 1.5% of GDP in 2010-2011 (including water supply and sanitation). It has increased by 0.2% since 2004. The estimates of health expenditure at the stale- level highlight a few issues. The average growth rate of Centre's spending in relatively worsening States has been lower than the better performing States. Hence, there has been a lot of disparity between the states due to their performance levels. While Centre's expenditure in per capita terms has increased in some of the poor performing states like Bihar and Uttar Pradesh, the slow pace of the States' own spending in these States is also an area of concern. In contrast, per capita health expenditure in states like Rajasthan and Orissa has increased sharply in the period. The high growth of per capita public spending on health in these States has moved them ahead of many of the other relatively higher income States. The study suggest a relook into the target of 40:60 sharing of health expenditure by Centre and States with better and standard measures to keep frequent checks and maintain standardisation in the provision of funds and services to the health sector of the state for the overall development of it.

.Sudhakara and Prasad (2016) analysed the healthcare expenditure. The objective of this paper was to examine the need for healthcare in India, evaluate the healthcare system and make an interstate comparison of health expenditure. Secondary data was collected from State Government Finances, 2004/2005. It was found that spending on health was considered a productive investment as it raises the income and reduces the toll of human suffering from ill health. Improved health even reduces production losses caused by workers illness, increase the roll of enrolment at school, and permits use of natural resources that were inaccessible because

of the disease. Health care is primarily financed by the state governments and the state allocation on health is usually affected by any economic stress that they encounter. Though India's health expenditure percent on GDP is higher than Asian economies like China, Malaysia, etc., public spending of total health expenditure is significantly low. Almost 75% of the total health care load is carried out by the private sector. According to Government of India, 2005 (Ministry of Health) combined expenditure of states on health, water sanitation and family welfare programmes declined from 8.4% in 1990s to 7.2% in 2001-02. Punjab's per capita spending was the highest and that of Madhya Pradesh was the lowest. The paper concluded that in spite of huge budget allocation, enormous health problems continues to remain as an unfinished agenda of the economy. Absolute levels of mortality in the state are still unacceptably high due to increase in population and requirement of a higher budget allocation. Hence, it was recommended that states should take up a proper road map to meet the challenges of health care services which is a pre-requisite for human development.

Ahmed and Honakeri (2012) aimed at examining the trends, composition and rate of growth of public expenditure on health sector India, covering the period from 2000-01 to 2012-13. It has perused the Annual Financial Statements of the Budget of Government of India of various years in order to analyse the Public expenditure on health. It showed that the total public expenditure in the country, irrespective of revenue and capita accounts, has increased gradually over the period 2000-01 to 2010-11 with a CAGR oh 19.58%. The per capital health expenditure on health sector in India increased from Rs. 24.26 in 2000-02 to Rs. 157.18 during the year 2010-11. For the year 2012-13, the Budget estimates for health sector in India is earmarked at Rs. 24261.06 crore. The percentage share of public health expenditure to the GDP of the country saw a mere increase from 0.13 percent to 0.26 percent during the period 2000-01 to 2010-11 respectively. Besides this revealing trend, the Government of India has set the target of increasing the government health spending to 2-3 per cent of country's GDP over the next five years, but it seems to be an uphill task to be achieved. Hence the government should take precautionary measures with regard to capital expenditure incurred on health sector in India, because it has witnessed negative growth rate under capital account on health sector during the year 2000-01 and 2007-08. High priority to the health sector should be provided in the Union Budget in order to increase the share of public expenditure on health.

In India, health expenditure accounts for less than 5 per cent of the Gross Domestic Product and the level of out-of-pocket (OOP) spending is 69.5 per cent of total health expenditures. OOP expenditure exacerbates poverty and has a negative impact on equity and can increase the risk of vulnerable groups slipping into poverty. Loganthan, et. al(2017) noted the socio-demographic determinants of out-of-pocket health expenditure in a rural area of Wardha district of Maharashtra, India. This study was conducted to estimate the OOP expenditure on health and

catastrophic health expenditure and their socio-demographic determinants. The study involved a monthly follow up visit, done in 180 households (primary research) of three villages under a primary health centre in the Wardha district. The study results showed that around 18.9% families had catastrophic health expenditure over a period of one year. 151 families had enough money, 27 borrowed money while 2 of them had to sell assets. The significant correlates for the ratio of out-of-pocket health expenditure to total annual income of the family were the occupation of head of family, caste category and type of village. The significant correlate for catastrophic health expenditure was type of village. The paper concluded that around one-fifth of the households had catastrophic health expenditure. People with no healthcare facility located in their village had higher odds of having catastrophic health expenditure. Private providers were preferred for the treatment of acute illnesses and medical college hospitals for hospitalization.

In the context of education, Adler and Newman (2002) noted the socioeconomic disparities in health. They aimed at identifying the inequality in education, income and occupation that would exacerbate the gaps between the health "haves" and "have-nots." This was a qualitative research. It was found that education is key to health inequalities, policies encouraging more years of schooling and supporting early childhood education may have health benefits. It would lead to increase in human capital, boost productivity and augment lifetime earnings and improving the socialization of the next generation. Higher incomes can provide better nutrition, housing, schooling and recreation. Independent of actually income levels, the distribution of income within countries and states has been linked to rates of mortality. Health effects at the upper part of the distribution strongly reflect relative status while at the lower part they are more linked to absolute deprivation. Although some of this association is a function of the "healthy worker" effect, there is evidence that being unemployed and the length of unemployment affect health status. Entitlement benefits appear to reduce some negative health effects, while means tested benefits do not. Threat to unemployment and job insecurity can affect health as well. This analysis suggests that multiple approaches are needed to eliminate SES disparities in health. Since the relevant sectors operate somewhat independently, there may be less direct competition for priorities than occurs within domains, and it makes sense to push on as many fronts as possible. What is needed is a broad gauged approach to the multiple determinants of health disparities if we are to eliminate, or even greatly reduce these disparities.

The existence of socio-economic disparities in responsiveness of public health facilities is contradictory to the basic principle on which this system was founded, that is, to ensure equity in health care access to all irrespective of ability to pay for health services (Ministry of Health and Family Welfare and Government of India 2005). Hence, determining whether responsiveness of the public health facilities varies systematically by the socio-economic status of individuals provides an assessment of potentially avoidable inequalities in health system responsiveness.

Malhotra and Do (2013) noted the socio-economic disparities in health system responsiveness in India. The study aimed at assessing the magnitude of socio-economic disparities in health system responsiveness in India after correcting for potential reporting heterogeneity by socio-economic characteristics i.e. education and wealth. Data from Wave 1 of the Study on Global Ageing and Adult Health (2007-2008) involving six Indian states were used. The heterogeneity in the study revealed socio-economic disparities in all health system responsiveness domains. Estimates suggested that individuals from the lowest wealth group were less likely than individuals from the highest wealth group to report 'very good' on the dignity domain by 8% points. Stratified analysis showed such disparities existed among users of both public and private health facilities. Hence, the paper concluded that socio-economic disparities exist in health system responsiveness in India, irrespective of the type of health facility used. The study findings have implications for the provision of quality health care to individuals with low socio-economic status. Policy efforts to monitor and improve these disparities are required at the health system level.

