Chapter – V

Conclusion and Recommendation
Chapter V

SUMMARY AND CONCLUSIONS

The present study entitled “An Inter-State Study of Maternal and Child Healthcare in India”. Maternal and child health is a ‘productive asset’ that affects economic development significantly. It is among the basic human needs and an integral part of human welfare.

The objectives of the study are: to study the inter-state diversity in primary healthcare in India and its states, to study the effect of maternal and child healthcare on health status, to analyze the performance of maternal and child healthcare variables, and to analyze the effect of economic growth on health.

In order to consummate our objectives certain methods have been used in the study. Descriptive measures, such as Compound annual growth rate (CAGR), Mean, Standard Deviation (S.D.), and percentage have been used to analyze the inter-state diversity in primary healthcare, and to examine critically the maternal and child health profile in India and its selected states. The effect of maternal and child healthcare on health status is analyzed through the simple correlation coefficient. T-test have been used to analyze the performance of maternal and childcare variables. Simple linear regression is used to find out the effect of maternal health on child healthcare in India and its states. Granger Causality test have been used to analyse the effect of economic growth on health and vice-versa.

The inter-state diversity in the primary healthcare system in India and its states is due to the variations in access to healthcare infrastructure and availability of healthcare personnel. Diversity in primary healthcare depends upon the healthcare utilization, health status, and quality of healthcare resources.

Global diversity in health care between 10 selected countries, five from the developing world and five from the developed world is found with respect to health expenditure, public health expenditure, and health status (LEB, MMR, and IMR). In terms of health expenditure either as the share of GDP and/or public health expenditure, developed countries perform better than the developing countries. Total health expenditure per capita in the developing countries is less than 1000 $ while in
developed countries it is more than 3000 $. Total health expenditure at the average exchange rate in India was just 58 $ in 2012 while in Brazil it is 1078 $ followed by Russia 913 $, South Africa 651 $, and China 322 $. Health expenditure as a percentage of GDP in 2012 in India was only 3.8 percent followed by China 5.4, Russia 6.5, South Africa 8.9, and Brazil 9.5 percent. Public health expenditure is again lower in India as compared to other selected developing countries. In India, public health expenditure as percent of total health expenditure in 2012 was only 30.5 percent, while the highest among developing countries was obtained in China at 56 percent.

Health expenditure in selected developed and developing countries is significantly higher than India. Total health expenditure (public + private) as a percentage of GDP in U.S.A. was 17 percent which was more than four times as compared to India (3.8 percent). Public health expenditure as % of total health expenditure in selected developed countries is also much higher than in selected developing countries. In India, public health expenditure accounts for only 30.5 percent of total health expenditure while for UK, USA, and France percentage obtained were 84, 47, and 77.4. Health status in developing countries is also very poor. Maternal mortality rate is significantly higher in developing countries recorded almost in three digit number whereas it is in the single digit number in the developed countries. India recorded 190 MMR per 100000 live births in 2012 whereas for the UK, Germany, and France it was recorded at 8, 7 and 9 respectively.

India has performed very poorly in terms of child healthcare. Among the selected developing countries India has the highest burden of infant death. IMR in India was 41.1 percent per thousand live births per year in 2012 while for Brazil, China, and South Africa, it was 12.3, 10.9, 8.6, 32.8 respectively. IMR for selected developed countries is within the single digit number. The infant mortality rate for the USA was 5.9, UK 3.9, Germany 3.2, France 3.5, and Japan 2.1 per thousand live births. Life expectancy at birth in almost all the developing countries is less than 75 years while for the developed countries it is more than 80 years except USA (79) and Japan (74). India has the lowest life expectancy among all the selected developing countries except South Africa (60 years). LEB in India was only 66 years in 2012 whereas in Brazil and China LEB is 75 years. Among the developing countries, Russia has
performed very well in healthcare and all the healthcare indicators such as public health expenditure, LEB, MMR, and IMR are near to the developed countries.

