

POPULATION HEALTH – AN ANTECEDENT TO ECONOMIC GROWTH

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***Abstract:** Today technology has brought in a paradigm shift in our lives. It has paved way to globalization, however, it has been pointed out that the benefits of globalization, has not penetrated down to the lower segment of the population. Research in the area of health economics has also reinforced that healthy population is a primary input to economic development. As quality of human capital is an important factor determining economic growth, it has become an issue of predominant importance across nations. In India, to enhance the quality of human capital, interventions have been designed, at national and state levels, to make 'healthcare' affordable, accessible and acceptable across the strata of population. However, the healthcare system in India is confronted by many challenges that deplete the effectiveness of the interventions implemented by the Government. The objective of this paper is to exhibit that population health is an antecedent to economic growth. The paper also tries to describe the health system in India, discuss the serious concerns encountering the health system and concludes by suggesting the key players in the health system to play an active role in enhancing population health, which would thereby trigger the economic growth of the nation.*

***Key Words:** economic growth, human capital, India, healthcare*

INTRODUCTION

Today technology has brought in a paradigm shift in our lives. It has paved way to globalization and has resulted into increase in sharing of ideas, culture, efficient production process and innovative technological break troughs. Even though globalization has resulted into serious benefits, critics have always questioned it. The primary grounds on which globalization has been criticised is that the benefits of globalization has failed to show colours at the base of the pyramid. It has also brought in challenges like environmental degradation, rise in disease incidence and its impact

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on life expectancy, quality of productive labour etc. The severity of these consequences is extremely high as all the factors contribute to effective utilization of resources thereby impairing economic growth of a nation. Nations across the globe have taken cognisance of this and have displayed their commitment by adopting the Millennium Development Goals (MDG) that was formulated at the Millennium Summit of the United Nations in September, 2000. The objective of the MDGs revolved around two prominent issues influencing nations across the globe. Namely, poverty reduction and improvement in the health care status of the population at the bottom of the pyramid. Three of the eight goals formulated relate to health, reduction in child mortality rates, improving maternal health outcomes and containing communicable & non-communicable diseases. The important issue to take cognisance of here is that these goals are not the end points in themselves. They are facilitators of a broader mission of achieving economic growth and development and reducing. That is, better health does not have to wait for an improved economy; measures to reduce the burden of disease, to give children healthy childhoods, to increase life expectancy will in themselves contribute to creating healthier economies. The objective of this paper is to exhibit that population health is an antecedent to economic development.

POPULATION HEALTH: AN ECONOMIC ENGINE

From time immemorial, health has always been considered as an important asset. The Millennium Poll report prepared by the Secretary General of the United Nations concluded that 'health' was consistently ranked number one among the things that people desired in life. Research in the area of health economics has also reinforced that healthy population is a primary input to economic development. Fogel (1994) observed the decline in mortality over the past 200 years in Europe and tried to associate two dimensions, namely calorie intake and economic growth rate. He concluded that if adequate calories had been provided to the bottom fifth of the population, it would have contributed to 0.11 per cent, annually, to the growth rate of UK between 1780 and 1980. A significant body of literature exhibits a strong association between dimensions health related and economic growth of a region. Barro (1997) proposed that a 10 per cent increase in life expectancy could increase the economic growth rate by 0.4 per cent, annually. Another line of enquiry by Nordhaus WD (2002) observed that half of the overall economic growth in the United States, during the previous century, could be attributed to be due to progress in population health. Murphy et al (2003) in his report titled 'Diminishing Returns? The Cost and Benefits of Improving Health', calculated the monetary worth of reducing mortality caused due to cancer and heart diseases. He opined that a ten per cent reduction in deaths due to heart disease was worth more than \$3trillion. He also concluded that a 1 per cent reduction in cancer mortality would worth \$400 billion to the present and future generations.

Traditionally, population health is considered to the outcome of growth process of a nation. It was opined that economic growth would lead to higher spending on health. Wealth undoubtedly leads to health but further introspection in required as

health is also an important factor determining the quality of human capital which further determines economic development.