In India, discrimination against girls begins before birth and spans the entire life. Punjab and Haryana, the two riches states in terms of per capita income, have among the lowest female to male sex ratio. Women have been provided with unequal opportunities in India in terms of basic facilities like health, sanitation, opportunities, ownership and households. To focus on the health aspect of it, Tiwari (2013) noted gender inequality in terms of health and nutrition in India. The paper aimed at seeing gender inequality with respect to adult nutrition, adult food, adult food consumption, child mortality, child vaccinations and child nutrition. National Family Health surveys (NFHS) were used to monitor and evaluate the success of its family planning and reproductive and child health programmes, both nationwide and in individual states. The study showed that boys are much more likely than girls to be taken to health facility at the time of sickness. It was also found that GPI showed no evidence of gender inequality in states of Kerala, Rajasthan, Uttar Pradesh and Punjab in respect of adult nutrition. A very high level of female deprivation was noted in Madhya Pradesh, Uttar Pradesh, West Bengal, Orissa, Punjab and Haryana in terms of adult food consumption. States like Bihar, Orissa, UP and MP have gender bias in terms of height for all. Karnataka, Kerala and West Bengal showed favourable conditions for females. In a nutshell, there was a significant correlation for gender bias in child mortality, child nutrition and composite index for gender bias. This shows that gender bias in health and nutrition may affect the inequality in life expectancy.

Maharana and Ladusingh (2014) aimed to shed light on the changing patterns of gender disparity in health and food expenditure over the time among elderly in India. Further the paper examines the changes in the sex composition of the elderly in households contributes to a change in health and food expenditure. National Sample Survey Organisation (NSSO) data of the 55th (1999-2000) and the 64th (2007-2008) rounds on household consumer expenditure have been used for

this study. The findings indicate wide gender disparity in food and health care expenditure, with that of males being higher than that of their female counterparts; the gap, however, is narrowing with time. The compositional shift in sex among the elderly in households contributes significantly to the decline in household health and the increase in household food expenditure over time. Gender differences exists among the elderly in expenditure of different health items like medicines, ECG, nursing home charges, etc. The paper concludes that gender disparity exits in households among elderly in health expenditure. Most of India's health programmes and policies haven been focusing on issues like population, stabilisation, disease control, etc. However, due to demographic transitions, there have been new set of medical, social and economic problems that have been risen. Hence, there is a need for expansion of social and community services for older persons, particularly women, and enhancement in their accessibility and use of removing sociocultural, economic and physical barriers and making the services client oriented and user friendly.

Brinda, et. al (2016) studied the socio-economic inequalities in health and health service use among older adults in India aiming at identifying the factors contributing to health inequalities among older people aged 50-plus years. The study is based on a population based, cross-sectional survey of 7150 older adults from WHO's study on Global Ageing and adult health Indian survey. About 19% (95% CI: 18%, 20%) reported poor health (n = 1368) and these individuals were significantly less wealthy. In total, 5134 (71.8%) participants made at least one health service visit. Increasing age, female gender, low social caste, rural residence, multi-morbidity, absence of pension support, and health insurance were significant correlates of poor SRH. The standardized concentration index of poor SRH –0.122 (95% CI: –0.102; –0.141) and healthcare visits 0.364 (95% CI: 0.324, 0.403) indicated pro-poor and pro-rich inequality, respectively. Economic status (62.3%), pension support (11.5%), health insurance coverage (11.5%), social caste (10.7%) and place of residence (4.1%) were important contributors to inequalities in poor health. Socio-economic disparities in health and health care are major concerns in India. Achievement of health equity demand strategies beyond health policies, to include pro-poor, social welfare policies among older Indians.

Objective

The paper aims to find the impact of State-wise Population Size, Literacy Rate, Per Capital Income, Capital Health Expenditure, Number of Sub-Centres, PHCs & CHCs and Aged Population (above 60 years of age) in Urban and Rural areas on State-wise Death Rate, whether positive or negative. In general it tries to signify the role of education, infrastructure, population, migration and age on death rate.

The paper also aims at suggesting policies to the government, corporate sectors, public-private partnerships and other educational and research institutions in order to improve the health care system in both public and private sectors.

Hypothesis

The hypothesis of the study states that State-wise Population Size, Literacy Rate, Per Capital Income, Capital Health Expenditure, Number of Sub-Centres, PHCs & CHCs and Aged Population (above 60 years of age) in Urban and Rural areas have a significant impact on State-wise Death Rate. While Population Size, Sex Ratio and Aged Rural Population are considered to have a positive impact on death rate, other factors like Literacy Rate, Per-Capita income, Capital Health Expenditure, Number of Sub-Centres, PHCs & CHCs and Aged Urban Population are expected to have a negative impact on the death rate. The significance parameter was checked through the P-Value of the independent variables at 5% level of significance.

Data

The paper is based on the study of 20 major states of India covering the four census year i.e. 1981, 1991, 2001 and 2011. The 20 states being included in the study are Andhra Pradesh, Assam, Bihar, Gujarat, Haryana, Karnataka, Kerala, Karnataka, Madhya Pradesh, Maharashtra, Odisha, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh, West Bengal, Arunachal Pradesh, Himachal Pradesh, Manipur, Meghalaya and Tripura. These states account for more than 90% of total population and hence, considered representative. Small sized states (like Goa), some Union Territories (like Delhi) and some special category states have been excluded from this study due to their different economic structure and availability of information. The newly considered state of Telangana has been considered as part of its parent state. The choice of period has been based on the completeness in the availability of data.

During the commencement of this research, State-wise Data of Death Rate, Population Size, Literacy Rate, Per Capital Income, Capital Health Expenditure, Number of Sub-Centres, PHCs & CHCs and Aged Population (above 60 years of age) in Urban and Rural areas were taken into consideration. However, due to their insignificance and irrelevant co-efficient signs in the model, they were omitted till a final model (model of best fit) was reached.

The regression analysis undertaken in this paper uses the panel data, created through the data collected from Indian State for Death Rate, Literacy Rate, Sex Ratio, Sub-Centre Establishment, CHCs & PHCs, Population and Aged Population (Urban and Rural), & EPWRF for Capital Health Expenditure. Based on the objective of the paper, the Dependent Variable used in the paper is Death Rate and the independent variables used are- Literacy Rate, Sex Ratio, Sub-

Centres, PHCs and CHCs, Population, Capital Health Expenditure and Aged Population (Urban and Rural).

Some drawbacks of data collection included missing data points for certain states in certain census years. If the missing data point belonged to the first year of research, i.e. 1981, discounting by 10% was applied and for the remaining, average of the four years was considered.