The inter-state disparity in primary healthcare in India is also very diverse because of underutilization of healthcare resources. India with 16 percent of world population accounts for almost 30 percent of the infant and child death in the world. The three-tier public healthcare system consists of SCs, PHCs and CHCs has grown rather slowly. The CAGR for SCs is 0.01 percent, for PHCs is also 0.01 percent, community healthcare centers recorded the highest CAGR between 1990 to 2015 i.e. 0.04 percent. Rural people mainly depends upon the primary health care or we can say that Primary health care centers are the main healthcare seeking resource than any other supporting healthcare center. If we consider the percentage of average population coverage as a measure of inter-state diversity then in the selected states the diversity is very high.

Only four states namely Gujarat, Kerala, Rajasthan and Tamil Nadu have less than minimum population norm coverage because these are the developed states and have a high living standard, high literacy level, and per-capita income except Rajasthan where per-capita income is below the national average of per-capita income. People go to the secondary and tertiary healthcare for follow-up and continued treatment and the primary healthcare facilities remain under-utilized. As a result, secondary and tertiary healthcare centers become overused leading to poor quality services (Ministry of Health and Family Welfare, Report, Kerala, 2016)."

Rajasthan has started privatization of public healthcare system (Pachauli C. & Gupta N., 2015). Per capita income of Rajasthan ($ 5,193.57 at PPP USD) is below the national average of per capita income ($5855.31 at PPP USD). People in Rajasthan are not really rich and not so poor, who are just as reluctant to use the public healthcare system as anyone else, who are extremely poor (Duflo E. et.al., 2004). Consequently, public healthcare system remains under-utilized and the healthcare facilities are not overburdened in the state. This is the reason why the states are lagging behind in terms of health standard.

In Tamil Nadu, though the public healthcare infrastructure has been fairly satisfactory (Krishnan, 1994) and has free or low-cost provision of healthcare services, utilization of private healthcare services are high even among those who falls below the poverty
line because the public healthcare system does not adequately fulfil the needs of the masses.

Two states namely Orissa and Punjab fulfill the prescribed norms of PHCs. Andhra Pradesh and Karnataka cater to a lower population than the fixed norm of SCs. Apart from these states, some states are those where average population coverage is above the fixed norm of population coverage such as Assam, Bihar, Madhya Pradesh, Maharashtra, Uttar Pradesh and West Bengal.

Some of the highly populated and poor states failed to fulfill the prescribed norm of population coverage by public healthcare infrastructure, because of higher population growth rate than the expansion of healthcare infrastructure. Thus the limited healthcare centers get over-burdened. Consequently, the health standard of these states deprived.

The huge shortfall of total health specialists such as Surgeons, Obstetricians/ Gynecologists, Paediatricians at CHCs looks Blur which presents the actual availability of doctors against the requirement. The gap between requirement of doctors and their availability is significantly large. The large shortfall at the level of CHCs is the biggest hurdle of Indian primary healthcare system which has forced the people to look for private healthcare personnels. The existence of shortfall may be due to the non-availability of doctors’ especially specialized doctors, financial constraints of the state government etc.

Average shortfall of health specialists during 2005-2015 varied between states. The highest mean value was obtained for Uttar Pradesh (1023.4), Maharashtra (619), and Rajasthan (504.5). Standard deviation value also varies from one state to another state. The states of Uttar Pradesh (592.8) have the highest S.D. value followed by Kerala (339.1), West- Bengal (283.0) and Maharashtra (274.4). The lowest S.D. value has been observed in the states of Gujarat (13.5), Haryana (16.3) and Bihar (28.6).