Health of the human capital of a nation plays a pivotal role in its economic development. Research in the domain of health economics has repeatedly emphasised this view. In the words of Amartya Sen, 'health, like education is one of the most basic capabilities that gives value to human life'. This holds good both at macro and micro levels. The various dimensions of economic consequences population health are narrated below:

- **Quality of Human Capital and Economic Growth:** traditionally economic growth has been measured in terms of quantum of accumulation of physical capital. Since the 1990s, researchers have been trying to identify the determinants of economic growth. Lucas (1988) opined that skill, education and health of the human capital are the primary determinants of economic growth. He concluded that stock of human capital would continue to appreciate provided there is a continuous improvement in population's health status, education levels and they are exposed to better learning and training procedures. He stated that economic value of human capital is enhanced only if the quality of human capital is enhanced. Bloom et al (2004) also observed a strong linkage between health status, as measured by adult life expectancy, on economic growth rate. Knowles et al (1997) also derived a strong linkage between health status and productivity. In effect, these studies draw a strong relation between health and productivity.

In contrast to the above school of thought, Acemoglu et al (2003) argues that health difference across nations is not large enough to explain the income variations across countries. They (2007) further propose that "there is no evidence that large exogenous increase in life expectancy led to a significant increase in per capita economic growth". Hence a further debate is necessary to define the most appropriate measure of population health.

- **Preventive Health Programs and Economic Growth:** Health programs implemented by the Government have resulted into betterment of health conditions of the poorer sections of the society, thereby facilitating a balanced economic growth. A World Bank Report (1993) calculated the economic gain of implementing preventive healthcare programs by the state, at a global level. The report concluded that the near eradication of malaria between 1947 & 1977 had raised the national income by 9% in 1997. A cost benefit analysis revealed that malaria eradication program was implemented at a cost of \$52million over the past 30 years but had resulted into a cumulative gain of \$7.6 million national income. This clearly highlights that effective implementation of preventive health programs triggers a boost in the national income.
- **Health and Income:** Health is a significant basis of income, both at national and individual levels. It is observed that countries with a high prevalence of

life threatening disease have poor economic prospects. Gallup et al (2001) opined that countries where the incidence of malaria was higher, achieved an average growth rate of 0.4 per cent between 1965 and 1990 as compared to an average growth rate of 2.3 percent in other countries which experienced a low incidence of malaria. A World Health Organization(WHO) report (2005) titled 'Preventing Chronic Disease – A Vital investment' estimated that India had lost US \$ 9 billion in income due to diseases like heart diseases, stroke and diabetes, which were necessarily preventable by nature. Abegunde et al (2006) opined that deaths due to preventable chronic disease would adversely impact labour supplies and savings which would further deplete the national income. The WHO report also revealed that an increased investment in chronic disease prevention would result into prevention of 36 million premature deaths that would occur the subsequent ten years. These averted deaths would convert into substantial economic gains at the national level.

Bloom and Canning (2003) further emphasised that reduction of poverty at the national level would also help families to emerge out of poverty. Hence improvements in health will lead better income potential there by influencing the level of savings.

- **Health and Contribution to savings and investment:** Increase in longevity raises the length of retirement thereby necessitating an increased retirement fund. In order to facilitate sustained retirement income, individuals start saving higher during their productive age. Bloom *et al.* (2003) investigated the impact of increased longevity on national savings rate. They opined that a significant (ten years) rise in life expectancy raised the savings rate by four per cent points. A similar view is upheld by Lee *et al.* (2000) in their study on the Taiwanese population. Bloom *et al.* (2003) opined that East Asian countries had an average savings rate of 30 per cent, which was a key to East Asia's economic success.
- **Health, Income and Education:** There exists a strong correlation between the health status of the population, education and income. Psacharopoulos et al (2004) opined that an increase in 1 year of education would result into increased wages by 10 per cent. Healthier households would have more disposable income as they would incur lesser expenditure on health related issues. This would facilitate them to invest more in their children's education and upbringing. The effect of health on education becomes a vicious cycle. Hence this triangulating effect of health, income and education would have its roots embedded into the economic development of a nation.