Variables

Table 1- Variables (Independent and Dependent) stated in the study, along with their meaningand quantitative scaling values (if any).

Death Rate	Death Rate is a measure of the number of deaths (in general, or due to a specific cause) in a particular population, scaled to the size of that population, per unit of time. Death rate has been used as a dependent variable as Indicator of Health. It has been stated in termsof persons per 1000 people.
Population	Population size is the actual number of individuals in a population. We used the log factor in order to measure this variable in order to scale it down to the proportion of death rate for a legitimate result of its impact.
Literacy Rate	Literacy rate is the total number of literate persons in a given age group, expressed as a percentage of the total population in that age group. For this study, since age demographics are taken into consideration, we are using adult literacy rate. It measures literacy among persons aged 15 years and older.
Sex Ratio	The sex ratio is the ratio of males to females in a population. In the study, it refers to females per 1000 males.
Sub-Centres	A Sub-Centre is the smallest or let's say, the grass-root level of primary health care system in India. This variable was specially included in order to represent the availability of health infrastructure in different states of India and its impact on death rates.

PHCs	Primary Health Centre (PHCs), sometimes referred to as public health centres, are state-owned rural health care facilities in India. They are essentially single-physician clinics usually with facilities for minor surgeries. They are part of the government-funded public health system in India and are the most basic units of this system. This variable was considered in order to study the rural healthcare infrastructure.
CHCs	Community Health Centre (CHC) as referral centre for every four PHCs covering a population of 80,000 to 1.2 lakh. This variable was also considered to analyse health infrastructure as a whole.
Capital Health Expenditure	Capital expenditures are designed to be used to invest in the long- term financial health of the company. This variable was also considered as an Infrastructural Indicator however it differed from Sub-Centres in way that it captures investment programmes on new equipment (e.g., medical and ICT equipment), diagnostic and therapeutic equipment or the expansion of information and communications technology (ICT), etc.
Aged Rural Population	Percentage of older people aged 60 or over living in rural areas. This variable was used in order to study the impact of old age as well as geographical location on the death rate1.
Aged Urban Population	Percentage of older people aged 60 or over living in urban areas. This variable was used in order to study the impact of old age as well as geographical location on the death rate.

Methodology

The conventional method for testing the impact of the above mentioned variables on death rate uses a linear regression-based approach where in Panel Regression of State-wise Census Data of the independent variables are regressed on the death rate. Panel Data, which is also known as cross-sectional time series data, is a dataset in which the behaviour of entities are observed across time. Panel Data allows the use of variables at different levels of analysis (i.e. Literacy rate, Availability of Sub-Centres, Age, etc.) suitable for multilevel modelling.

For the commencement of the analysis, we used the programming language-R2. Panel data regression requires the use of 'plm' package. 'Plm' is a package for R which intends to make the estimation of linear panel models straightforward. It provides functions to estimate a wide variety of models and to make (robust) inference. Therefore 'plm' package is used in our panel data.

Further, the problem of multicollinearity3 was checked through two ways to avoid any kind of bias in the results. Firstly, through the correlation matrix. In order to do that, we tested the correlation problem (using the Pearson matrix) and eliminate variables that have a high correlation, more than 0.811-the limit set by Kennedy4 since they exhibit the problem of multicollinearity. Since the only variables above this threshold were Sub-Centres and PHCs, hence, the variable- PHCs was eliminated from the model. The reason for elimination of PHCs over Sub-Centres was that PHCs is a subset of Sub-Centres. Hence, it would be reasonable to include the broader variable in the study. Secondly, VIF5 factor was considered to test for multicollinearity. The harsh threshold for VIF is 5 i.e. any variable with a VIF > 5 would be eliminated from the study. PHCs was the only independent variables that had a VIF > 5 hence, finally, the independent variables considered in the study were Population Size, Literacy Rate, Sex Ratio, Capital Health Expenditure, Revenue Health Expenditure, Number of Sub-Centres & CHCs and Aged Population (Urban and Rural).

In order to further analyse the panel data, the study focuses on two techniques i.e. Fixed Effects and Random Effects. In the case of the first set of regression models, we are accounting for fixed effects while the same models were regressed through the technique of random effects in the second set of regression models. Fixed effects are variables that are constant across individuals; these variables, like age, sex, or ethnicity, don't change or change at a constant rate over time. They have fixed effects; in other words, any change they cause to an individual is the same.

The opposite of fixed effects are random effects. These variables are—like the name suggests— random and unpredictable. The rationale behind random effect model is that, unlike the fixed effect model, the variation across entities is assumed to be random and uncorrelated with the independent variables included in the model.

In a nutshell, fixed effects are constant across individuals, and random effects vary. Fixed effects explore the relationship between predictor and outcome variables within an entity (in this case-country). Each entity has its own individual characteristics that may or may not influence the predictor variables. On the other hand, in the random effects model, the variation across entities is assumed to be random and uncorrelated with the predictor or independent variables included in the model. The crucial distinction between fixed and random effects is whether the unobserved

individual effect embodies elements that are correlated with the independent variables in the model, not whether these effects are stochastic or not. If there is a reason to believe that differences across entities have some influence on the dependent variable then we should use random effects.

During the first regression of both models, all independent variables were considered (except PHCs). Population Size was converted into Log (Population) in order to scale it in proportion to other variables6. The significance of variables was checked through the P-Value at 5% level of significance. Applying the fixed effect and random effect, as explained above, the study analysed whether the above mentioned factors had any impact on the death rate in the period from 1981 to 2011. Now, even though Sub-Centres were significant at 5% level of significance, CHCs still remained insignificant and the sign of coefficient also seemed to be irrelevant. Hence, ultimately, the study only used Sub-Centres as an indicator of state-wise availability of number of hospitals. For our final set of regression, the variables considered were- Log (Population), Literacy Rate, Capital Health Expenditure, Sub-Centres and Aged Population (Urban and Rural).

In the final model of Fixed Effects- Literacy rate, Sub-Centres were significant. On the other hand, in the final model of Random Effects- Log (Population), Literacy Rate and Sub-Centres were significant7. The other factors considered in the two models, however not significant at 5 % level of significance, were relevant w.r.t to the literature and show-casted a relevant coefficient sign in the model.