India is a big country and has distinct regional features. Every state has a unique quality in comparison to other states. The general economic and social profile of each state is reflected by and large from the living standards and health standards of the concerned states. The comparative statistics reveals that there is widespread disparity even within the states. Among the states Kerala, Tamil Nadu, Andhra Pradesh etc. are
performing better than the states of Uttar Pradesh, Bihar, and Madhya Pradesh etc. There are huge disparities in terms of infant, child and maternal mortality in the major Indian states. This is so because in states like Andhra Pradesh, Kerala, and Tamil Nadu the public healthcare infrastructure and healthcare facilities are well established than in states of Uttar Pradesh, Bihar, and Madhya Pradesh. Lack of infrastructure and healthcare facilities make poor states poorer in terms of health standard.

The study reveals that the maternal and child health profile is poor in the country, as well as in the international perspective. The southern states have immense human resource capital, higher living standard, advanced technical know-how etc. but in northern states, illiteracy and lower living standard are still prevalent. India faces more healthcare burden than Developed as well as developing countries namely Sri Lanka, Brazil, and South Africa etc. India stands in the queue of the poor countries like Bangladesh and Nepal in many healthcare aspects. It is clear that this is so because more than one-third BPL population stands at the starvation line and the remaining proportion of the population is not able to bear the huge medical expenses and thus always remains in the grip of poor health. The situation becomes more severe due to government's passivity to this crucial sector. The government's passivity is reflected in public healthcare expenditure which is only 1.4 percent of total GDP. Consequently, the country experiences lack of healthcare infrastructure, healthcare facilities, healthcare manpower etc. which manifests itself in low life expectancy at birth, and high maternal mortality rate, infant mortality rate, child mortality rate, low nutritional value, etc.

On the antenatal care (ANC) front also, there is great variation within the states. Despite the high emphasis on ANC by the government, during 2012-13 (RSoC) only 85.2 percent of pregnant women have any antenatal care visit in India. DLHS-2 reveals that any ANC visit in India was 73.6 percent which was increased to 75.2 during DLHS-3. The percentage of women who receive any ANC during pregnancy period is quite low in India as well as in its states. Kerala ranked first among all the major states in utilization of any ANC during pregnancy. In Kerala highest percentage of women received any ANC at 96.2 percent. Women education plays a key role in the utilization of maternal health care services, thus the states where the education level is higher the use of ANC is also higher. The national average for women having any ANC during pregnancy was 90.3 percent in urban areas while it was only 83.0
percent in rural areas. Utilization of any ANC in urban areas is almost universal in the states of Tamil Nadu (98.3%), Kerala (97.1%), and West Bengal (96.8%). Utilization of any ANC in rural areas is highest in the states of West Bengal (99.0%) followed by Tamil Nadu (98.0%).

Place of delivery is an important factor that plays a crucial role in maternal and child health. India still has 30 percent of home deliveries conducted by traditional healthcare personnel called "Dai". The deliveries assisted by "Dai" or other female members of the family, is conducted in the most unhygienic conditions involving a high risk of infection which can cause death of mother and child as well. The problem of institutional deliveries is more in rural areas as compared to urban areas. In rural areas, no perfect referral system is available at nearby places, and pregnant women have to go long distances for seeking healthcare. The nearby health centers are less equipped with the shortfall of healthcare personnel, and necessary healthcare infrastructure. The problem is compounded with poor transport facilities ('kutcha' roads) to health centers. Rural Uttar Pradesh has only 16 percent institutional deliveries which increased to 22.1 percent during DLHS-3 and 67 percent in during RSoC (2012-13). A subsequent increase has been seen in the percentage of institutional deliveries in rural Uttar Pradesh in 2013-14, the percentage increased to 67.7 percent. Kerala is the state where the highest percentage of institutional deliveries has been recorded since the beginning of health surveys. Kerala had 100 percent institutional deliveries in 2013-14 up from 97.1 percent during DLHS-2 Survey.