HEALTH CARE EXPENDITURE AND HEALTH OUTCOMES

The developing countries are prone to a higher incidence of disease due to existence of communicable diseases, poor nutrition, unsanitary living conditions and poor access

to health care system. In developed economies, non-communicable diseases are prevalent. A report published by the Department of Chronic Disease and Health Promotion - World Health Organization in 2006 observed that 388 million people, worldwide, were projected to die due to chronic non communicable diseases. It was concluded that eighty per cent of these deaths would occur in low and middle income countries and among the productive demographic profile of the population. Since health is a prerequisite for economic growth, it brings to light the necessity of investing in healthcare at the macro and micro levels. The report also states that most of the causes of deaths are preventable in nature. This further necessitates economies to implement preventive healthcare interventions so as to shape the country's human capital into a productive one, thereby reducing the incidence of diseases. Thus preventive health care would be a vital investment for developing countries like India.

Table 1
Health care expenditure and health outcomes

	<i>Public Expenditure on Health % of GDP</i>	<i>Private Expenditure on Health % of GDP</i>	<i>Births attended by Skilled health personnel (%)</i>	<i>Loss due to inequality in life expectancy (%)</i>	<i>Life expectancy at Birth (years)</i>
High Human Development (sample)					
Australia	6.5	3.1	100	4.7	80.4
United States	7.1	8.5	99	6.6	77.4
United Kingdom	6.9	1.1	99	4.8	78.5
Medium Human Development (sample)					
China	1.9	2.9	97	13.5	72
India	1.1	4.1	43	32.3	62.9
Pakistan	0.8	1.8	31	27.1	63.6

*Source: WHO: Human Development Report – 2011 **Notes: GDP: Gross Domestic Product

It is worth mapping health care expenditure and health outcomes of select countries that are ranked at different level as per the Human Development Report published by WHO (2013).

India's government spend on health care is 1.1 per cent of its Gross Domestic Product (GDP) which in comparison to China is 1.9 per cent of its GDP. The developed economies spend on an average 6-7% of their GDP on health care. This indicates that private expenditure plays an important role in keeping the health system intact in India. Private expenditure constitutes of out of pocket expenditure by individuals and insurance schemes. The level of health insurance penetration in India is only eleven per cent which implies that most of the spending on health care is primarily done by individuals out of their disposable income. In India, the significance given to preventive health care spending is questionable as maximum health spending is done

by individuals themselves. In developed countries, the government plays a significant role as a provider of quality health care with a concurrently lower share of private health care expenditure.

The Human Development report published by WHO, in 2007-08 indicates that China has given more importance to preventive programs like vaccinations etc. The report revealed that most (86 per cent) of the infants below the age of one had been given preventive medication to fight diseases like measles, polio etc. In India, the coverage was lower (58 per cent). The factors that emerges as the precursor to the extent of coverage is the adult literacy rates in both countries. In India the adult literacy stands at a dismal 61 per cent in comparison to China, where 91 per cent of the adults are literate. In the industrialized economies almost 100 per cent of births have been attended by skilled medical personnel whereas in India the figure stands at 43 per cent.

Inaccessibility and non-utilization of health services by women are one of the primary reasons that contribute to maternal mortality, which is a sensitive indicator of the prevailing health conditions of women in a country. It can be observed that maternal mortality is also an indicator of underutilization of preventive health services by women. Available statistics reveal that maternal mortality in developing economies is higher than that in developed economies. According to a study by UNICEF conducted in 2008 on Maternal & New Born Health, 536,000 women died in 2005 from causes related to pregnancy and child birth. It is reported that South Asian region alone contributed 35% of the maternal deaths accounting to 187,000 deaths alone in 2005. Apart from the South Asian countries, it was the West & Central African region that accounted for 30 per cent of the maternal death worldwide in 2005. The unfortunate rider is that most of these deaths are preventable by nature.

Health outcomes like life expectancy at birth indicate the quality of human capital an economy holds. This measure of population health is not only dependent on the health care system –structure of health care service delivery, medical and allied health professionals, the techniques they employ, and the institutions that govern their access to and utilization. Such measures also depend on adoption of preventive behaviour at an individual level that affects an individual's health such as diet, exercise, smoking, and compliance with medical protocols. The health care system could be performing exceptionally well in identifying and administering treatment for various diseases, but a country could still have poor measured health if preventive health care practices are unusually deleterious. On comparing life expectancy at birth in developed and developing nations, it is clearly observed that developed nations have an average life expectancy at birth of 79 years where as the developing nations have a an average life expectancy at birth of 65 years. Dax Bermudez (2011) opined that an increase in per capita health care investments would enhance the life expectancy due to availability of better quality of health care services made available to population at large. Statistics given in table 1 reiterates that countries with higher healthcare spending, both private

and public, had significantly higher life expectancy of their human capital. Maciosek et al (2010) observed that adoption of preventive health services, both at individual and macro level, by a nation would avert the loss of more than two million productive life-years annually. Hence policy makers should pursue options that move the nation toward greater use of proven preventive services.