Even though the data distribution was more inclined towards the usage of Random Effect Model since it considered variables that vary over time, Hausman Test8 was conducted to check whether the null hypothesis (preferred model is random effect)is accepted or rejected. The null hypothesis stated that Random Effect is significant while the alternative hypothesis states that Fixed Effects is significant. If the P-Value < 0.05, we reject the null hypothesis. The regression results for the Hausman Test stated that the P-Value is 1, hence we accept the null hypothesis, confirming that the final Random Effect Model is the model of best fit. Hence, the final model is

Equation 1.1:

$$DeathRate = \alpha + Log\,(Population) * X1 + LiteracyRate * X2 + SubCentres * X3$$
$$+ SexRatio * X4 + CapitalHealthExpenditure * X5$$
$$+ AgedRuralPopulation * X6, it + AgedUrban\,Population * 7 + uit$$

Here, α is the intercept and,
u is the error term

Results and Interpretation

Table 3(a) - Regression Analysis of the variables mentioned in Equation 1.1

Variables	Estimate	P-Value
Intercept	-2.0906	0.758684
Literacy rate	-0.13396	2.2E-16
Sub-Centres	-0.0001712	0.002819
Log(Population)	0.86882	0.000377
Capital Health Expenditure	-4.5335E-06	0.6735
Sex Ratio	0.0043525	0.480663
Aged Rural Population	0.31883	0.093718
Aged Urban Population	-1.93E-01	0.32181

Table 3(b) - TSS, RSS, R^2, Adj R^2, Chisq, df and P-Value of the variables mentioned in Equation1.1

Total Sum of squares	367.03
Residual Sum of Squares	88.66
R-Squared	0.75844
Adjusted R-Squared	0.73496
Chi Square	226.064
Degrees of Freedom	7
P-Value	2.22E-16

Table 3 (a) shows the regression analysis result of our model of best fit. Best fit model includes variables included in Equation 1.1 i.e. Death Rate (Dependent Variable), Literacy Rate, Log (Population), Capital Health Expenditure, Sex Ratio, Sub-Centres and Aged Population (Urban and Rural). Estimate refers to the coefficient of the variables and P-Value refers to the probability of obtaining test results at least as extreme as the results actually observed, under the assumption that the null hypothesis is correct. In this paper, we have considered 5% as the level of significance.

The coefficient of Literacy Rate has a P-Value of approximately 0 which is much lesser than 5% level of significance. This states that literacy rate has played a vital role in the reduction of death rates over the years. The sign of the coefficient has come out as per our hypothesis signifying the

relevance of the variable. If the literacy rate increases by 1% then the death rate falls by 0.13 persons per thousand people.

For literacy rates, we believe that if people are more educated, they would be more aware of the need to consult doctors for even small diseases and hence would be able to prevent any major complications. So, a higher literacy rate would mean the people get themselves checked more often or consult doctors when they are sick instead of not doing something about the illness.

The coefficient of Sub-Centres has a P-Value of 0.0028 which is again smaller than the 5% level of significance. Hence we can reject the null hypothesis and conclude that Sub-Centres have played an important role in the reduction of death rates. The sign of the coefficient has come out as per the hypothesis. For 1 additional Sub-Centre in a given state, the death rates fall by 0.000167 persons per thousand people. It seems that a huge increment in Sub-Centres would be required to have a big impact.

For sub centres, we believe that if a state has a higher number of sub centres healthcare services would be more accessible to the people. In the absence of sub centres or govt. facilities, poor people might have to leave their daily wage jobs or their farms to get the consultation which leaves a heavy financial burden on them. So, they generally prefer to not move out of their areas and ultimately suffer. If sub centres are higher in number, this problem can be easily solved.

The coefficient of Log (Population) has a P-Value of 0.000377. This is smaller than the chosen 5% level of significance and hence we reject the null hypothesis. We find that population has also had a significant impact in increase/decreasing the death rates. Moreover, we observe that the sign of the coefficient is in order with the hypothesis. We would expect that the bigger the population size, the higher the death rate number would be. Here also we observe that the sign is positive which would mean that incremental population would lead to increasing death rates. With 1 unit increase in population size, the death rate increases by 0.86882 persons per thousand people.

For all the variables that represent the population size, it can be argued that a bigger population will lead to less resources per person and there would be more congestion at the healthcare service centres (assuming that everyone does actually have the access to the services and they use those facilities). This reduces the overall efficiency with which the patients are treated and hence quality that is offered diminishes.

Though the sign of the coefficient of healthcare expenditure is correct w.r.t. our hypothesis, the variable's impact is not significant as the P-Value of the coefficient is 67.35% which is much higher than the 5% benchmark. We do not have enough evidence to reject the null hypothesis.

The P-Value for Sex Ratio is 0.480663. At 5% level of significance, it is quite an insignificant value. The co-efficient is also quite close to 0 (however, it is positive), indicating that gender does not really play a role in the increase or decrease of death rate.

We observe that though the healthcare expenditure (capital) is increasing, there is no significant impact of it in reducing the death dates over the years. It could be that the state governments just focus on increasing the number of facilities rather than actually improving the quality of services offered there. Increasing the number of facilities doesn't mean that the doctors can treat major diseases there. Advanced equipment and labs are required to be able to diagnose diseases and treat them. Another reason why healthcare expenditure has not played a defining role is because there is a disparity within the states in terms of the quality of services available. The govt. can be driven by the motive to get more votes in certain areas and hence spend more there just before the elections to show good performance on their part when actually other areas require more funding.

The P-Value of Aged Rural Population is 0.09 which is closer to the 5% level of significance and hence, we can conclude that the variable has played some role in increasing the death rates. The sign of the coefficient has come out as expected. The sign is positive which means aged population in the rural area are prone to contributing to the increase of death rate.

Surprisingly, the P-Value of Aged-Urban Population is quite higher than 0.05 level of significance indicating that the variable is insignificant. However, the coefficient sign co-incides with our hypothesis stating that staying in an Urban Area, an individual above the age of 60 reduces (do not contribute as much as Aged Rural Population) the death rate.

Discussion

Figure 1(a) shows a decreasing trend in the Death Rate over the past four decades. The X-Axis represents the Census Years 1981, 1991, 2001 and 2011 while the Y-Axis represents the death rate of all the 20 states in person per 1000 people. The red points on the graph signify the position of the 20 states.
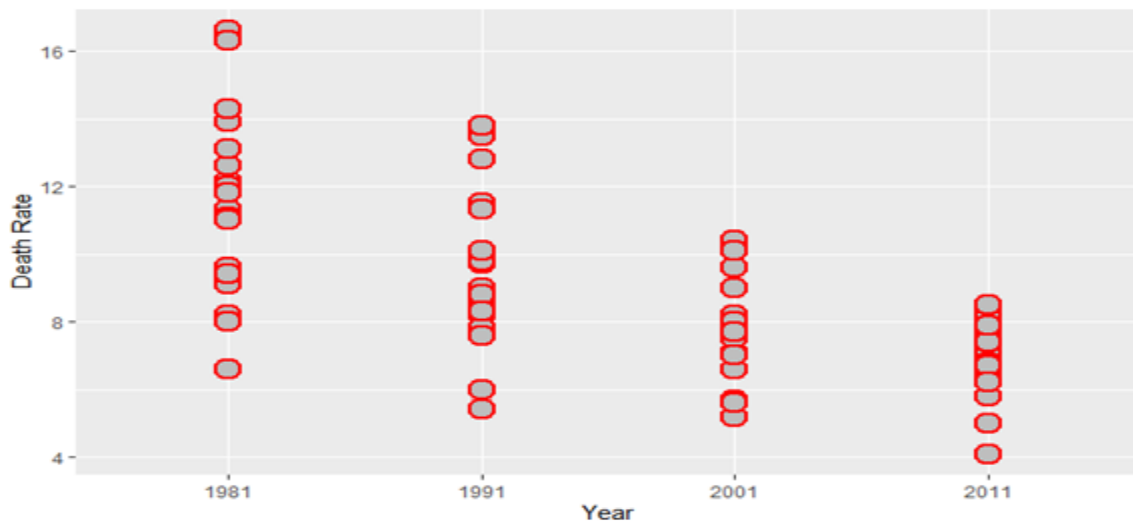
Figure 1 (a) – Downward trend of Death Rate in 1981, 1991, 2001, 2011