Care after birth or post-natal care is also very significant for mother and child. The first 48 hours after birth is very sensitive to many infectious diseases. In India, generally, people ignore the importance of post natal care (PNC) even when delivery take place in healthcare centers. Post-delivery women, prefer to go home as early as possible. The reason behind this is the unhygienic condition that prevails at the public healthcare centers. Post natal care (PNC) the basic care for all newborn includes curative and primitive healthcare; promotes early and exclusive breastfeeding, keeping the newborn warm, providing safe and hygienic umbilical cord and counseling when to take newborn to the healthcare center. Despite the effective support of the government and steps to control the maternal and newborn deaths within the first 24 hours after birth, during RSoC (2012-13) only 39.3 percent of
newborns and mothers received postnatal care after 24 hours of delivery. While most of the major states showed a reduction in the percentage of PNC but it had risen in the states of Andhra Pradesh and Maharashtra. From 73.3 (12 hours) and 64.1 (24 hours), in Andhra Pradesh PNC rose to 77.9 (12 hours) and 79.9 (24 hours). In Maharashtra, the PNC within 12 hours of delivery increased from (64.0) to (65.2) and from (58.7) to (77.1) for those who have received PNC before 24 hours after birth. The highest PNC (within 12 hours) in 2013-14 were in the states of Maharashtra (65.2) followed by Tamil Nadu (58.7) and the lowest PNC were in the states of Assam (6.7) followed by West Bengal (9.1), likewise the highest PNC within 24 hours after delivery was in the states of Tamil Nadu (94.7) followed by Kerala (94.0) and for lowest PNC Bihar (6.4) Leads all the states followed by Assam (7.0) and West Bengal (9.1).

Child health is no exception to this pathetic condition of healthcare. Women and children are the most neglected section of the society. Though the rate of infant deaths have been declining over the years yet it is very low compared to developed countries. The highest compound annual rate of decline in IMR is found in the states of Tamil Nadu. From 76 per 1000 live births in 1987, it comes down to 21 per thousand live births in 2013, with a CAGR of -0.05 percent, followed by the states of Maharashtra and Gujarat both have a CAGR of -0.04 percent respectively. The lowest reduction is found in the state of Assam. In 1987 Assam has 102 IMR; it come to 54 per 1000 live births in 2013. Assam has -0.02 percent compound annual growth rate (CAGR) which is lowest among all the selected major states. It is well-known fact that mother's education, higher birth interval, higher maternal age at birth, ante-natal care, breastfeeding, and access to proper medical care play a vital role in determining the child survival rate especially of infants (India Infrastructure Report, 2006).

IMR (Infant mortality rate) is higher in rural areas of the selected states compared to urban areas. In some states, there have been significant improvements in the infant's survival rate between 2005-2012. The rate of reduction in infant's deaths calculated by compound annual growth rate is higher in urban areas (-0.044%) compared to rural areas (-0.040%). As the World Development Report 2004 has pointed out that if the health services are delivered well, it will improve health outcomes for even the poorest groups. In 2012, rural IMR was 46 percent per thousand live births against the 28 percent urban IMR. The causal factor of this gap is that the urban women have better education facilities, healthcare facilities as well as easily accessible healthcare
centers etc. Among the better performing states in terms of rural IMR is Kerala. Kerala has IMR of 13 per thousand live births in rural areas and 9 percent per 1000 live births in urban areas. Other states like Tamil Nadu (24), Maharashtra (30), and Punjab (30) also performed better in rural areas.

Rural areas accounted for 0.60 percent reduction in neonatal mortality (NNM) while urban areas accounted for only 0.50 percent between 1991-2012. The rural NNM reduces from 55 per thousand in 1991 to 33 per 1000 live births in 2012, likewise, urban NNM fell to only 16 percent per thousand live births in 2012 from 32 per 1000 live births in 1990's. The Average Annual Growth Rate (AAGR) of reduction of NNM was only modest at around -1.961 percent in the period from 1991-2012. Neonatal mortality is the most sensitive among the child mortality indicators. The neonatal deaths contribute a larger portion in infant mortality and under-five mortality of the country. Thus, to achieve our targets of reducing IMR and U5MR we have to ensure a significant reduction in neonatal mortality. India accounted for 29 percent NNM per thousand live births in 2012. Almost 70 percent of infant die in their neonatal period and more than half of under-five mortality in the country falls in the neonatal period.