THE HEALTH CARE SYSTEM: AN INDIAN PERSPECTIVE

Today, India has witnessed significant advances in technology, education and research which have enabled her to be the focal point of discussion at various verticals. Much of the progress is strongly attributed to the development of human capital. On one hand population explosion in India is a critical issue that has to be addressed and on the other it is viewed as a blessing in disguise. The young, educated employed proportion of the population is offering dividends to the country, especially at a time when the world is concerned about the ageing population profile. However, a disparity has been observed across social strata, across gender with reference to health, education and employment. This disparity needs to be addressed immediately, failing which the dividend may turn into a demographic liability. A few statistics are worth mentioning:

Inequity in Healthcare spending

A WHO report (2004) on Disease and Injury Country revealed that India accounts for 18 per cent of the deaths and 20 per cent of disability adjusted life years (DALYs). A UNICEF (2009) study concluded India accounted to a fifth of maternal deaths and a quarter of child deaths in the world. The statistics published by WHO in 2010 indicated that the mortality rate among children below 5 years is 69 per 1000 live births, which outnumbered the average of Southeast Asia of 63 per 1000 live births.

The statistics conceal the wide disparity existing in India. The National Family Health Survey (NFHS) 2006-2007 revealed that the infant mortality rate was 82 per 1000 live births among the poorer sections of the society and the same figure stood at 34 deaths per 1000 live births in the affluent class. There also exist disparity across geography in India. The NFHS report also indicated that some states in India had better health indicators. Life expectancy at birth in Madhya Pradesh was 56 years, in contrast to 74 years in Kerala. This disparity can be mainly attributed to the social, political and economic circumstances prevailing in the state. One more reason that could have caused this disparity is the low priority given by the state Government to social sectors, like health and education in particular, in terms of allocation of resources. India allocates only 1 percent of its Gross Domestic Product (GDP) to health, in comparison to developed countries like Australia and United States investing 6 percent on an average. A wide discrepancy is observed on the amount invested by individual states. Rao *et al.* (2005) opined that states like Gujrat, Haryana spent only 3.5 per cent of their budget on health whereas states like Rajasthan and Tamil Nadu spent an average of 5 per cent of their budget on health in comparison to the national average

of 4.97 percent. The study also concluded that the healthcare spending by states was declining over a period of time. They indicated that in 1985 – 86 all states spent 7.02 percent of health which has declined to 4.97 percent in 2003-2004.

Dependency on private spending on healthcare

India might be growing at a rate equitable to the other BRICS economies but the proportion of public expenditure on healthcare is far below comparison. A study undertaken up by the World Bank revealed that among the comparable BRICS nations, which have similar socio, political and economic influence in the globe. This study compared public healthcare spending between the period of 2004-2009 across BRICS, and it concluded that India spent the least among the nations. India, on an average spent one percent of 0.936 percent of its total expenditure on healthcare in comparison to the other nations in BRICS, who spent an average of 3 per cent of their total expenses on healthcare. The difference is even more disheartening, when these figures are analysed keeping the population growth rate in the back drop. Population over the same period, grew at a rate of 1.36 per cent in India, where as the population growth rate is only 0.7 per cent for BRICS group as a whole.

As the public health expenditure is low, the nation as a whole largely depend on private expenditure to meet their healthcare expenses Rao *et al.* (2005) opined that 72 per cent of the healthcare expenses in India is funded by the private sector. Out of this 68 per cent is funded by out of pocket expenses of the households. The results clearly indicate the strong dependence India has on out of pocket expenditure to cover the healthcare expenses. The study also concluded that government spending on healthcare amounted to only a meager 23.8 per cent, and the rest was funded by NGOs and external funds.