Death rate has not only been decreasing over time but it has also shown a convergence between the states. In the year 1981 states like Kerala and Manipur had a fairly low death rate of 6.6 each while sates like Uttar Pradesh and Madhya Pradesh had sky rocketing death rates of 16.3 and 16.6 respectively. The overall death rate of India was 12.5 persons per 1000 people, however, in the course of time, overall death rate fell to 7.2 persons per thousand people in 2011.States like Uttar Pradesh, Madhya Pradesh, Odisha, even though theyhad a higher death rate than many other states, showed a drastic decline compared to the death rates in the previous Census Years.
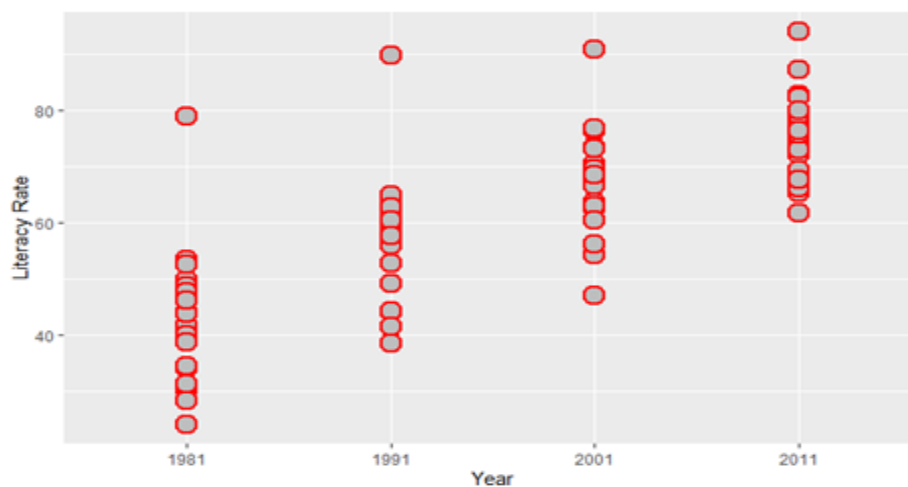
Figure 1(b) - Literacy rate trends in 1981, 1991, 2001, 2011

Figure 1 (b) shows the Literacy Rate trends for the census years 1981, 1991, 2001 and 2011.

The X-Axis represents the years and the Y-Axis represents the literacy rate. The red points on the graph signify the position of the 20 states.

The figure shows an increasing trend of literacy rates. It states that Literacy Rates have been increasing significantly over the last four census years. According to the Census Report of India, Literacy rate has surged forward from 64.83 % in 2001 to 74.04 % in 2011 showing an increase of 9.21 percentage points. The literacy rate for males and females works out to 82.14 % and 65.46 % respectively. Kerala has always had the highest literacy rate. The total effective literacy rate for the State of Kerala in Census 2011 has been out to 93.91 %, which is much higher than the all India total effective literacy rate for the corresponding period. In 1981, Kerala was way above all other states in terms of the literacy rate. However, through the figure, we see that over the last 3 decade, there has been a convergence between Kerala and other states in terms of their literacy rates.
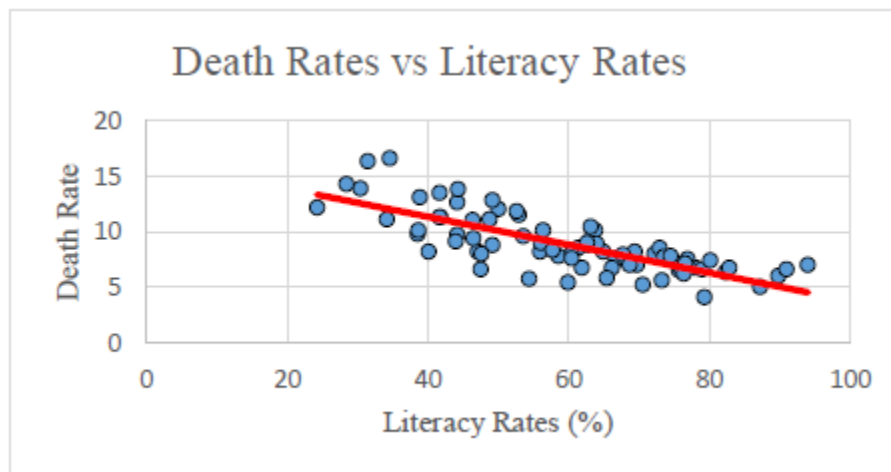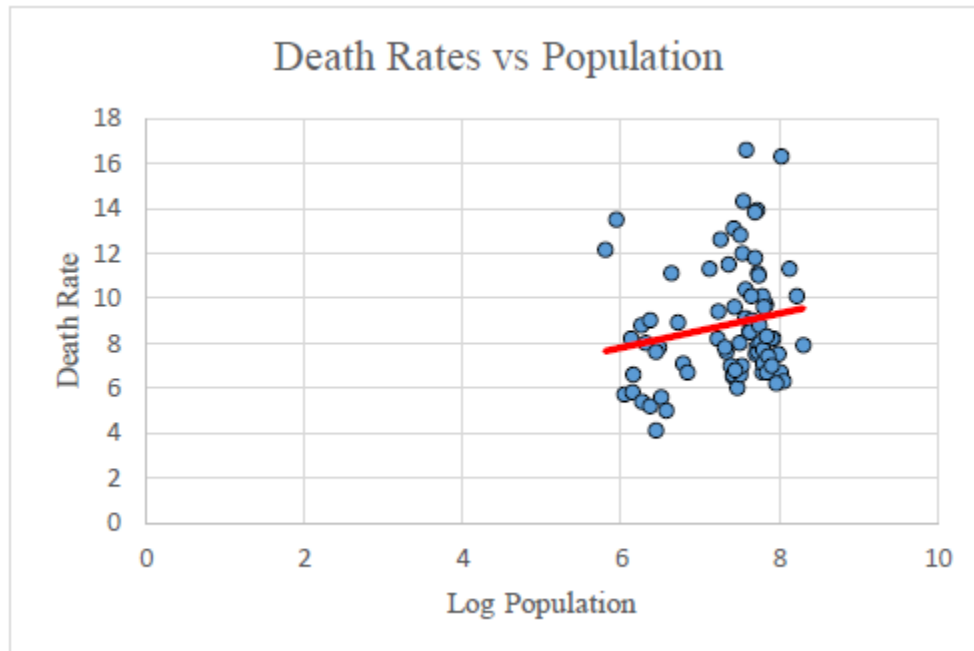

Figure 1(c) Relationship betweenLiteracy Rate and Death Rate

Figure 1 (c) shows that Literacy rate and Death Rate are negatively related i.e. higher the literacy rate, lower will be the death rate. The X-Axis represents the literacy rates for all states for the 4 discrete years in percentage terms while the Y-Axis represents the death rate in terms of persons per thousand people.