Child mortality is defined as the death of the child before completing 4 years of his/her life per thousand live births. Most of the child deaths were reported in the states of Madhya Pradesh, Uttar Pradesh, Assam, Rajasthan, and Bihar. These states are also marked by some of the highest poor people and illiterate people in India. Southern states have very low percentage of child mortality in comparison to northern states. The ranks of developed states (Kerala, Tamil Nadu, Andhra Pradesh, and Karnataka) in terms of child mortality rate are higher than the less developed states (Madhya Pradesh, Uttar Pradesh, Rajasthan, Assam, Orissa).

CMR in rural areas is very high than in urban areas. The rural-urban CMR gap is almost double and in some states, it is more than double. This is because of the inter-regional diversity in major states. Rural healthcare infrastructure especially in rural areas is inadequate and historically neglected. Of whatever is available the facilities are less efficient as compared to urban areas. The highest rural-urban gap is observed in Madhya Pradesh with 19.5 percent CMR per 1000 children in rural areas and 10
percent per 1000 children in urban areas. The lowest rural/urban gap of CMR is in the states of Kerala (2.6/1.9 percent) followed by Tamil Nadu (5.5/4.1 percent).

The IMR has reduced over the years but reduction is at a much slower rate as compared to the reduction of under-five mortality (U5MR). The percentage of reduction of IMR in the period from NFHS-1 to NFHS-2 is -0.14 percent and from NFHS-1 to SRS-12 is -0.47 percent. Percentage of reduction in U5MR, between NFHS-1 to SRS-12 U5MR is much higher at -0.52 percent. Over the same period of time, Neo-Natal Mortality reduced to -0.41 from NFHS-1 to SRS-12.

Universal immunization and vaccination against preventable diseases such as Tuberculosis, diphtheria, whooping cough, tetanus, polio, and measles are very important to increase child survival rate. There is an increase in the number of children completely immunized and a decline in the number of children who did not receive full vaccination between NFHS-1 and NFHS-3 to Rapid Survey on Children (RSoC) 2013-14. The percentage of vaccination and immunization is improving but still, the percentage is very high. Karnataka (79.4) has the highest number of immunized children followed by the Punjab (78.6), Maharashtra (77.4), Tamil Nadu (76.3), West Bengal (75.2), and Andhra Pradesh (74.1). Uttar Pradesh (47) and Orissa (62) have the lowest number of immunized children among the states. There is an improvement of almost 11 percent in the number of immunized children between the District Level Household Survey (DLHS-1) and RSoC. Bihar is the only state which shows the highest percentage change in the number of immunized children between DLHS-1 and RSoC (Rapid Survey on Children), more than double, from 22.4 per cent in DLHS-1 survey, Bihar stepped up to 60.4 per cent in 2013-14.

Percentage of underweight children reflects the state of malnutrition. According to the World Health Organization (WHO), 43 percent of Indian children are underweight. The health condition of children is worst in India in compared to other developing countries. This is despite the fact that India has witnessed higher economic growth than other developing countries.

The correlation coefficient between child health (IMR) and maternal healthcare explains the importance of healthcare for women and child health. It is found that all the healthcare variables used in the present study have a strong negative correlation with IMR and MMR except U5MR, Safe delivery (SD), and Institutional delivery
(ID). Meaning that increased utilization of healthcare automatically increases the health standard. The correlation value of -0.5098 and -0.54601 representing the negative correlation between IMR and tetanus toxoid injection (TT) and/or MMR and TT which means that with the increase in TT, IMR and MMR would be reduced and opposite with the decrease in tetanus toxoid (TT). The value of correlation between IMR and MMR is 0.86325 representing the positive correlation between IMR and MMR. MMR increases due to complication during pregnancy and childbirth which can cause infant death.