Table 2
Health Care Spending in India

	Private		Government			Public		NGO s	External Funds
	House-holds	Private Firms	Centre	State	Local	Firms	Banks		
Health Spending	68.8%	3%	7.2%	14.4%	2.2%	3%	0.2%	0.3%	2%
Total	71.8%	23.8%	3.2%	0.3%	2%				

Source: Rao *et al.* (2005).

Even though 'Health' of human capital has been acknowledged as an integral factor determining growth of a nation, it does not rank high on the Indian priority list. The poor state of healthcare in India is the reflection of this. However, India's National Commission for Macroeconomics and Health (NCMH – GOI 2005b) proposed an increase in Government spending on health to 2.5-3 per cent of GDP. Taking a step in this direction, the Planning Commission, under the Prime Minister's office, has been

directed to increase the funding for healthcare in the 12Five Year Plan on universal healthcare coverage initiatives like National Rural Health Mission(NRHM) etc.

The Urban Rural Divide

In India's 65 years of post-independence era, several developmental programs have been implemented, but still around 62 per cent of the population continue to live in the rural areas. There exists a rural-urban gap in healthcare care indicators (Challenges like malnutrition are still to be addressed totally in rural India and the JhilaM Rudra De (2008). IMR (74:44 /1000 live births), births attended by trained health personnel (35: 73 per cent), number of doctors (0.6:3.4 / 1000 population) are a new health indicators that reiterate the divide

Poor access to primary and preventive health care services

A Government of India Report on Universal Health Coverage for India(2011) opined that one of the important factors hindering the improvement of health indicators in India is the fact that majority of the population have poor access to primary and preventive health care services. This is evidenced by the fact that India's births attended by skilled health personnel rank among the worst in the world (Table 1).

Inadequate preventive health care services results in high incidence of deaths from communicable diseases. A WHO report on Global Burden of Diseases, published in 2008, revealed that of the total number of deaths in a sample of 192 countries across the world, India accounted for nearly one fourth of the deaths due to diarrhea, more than a third of the deaths due to childhood cluster diseases (many of which are preventable by basic immunization), more than a third of the deaths due to Leprosy, more than half the deaths due to Japanese Encephalitis and about 30 percent of the deaths due to prenatal conditions. The burden of diseases is more prevalent in rural India than urban India. Park (2000) observed that most of rural deaths, which are preventable, are due to infections and communicable, parasitic and respiratory diseases. Infectious diseases dominate the morbidity pattern in rural areas (40 per cent rural: 23.5 per cent urban). Waterborne infections, which account for about 80 per cent of sickness in India, make every fourth person dying of such diseases in the world, an Indian. This statistics throws light of the extent access the population has to primary healthcare services which further reflects on the utilization of preventive healthcare services.

Public Health Infrastructure

One of the prime factors that reflect on the Indian healthcare system is the availability of public health infrastructure. The public health facilities are ailing due to their poor infrastructural setup and lack of manpower. The Census report 2011 revealed that, there is a tenfold difference in availability of qualified doctors between rural and urban areas i.e.: one qualified doctor per 8,335 people in rural area visa VI one doctor per 885

people in urban area. This vast gap in the healthcare system, highlights the emergent need to address the scarcity, failing which the effectiveness of the Government interventions in the healthcare system can be questioned.

Health Insurance

Healthcare, in India, is financed predominantly by Private sources and the Government spending on healthcare accounts only to a meager 23.8 per cent (Table 2). Chollet *et al.* (1997) opined that health care financing as a percentage of GDP is only 1 per cent in comparison to other middle income countries who spent almost three per cent of GDP on healthcare. They opined that the current proportion of healthcare spending by the state is not sufficient as India ranked high on burden of disease. As a result majority of the Indian population resorted to out of pocket expenses to finance their healthcare needs. Gumber 1997, Visaria & Gumber 1994 opined that out of pocket expenses incurred by the poor in India lead them to a poverty trap as they are more susceptible to diseases. A study by the World Bank (2002) concluded that majority of the Indians fell into the poverty trap due to medical expenses incurred them on event of hospitalization. The report stated that 40 percent of the Indians who are hospitalized borrow money or sell their assets to cover the cost of healthcare and the Indian population, on hospitalization, spend more than half of their total annual expenditure on healthcare. The above scenario leads to inequity in health insurance coverage. Anita J opined that only 15% of India's 1.1 billion people are covered through health insurance, and most of it is government employees. The poor quantize of population, who are the neediest of health insurance, are not covered by a health insurance package. This phenomenon occurs as they are not in a position to afford the expenses incurred in health insurance.