A study by the Northwestern University stated that low literacy impairs people's ability to obtain critical information about their health and can dramatically shorten their lives. This is what our hypothesis state as well. States like Uttar Pradesh and Bihar had a death rate of 7.9 and 6.7

respectively. Their literacy rates were also among the lowest (67.7% and 68.1%) indicating that improvement in education opportunities is necessary in order to improve the death rate of these states. Literacy would make one aware of the health hazards one could face and in turn allow the use of precautionary measures pulling the death rate down like in the states of Manipur (4.1), Tripura (5) and Arunachal Pradesh (5.8).

Figure 1(d) Relationship between Population Size and Death Rate

Figure 1 (d) shows that Log (Population) and Death Rate are negatively related i.e. higher the Log (Population), higher will be the Death Rate. The X- Axis represents the literacy rates for all states for the 4 discrete years in percentage terms while the Y-Axis represents the death rate in terms of persons per thousand people.

The study states that with increase in the population size of the state, death rate increases to a certain extent only. Figure 1 (d) shows a fairly flat line indicating that although population has a significant impact on death rate, the impact is not drastic. For the extreme states like Uttar Pradesh that has been the highest populated state for the last 4 decades, this interpretation seems fair however, states in the middle like Maharashtra and West Bengal with significantly high population size do not experience a very high death rate relative to states like Andhra Pradesh, Odisha and Madhya Pradesh.
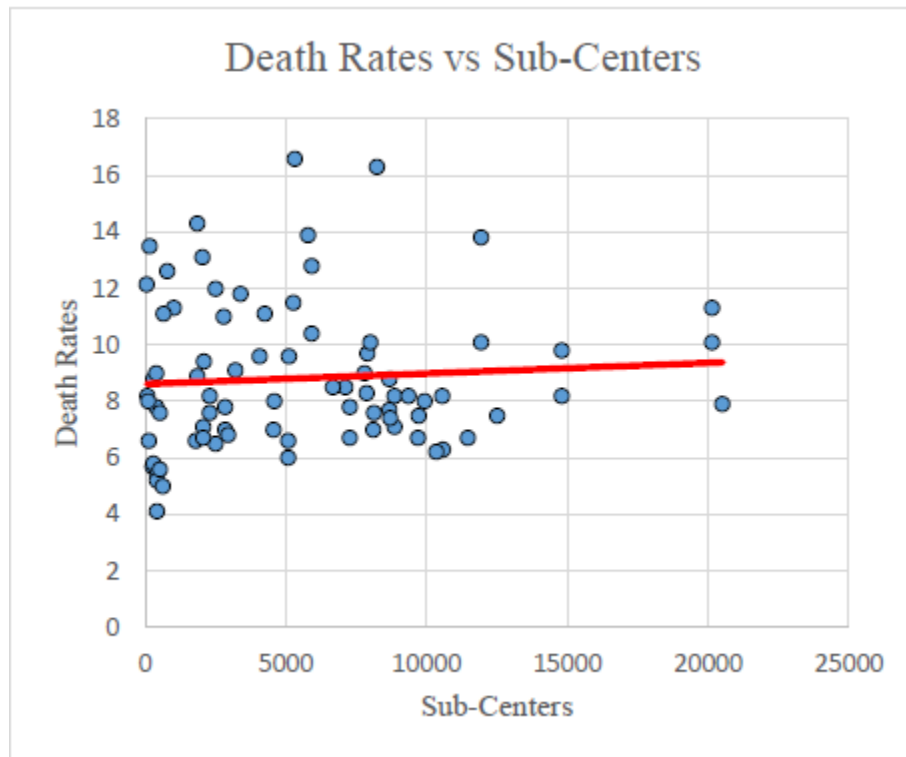
Figure 1(e) Relationship between Sub-Centres and Death Rate

Figure 1 (e) shows that Sub- Centres and Death Rate are positively related i.e. higher number of Sub-Centres in astate,, higher will be the Death Rate. The X-Axis represents the Number of Sub-Centres for all states for the 4 discrete years in absolute terms while the Y-Axis represents the death rate in terms of persons per thousandpeople.

Even though the figure shows an upward trend, the impact is not very drastic. Although the impact of Sub-Centres is highly significant w.r.t. Death Rate, the trend line is relatively flat. In the year 2011, states like Rajasthan (9926 Sub-Centres) and Maharashtra (9725Sub-Centres) follow the hypothesis and reduce the death rate with increase in number of Sub-Centres. However, highly populated states like Bihar (9696 sub-Centres) and Uttar Pradesh (20521 Sub-Centres) tend to have large number of Sub-Centres due to its increased population. However, the poor use of these services in these states leads to an increase in the death rate. These states, due to their high population, and hence a proportionate impact, offset the impact of Sub-Centres to a certain extent.
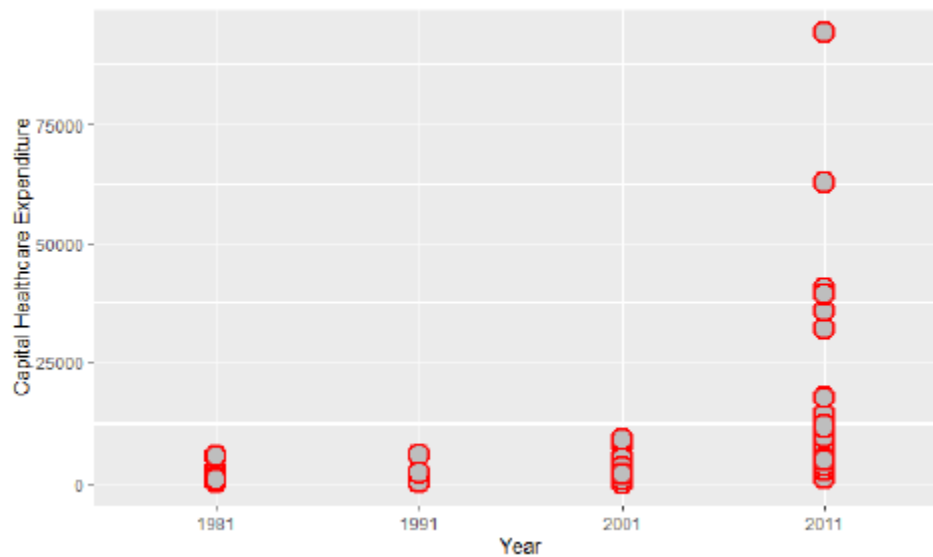
Figure 1(f) – Capital Health Expenditure trends in 1981, 1991, 2001, 2011

Figure 1 (f) shows the Capital Health Expenditure trends for the census years 1981, 1991, 2001 and 2011. The X-Axis represents the years and the Y-Axis represents the Capital Health Expenditure. The red points on the graph signify the position of the 20 states.