The highest negative correlation for IMR and MMR is found with delivery by healthcare personnel (Del HP) which means that delivery in the healthcare centers must be universalized. Safe delivery and institutional delivery have a positive correlation with antenatal care (ANC). Thus ANC registration for every pregnant woman has to be compulsory. It must be the duty of ASHA to counsel the pregnant women and their family for the benefits of ANC's. The correlation value of ANC with SD and ID are 0.8030 and 0.8330 respectively. MMR showed negative correlation with PNC (-0.70917) meaning that care after delivery is very necessary most of the infection may get controlled if diagnosed on time. Postnatal care reduces the risk of death of mother after childbirth. Postnatal care has a correlation value of -0.6241 with IMR which is higher in the case of MMR that shows that infant mortality heavily depends on the mother health.

Independent t-test has been applied for the significance of maternal and child healthcare between two groups i.e. group X and group Y on the basis of IMR. Group X consists of those states where IMR is of higher rate as compared to group Y. While applying t-test we have assumed that there are equal variances. So the t-test under equal variance has been used in the study. Consequently, the t-value under equal variances is rejected for all the health care variables under consideration under the null hypothesis i.e. there is no difference of the mean of healthcare variables between the 2 groups. States where IMR is lower showing better performance as compared to the states having higher infant mortality rate.

Simple linear regression has been applied to check the effect of maternal health on child health. We have set a panel data for six points of time. Infant mortality rate has been taken as the dependent variable and maternal mortality as the independent variable. If we consider the elasticity coefficient as a measure of the level of effect of
maternal health on child health then in the child health standard maternal health plays a dominant role. The model shows R-square value (0.6785) meaning that 67 percent variation in the dependent variable is explained by the independent variable. The positive coefficient value (.1343) indicates that maternal and child health have a positive relationship. The coefficient value of .1343 at 5% level of significance demonstrates that a 100 percent increase in the maternal mortality increases infant mortality by a rate of 13 percent. The value of coefficient is very high showing that infant health is affected by other factors also such as living standard, family income level, healthcare system, female education level etc. factors which have not been considered in our study. This will create a new line of research in which researcher can find the effect of these factors on child health. The causes of infant death may be various types of infections (neo-natal tetanus, pneumonia, and diarrhea), premature birth and birth injuries, maternal malnutrition etc. Infant deaths can be controlled if steps are taken to provide basic healthcare services to mothers before, during and after pregnancy. A healthy mother takes cares of her baby more effectively than a mother who suffers from illness. Mothers play a prominent role in the nutritional status of children by producing household food. Therefore physical and cognitive development of children totally depends on the health status of their mother. In the developing countries, mothers play a critical role in nurturing, socializing, and educating children. Maternal deaths lead to infant deaths which in turn leads to a fall in the size of future labour force and/or human capital.

We applied granger causality test to the selected states in order to find out the relation between GSDP and health status (IMR). We have applied the test individually on each state to find out that GSDP affect IMR and vice versa. In our test we have found that that the leading type of causality is unidirectional, meaning that 9 states (Bihar, Haryana, Maharashtra, Madhya Pradesh, Uttar Pradesh, West Bengal, Assam, Orissa, Punjab, India) out of 15 selected major states. In these states IMR affects GSDP and GSDP affects IMR. For one way causality, relationship generally runs from IMR to GSDP. Four out 15 selected states showing the bidirectional causality from GSDP to IMR and vice versa. The states are Andhra Pradesh, Gujarat, Haryana, and Rajasthan). One way causality also runs from GSDP to IMR but the magnitude is lower as compared to the bidirectional and unidirectional causality from IMR to GSDP. Only 3 states namely Assam, Orissa, and Punjab out of 15 selected states have
the causality from GSDP to IMR. We have found 2 exceptions of no causality for selected 15 states. The states like Tamil Nadu and Kerala showing that there is no causality between health and wealth.