Managerial Lacuna in Government interventions

Since Independence, several measures have been initiated by the Central Government to improve the status of healthcare in the country. Prominent among these programs are: the programs launched by the Centre and State Governments aimed to control or eradicate communicable diseases, programs aimed to improve the environment sanitation and programs targeted to improve the health of the rural populace of the country. One such initiative that has been acknowledged worldwide is the National Rural Health Mission Program (NRHM). This program was launched with an objective of providing comprehensive primary healthcare service to the poor and the vulnerable population. It provides financial assistance to access primary healthcare service there by making the system affordable (Janani Suraksha Yojana), it facilitates acceptability through the trained healthcare staff (Accredited Social Health Activist network) and it also enhances the availability of health infrastructure for health delivery. Even though NRHM is conceptualised in a magnificent manner, it encounters several hurdles in the implementation phase, due to which the effectiveness of the initiative. Firstly, the cash transfer process to the beneficiary of the programs and the ASHA workers is not

clearly drafted. Information about the exact quantum and the process for the payment of the money is by no means clear - both to the community, and even to some health care providers. This reduces the efficacy of the NRHM program and does not sufficiently incentivise the rural population to access primary healthcare services. The other factor that determines the success of the program is the availability of health care personnel. DeokiNandan *et al.* (2008) opined that one of the major bottle necks in successful implementation of Government programs, in India, is lack of adequate number of healthcare personnel, specifically female, in the public health system. Thirdly, provision and availability of required logistics is an important issue for success of any programme. It is observed that the public health system in India does not provide the required medicine, infrastructure and support at the required place at the required time. The absence of required infrastructure and medicines fails to enable the existing health personnel to deliver quality service.

RECOMMENDATIONS AND POLICY IMPLICATIONS

Based on the above analysis, the authors conclude that population health is instrumental in economic growth and development of a region. A holistic analysis of the Indian health care system clearly indicates the lack of focus on health by the state and the repelling effects disposal income at the individual level. The authors present the following recommendation to different stakeholders in the health care sector:

1. Central and State Governments

- **Bottom-UP Management Approach:** Given the difference in environmental forces operating in different regions on India, the national programs aimed at improving health outcomes should develop different strategies to suit the topography of the region. It is further reiterated that the district level health officers should be involved in the designing and implementation of interventions rather than only in the implementation phase. This will not only add value to the implementation process but will facilitate implementation with ownership and responsibility.
- **Strengthening the Human resource and Public Health Infrastructure:** Secondary data suggest that the public health infrastructure and strength of health professionals serving the public health system are incongruent with the total population of the country. The NRHM program initiated a strategy to appoint an additional ANM at every sub-centre which could ensure institutional deliveries. However, according to the health facility report compiled by the Ministry of Health and Family Welfare, almost seventy per cent of the sub centres in India lacked the basic facility of tap water, in the absence of which it is impossible to conduct deliveries. According to the Indian Census report, 2011, doctor population ratio in rural areas of India stands at one doctor per 18,335 people, which is far below the national and international standards. Therefore, one objective of health reforms should be

to improve the public health system in terms of infrastructure and human resource.