Even though Capital Health Expenditure has been increasing the past 4 decades, for the year 1981, 1991 and 2001, the increase has been very minimal hence, most of the states converge during these years and still have a Capital Health Expenditure of less than 25000 (Cr.) However, in the year 2011, we see a trend of divergence where states like Uttar Pradesh, West Bengal, Maharashtra, Bihar and Gujarat substantially increased their Capital Health Expenditure while sates like Assam, Tripura and Arunachal Pradesh still didn't invest much in infrastructural improvement activities making the impact of the variable insignificant in the study.

Figure 1 (g) shows the Sex Ratiotrends for the census years 1981, 1991, 2001 and 2011. The X-Axisrepresents the years and the Y- Axis represents the Number ofFemales per 1000 Males. The redpoints on the graph signify the position of the 20 states.
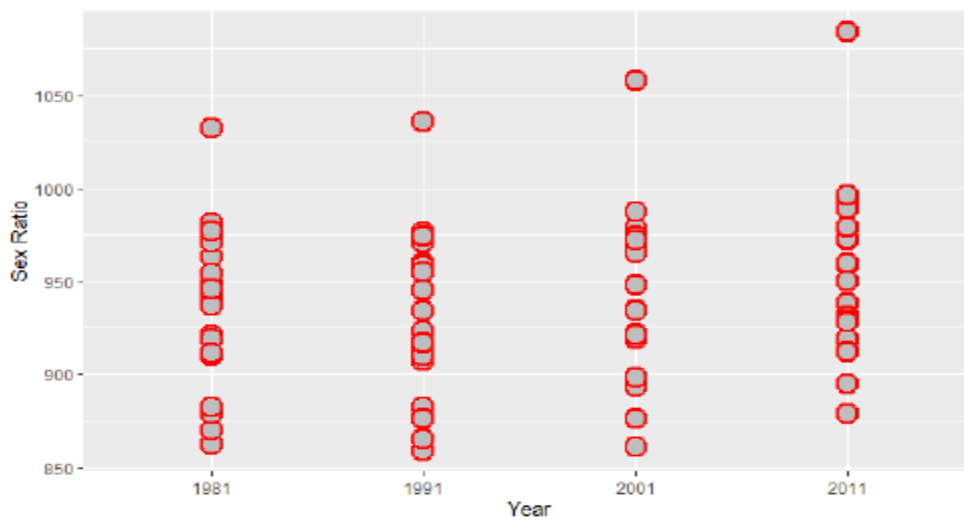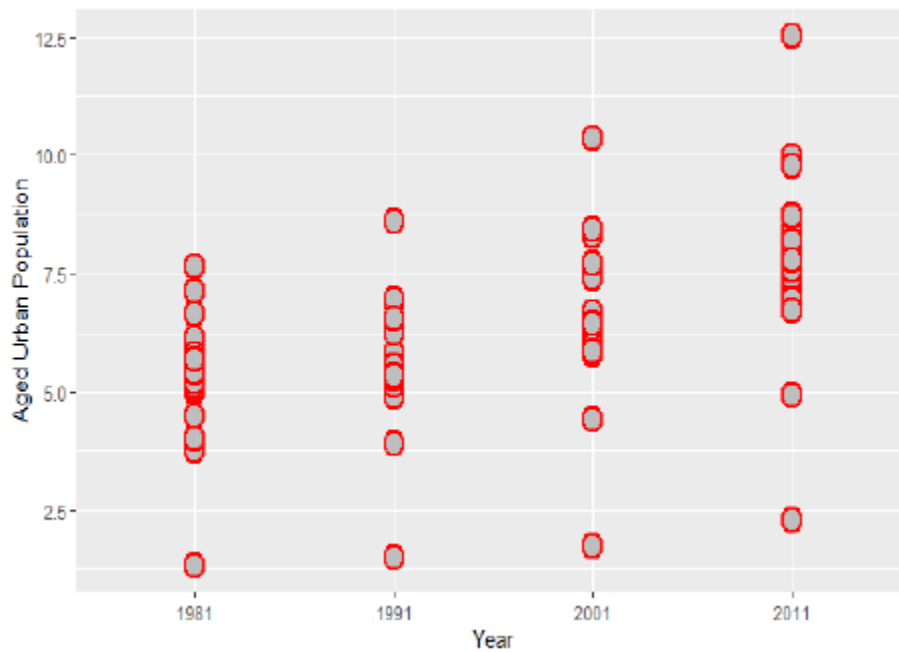
Figure 1(g) – Sex Ratio trends in 1981, 1991, 2001, 2011

The sex ratio has declined from 934 (as per 1981 census) to 927 (as per 1991 census) and has increased to 933 (as per 2001 census) and to 940 (as per 2011 census). Though the literature of the paper stated that with increase in literacy rate, sex ratio grows, however Kerala and Karnataka were the only state that supported this belief while all the and was way above the Nation average in all the 4 years (Kerala- 1031, 1036, 1058, 1084 & Karnataka- 963, 960, 965, 975) while all the other states are either close to the average value or way below it.

Figure 1(h) – Aged Rural Population trends in 1981, 1991, 2001, 2011

Figure 1 (h) and 1 (i) show the Aged Population (rural and urban) trends for the census years 1981, 1991, 2001 and 2011. The X-Axis represents the years and the Y-Axis represents the Aged Population.The red points on the graph signify the position of the 20 states.

Figure 1(i) – Aged Urban Population trends in 1981, 1991, 2001, 2011

It showed an increase in both the figures indicating that the population of Aged Individuals has been rising in both Urban and Rural parts of the states.

Assam has been at the bottom on the both the Urban and Rural population during the period of 4 decades indicating its in general, lower aged population in the state. On the other hand, Andhra Pradesh has had the highest rural population in the 4 decades (on an average) while Kerala has had the highest number of Urban Population on an average in the last 4 decades. Aged Urban have shown a divergence in their graph stating that the population size of Urban Population has been increasing on account of migration in order to look for better job opportunities, improving standard of living, etc.