Our contribution to the existing literature is to show the relationship between economic growth and health. The present Study found strong evidence of unidirectional causality between economic growth and health standard. A further prospect of this type of study has emerged here to investigate the possible reasons for bi-directional and unidirectional causality between GSDP and health standard.

**Future Prospects of the Study**

During the study we have found many areas that need to be explored. As per the limitation of data and time and to maintain the main track inflow to get meaningful result these areas have not been included in the study and are briefly explained below for further research. Hopefully, these areas will contribute a lot to the maternal and child healthcare. These are as follows:

Health of mother and child depends on many factors others than the healthcare system. They are assimilated to many factors. Study takes into account only the primary healthcare system which consists of three sub heads such as SCs, PHCs, and CHCs leaving behind the other important areas such as water supply, housing facility, sanitation, income, education etc. These factors also need to be exploration.

This study examines only the inter-state diversity in the healthcare system. Within the states diversity is also exists between rural and urban areas. The present study does not take into consideration this aspect of inequality. It is repeatedly cited that rural areas contribute more to the maternal and child mortality and consequently. Rural-urban disparities also need to be assessed for a more meaningful understanding of health of India.

This study takes into consideration only 15 major states namely Andhra Pradesh, Assam, Bihar, Gujarat, Haryana, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh, West Bengal out of 32 states and 7 union territories in India. Though it covers a large part of our total population but health status of the remaining population also needs to be researched.
Maternal and child healthcare is just a criterion to examine the health standard of India. The Study takes into account the maternal and child healthcare in India and its 15 major states. In Indian perspective, schedule caste, other backward class, tribal people, some Hindu and a major portion of Muslim community constitute the most deprived and vulnerable sections and their entitlement is very poor. These communities contribute a higher portion to our low performance on the front of healthcare and health profile. So further research has to be taken especially for the most deprived section of the society and measures has to be taken to uplift these societies.

In our study, we explored child healthcare. Child healthcare differs tremendously by sex. Problems of the girl child (infant) are significantly higher from the male child. Likewise, problems of different age group mothers are entirely different from one another. The women age group 15-25 years bears greater risk during pregnancy than other age group women. Health problems of these women and child these aspects of healthcare should also be addressed.

The study shows the relationship between maternal and child health and finds that maternal health has a positive and significant effect on child health. We take into consideration only the maternal health leaving other factors as constant. While there are many factors that contribute a larger portion to the infant mortality such as mother's education, safe delivery, antenatal care, employment level, place of delivery etc. Hence, it will give us a new direction for research to investigate the role of these factors on infant mortality.

While doing granger causality test we have investigated that between health and growth the dominating causality is unidirectional. Although bilateral causality is also found but the direction of unilateral causality is not same. For some states, it is from Health to growth and for some, it is from growth to health. Thus, further research has to be conducted on similar lines to explore the reason for causality between health and growth.

**Suggestion for better health outcomes:**

After analyzing the maternal and child healthcare in India following recommendations I must give here are-
Government must decrease the population norms for the densely populated states. As the states like Bihar, Uttar Pradesh, Maharashtra, these states are highly populated and healthcare infrastructure has not grown with a speed to combat the population growth.

More medical colleges have to be opened by the center as well as state governments to cater efficiently to the growing population of the country.

State governments must design some strong policy regarding the institutional deliveries which may decrease the burden of maternal and infant mortality.

As the dominant direction of causality is bidirectional in India. Effective steps to increase the employment, education, and to reduce the population growth.

Government should increase the availability of doctors and other healthcare personnals in rural areas.

Local administrative bodies should initiate some health awareness programme focusing on healthy lifestyle of the most vulnerable section of the population i.e. women and child.

Cash incentives for institutional deliveries must be given directly to the beneficiaries rather than through ASHA.

There must be some strong programmes or policy regarding the nutrition level of pregnant women and children under five years of age especially for families that fall below the poverty line.

There must be a policy for stay of the mother in the healthcare facility at least for 48 hours after the delivery to be able to receive financial assistance. This makes it easy to take care of mother and infant.