- **The Accessibility Challenge:** In rural areas, the biggest challenge is accessibility to the health care facility due to which health service utilization rates are hampered. Poor accessibility could be due to poor roads or poor quality of transportation facility to the health centre. If effective transportation facility is not made available to the rural population, the efforts channelized by the community health workers in promoting use of health facility would not be fruitful.
- **Information Education and Communication (IEC) Programs:** Literacy is acknowledged as one of the primary factor that determines health seeking behaviour. Government has passed legislations making education compulsory till the age of 14 years in India. However, the benefits of this strategy would be reaped through time. But to tackle the problem of poor health literacy information, education and communication strategies have to be implemented. IEC programs need to be designed to suit the needs of the local population thereby facilitating higher effectiveness. The ASHA workers and ANM's can play an instrumental role in enhancing the effectiveness of the IEC programs. Such initiatives should also be targeted to the community at large with an objective of creating awareness on the need and benefits of utilizing formalised healthcare.
- **Persuasive IT:** It is observed that integrating information technology and IEC programs had a better impact on maternal outcomes than using the traditional method of persuasion (visual aids and interaction) by the ASHA workers. The use of videos on mobile phones by ASHA workers for maternal health promotion has resulted in enhancing knowledge of the ASHA worker and the community at large (Ramachandran D. *et al.*, 2010). The authors opines that the use of digital presentation of health messages is more effective among population with lower literacy levels. The authors have also concluded that ASHA worker used videos created by them locally, instead of the standardized videos prepared by the project implementing authorities. Hence it can be concluded that Persuasive IT is an integral route that can be implemented to strengthen maternal health outcomes. However, implementing Persuasive IT in maternal care promotion is in the infant stage in India as this needs to be supported by technology and financial assistance. This gap can be bridged by implementing and monitoring such projects at the District level. Health Department can take up the mandate of implementing localized Persuasive IT programs by generating standard videos that are area specific, so as to enhance receptivity of videos in the community. Focus in implementing Persuasive IT should be on creating the audio-visual messages, upgrading skills of ASHA workers to use this technology and monitoring the implementation of the Persuasive IT tools by ASHA workers by documenting the same.

- **Role of Non-Government Organizations:** The NRHM program, the flagship initiative of the United Progressive Alliance, aims at making quality healthcare affordable and accessible to the vulnerable sections of population. Funds required to implement the NRHM initiatives are allotted by the State as well as the National Government. At a state level, funds are prioritized and allotted to districts by their level of backwardness. On a closer examination of per capita funds allocation, it is observed that, there is an incongruity in per capita health expenditure and health index rank value of the districts (K. Gayithri, 2012). Districts with a higher rank in the health index have been apportioned a bigger proportion of the total budget and the needy districts, lower on the health index, are apportioned a lower share. This brings to light a discord between planning and implementation. The above inquiry indicates a need not to only enhance funding but also to improve expenditure planning by the authorities concerned to achieve the targets. On the funds utilization front, it is observed that funds allotted are not commensurately utilized. There is a sharp decline in the proportion of funds utilized by various districts across the development continuum. The pattern of fund allocation and expenditure reveal an injustice to the core object of NRHM i.e. narrowing down the regional variations. In order to achieve the vision of NRHM program, evidence based approach has to be adopted while planning and implementing the NRHM programs to ensure the gap. The Government authorities could involve the Non-Government Organizations to induce professional scientific approach to the planning and implementation process which will enable them adopt a need based, focused fund allocation and utilization mechanism. NGO's could be involved in conceiving, developing and implementing strategies to meet the needs of the local situations but are based on grounded core principles that could ensure political backing and support from all stakeholders.
2. **Public Private Partnership (PPP) Approach:** The Government can partner with the private sector to make healthcare affordable and accessible to the vulnerable population. Successful PPP models like resource sharing mechanisms and insurance have been implemented in India. The Government has to design policy changes in such a manner that a PPP approach appeals to the private sector. This approach will add a new dimension of making healthcare accessible and affordable to the rural population at large. Corporate hospitals can implement telemedicine initiative to overcome the distance barrier and make expertise care reach the vulnerable rural population.
 3. **Corporate Sector:** the efforts of the government could be strengthened by the intervention of corporate sector. As a corporate social responsibility initiative, corporate houses should play a more visible role in filling gaps of the healthcare system, in fields of health insurance and health service delivery & promotion. It is worth noting the 'bottom of the pyramid' model adopted by Dr. Devi Shetty in his

healthcare venture, Narayana Health. His notable contribution has proved the profitable nature of the BOP model adopted.

4. **Active role of Researchers and Academicians:** The medical academic fraternity should contribute their part in the field of quality of service delivery, health literacy and promotion, and design, implementation and management of health care interventions. The contribution of Manipal University, Manipal, located in Karnataka, India, is noteworthy of praise. The active role of the university in offering quality health care service to the vulnerable segment of the population is remarkable. The efforts of the university is not only restricted to healthcare service delivery, but extends to partnering with non-profit organisations in implementing health literacy and promotion programs. The university also partners in funded projects by UNICEF and WHO in sound management of the health systems. Similarly, research institutions and academicians could play a more active role in building a stronger health system which are more responsive to the community needs.

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