Policy recommendations

For central and state government

- Health security needs to become a national and political priority. Improvement in

health expenditure is needed not only to accelerate and sustain the country's economic growth but also in terms of gaining recognition as a middle-income country with reduced levels of human deprivation and an increase in the standards of living. Hence, there is a need to focus on health equity in order to enhance human capabilities and advance the progress of Indian society over the next decade.

- In India, States like Kerala and Tamil Nadu are in a better position to benefit from the demographic changes arising to death rate changes. However, states like Bihar and Uttar Pradesh are highly populated with relatively low literacy rates. Hence, they are not able to engage in work that could improve their economic status. Due to this high heterogeneity, India needs to consider a combination of policies like investment in education and training, good governance, efficient infrastructure and well developed and competitive financial markets to catalyse and speed its demographic transition in order tocapture demographic dividend.

- The government should set benchmarks for healthcare and hospitals at various levels. It should catalyse the development of accreditation system oh health facilities in terms of equipment used in the public as well as private sectors. Such quality improvement shouldalso include non-clinical and support services.

- Management information system and accountability mechanism needs to be substantially improved in public health services so that health professionals take their task seriously and perform their functions adequately. In order to implement this, Management capacities in health systems needs to be improved at various levels through training and creation of new management positions.

- Health insurance sector should be promoted to subsidize the poor and lower socio-economic classes. Government should encourage the participation of NGOs like SEWA from minimum capital requirements.

- Funding of public health services needs a substantial increment to counteract the effects of chronic under-funding for the last several years. Non-salary component of healthcare expenditure, i.e. repair and renovation, medicines, equipment, communication and vehicleshould be significantly considered and attended.

Aid through Research and Academic Institutions

- Mio medical research organisations should keep improving the medical technology

of India. They could indigenize global technologies and make them available to the citizens of the country at low cost. These pharmaceutical initiatives should be followed by medical equipment and devices. Since WTO is emerging, bio-medical research is becoming a necessity and would give India a competitive advantage for attracting global research opportunities in the long run.

- Medical institutes should include new areas of clinical practices in order to respond to the rapidly changing health scenario of the country. These institutes should help build health systems which are responsive to community needs.

Role of Corporate Sector

- Corporate sector plays a significant role in building health systems in order to improve delivery of health services. It has the responsibility of serving economically weaker sections of the society (Corporate Social Responsibility). Other areas of CSR include, health check-up camps in remote and rural areas, tele-medicines, etc.

- They should also provide high quality health services at reasonable costs. It should develop mechanisms of cross subsidizing the poor through earnings from well-off sections of society (redistribution). By using the "bottom of pyramid" approach, corporate sector could make reasonable profit by serving the needs of poor.

- India's corporate sector has been rapidly strengthening and has a growing influence on government. Due to this, organisations such as CII and FICCI can play a significant role of advocating state and central governments to fulfil the needed changes in the policies and programmes.

- Regulatory reforms like enhancing the limit of Foreign Direct Investments (FDI) should become a matter of prime importance to stimulate private sector efforts in improving financial access to health care. Also, provision of tax incentives to employers and their families should be one of the priorities to promote use of health insurance which would in turn aid the growth of this sector.

Role of public private partnership

- Indian Health System is complex in nature due to the diversity in expectations and needs from a large heterogeneous population. This is because people belong to various socio- economic and cultural groups in terms of their locality, i.e. rural

or urban, age groups, income groups, etc. Therefore, there is no single agency that could satisfy and address the health needs of the society a whole. Hence, governments, corporate sectors, NGOs and other sectors of the society need to enter a mutually beneficial partnership to serve the health needs of the poor and lower income groups. These partnerships need to be well structured and open to independent assessment to ensure transparency and results.

Limitations and Future Scope of Study

- All the states could not be taken due to unavailability of data for these over the period oftime considered for the study.

- The behaviour of variables such as population and healthcare expenditure could have been different if data were more granular in terms of areas covered. For e.g., had we looked atcity-wise data rather than state-wise, we would have been able to get a better understanding of the impact of the variables. When data is aggregated for the state level the results get averaged out and it is impossible to look at which cities or regions have performed better or worse. Hence, it becomes difficult to identify which policy or area a state govt. should focus on.

- The period considered for each state starts from 1981 and ends on 2011 with a gap of a 10 years between each data point. In a long period of time such as this, the impact on the death rates could have occurred because of some other unobserved reasons or variables and the currently observed regression could be spurious. Hence, low frequency data is another limitation of the study.

- A lot more variables could be used as independent variables such as doctors per thousand people, dependency ratio, etc. Moreover, variables other than the death rate could also beconsidered as Y variable but due to data constraints they were left out.

- Factors like Per-Capita Income could not be included in the model because fixed effects approach cannot control for variables that vary over time. In order to avoid disparity in Random and Fixed Effects model, we excluded these variables. However, this variable could be included through the inclusion of dummies for time or space units. The use of dummy variables should be kept in check otherwise it could lead to increase of noise in the model and hence, over-dampening of the model.

Conclusion

Health is a matter of priority in the current times. Especially after the outbreak of Covid-19, individuals have started becoming more aware about their self-sanitation, environment sanitation and medical procedures. Realizing, how expensive health consulting can be should eventually lead to individuals thinking about planning their families in future in order to survive and at the same time being able to support the needs of every individual in the family.

Population is not in people's control at the micro level but it is something that the state government needs to interpret and change. Family planning has benefits over and above just the health benefits. Family planning norms should be implemented.

Public expenditure on health in India is both inefficient and inequitable. It is inefficient. Only 3.6% of India's GDP constitutes health expenditure in the country and so, doesn't benefit the majority of population. Public expenditure on preventive and basic health care accounts for a small proportion of the total health budget. Hence, allocation of budget for health sector needs to be increased in an adequate manner.

Quality matters more than quantity. A country, with a population of 136 Cr. individuals, even though working on the availability of hospitals to every state, every city-be it rural or urban, fails to focus on the quality of health benefits provided to individuals. Rural cities might have an increase in the number of health-centres, however, the facilities available aren't sufficient to fulfil the needs of individuals with serious health issues. The good quality of services itself doesn't attract people to get themselves treated for their diseases, they need to be aware and educated enough to approach critical help. They should be able to understand how not getting treated might have bigger costs than leaving their daily wage work and get proper help.

Apart from increasing expenditure, government needs to bring up policies to promote higher-education among individuals in both urban and rural for two reasons-

1. So people understand the value of health and,

2. Increase their survival rate since this would make them eligible for higher salaried jobs.

It might sound intuitive as to how a proper health policy should be developed in a poor countryor a developing nation and spend more on the vulnerable sections of the society. However, in reality, we need to look at more variables in determining what actually works. The availability of good health services is not enough. It should be accessible for individuals of the area. Poor

people should have close access so that they don't have to stay away from work for a very long time. Working on availability of health infrastructure is the need of the day.

Acknowledgements

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