



Association between Maternal Mortality Ratio and Human Development Index in India: A Temporal Analysis

Karuna Rathore

(Post-Graduate Diploma in Hospital Management (PGDHM), Perusing PhD Manager Quality, GCS Medical College, Hospital & Research Centre

ABSTRACT

Women face discrimination, pushed to the secondary status and compromised health status. Maternal mortality ratio is the vital indicator of women health. Human Development Index is a measure to rank countries on basis of a composite score of life expectancy, education and income per capita. Improve HDI shows that we have higher life span, education status and GDP which also benefits women also. So we have tried to measure the association between MMR and HDI. Linear equation method and linear correlation is used for analysis of data.

Result: Study indicates significant associations between HDI and maternal mortality ratio -0.93141; education is a factor of HDI which shows highest association with MMR -0.97596.

Conclusion: Study indicates significant associations between HDI and maternal mortality ratio and all composite factors. Our findings suggest that the initiatives to curtail discrimination and prioritizing women's rights should be focus. Holistic multidimensional initiatives to be planned by government to focus on social well-being of women and reduce gender barriers are the need of the hour.

KEYWORDS : Maternal Mortality Ratio (MMR), Human Development Index (HDI), Government of India (GoI)

1. Introduction

Maternal health is vital for every country as they shape the future of country. Maternal health refers to the health of women during pregnancy, childbirth and the postpartum period. While motherhood is often a positive and fulfilling experience, for too many women it is associated with suffering, ill-health and even death (Xu et al., 2007).

Maternal health and economic growth are closely linked. Maternal death is a measure of quality of health care in community (Bardale & Dixit 2010). It was a highly ignored area since decades. Women has faced discrimination in all the phase of life and relegated to lower status. But since 90's maternal and newborn health has got lot of importance and multi-dimensional efforts has been done to improve it and these efforts have been improved over a period of time. And result of it has shown since 1990, maternal deaths worldwide have dropped by 45 percent, but every day about 800 women die from preventable causes related to pregnancy and childbirth (Maternal, Newborn and Child Health, n.d.). Which draws our attention that still we have a long way to go to make it a better place.

Maternal care is a global agenda and part of various non-governmental organizations. Indian government has designed numerous plans to address maternal care. Reproductive and Child Health (RCH) is a comprehensive sector wide flagship programme, under the Government of India's (GoI) National Health Mission (NHM), to maternal mortality and total fertility rates. Above this Government of India initiated many maternal mortality and morbidity improvement program. Following are the new initiatives launched by GOI i.e. Maternal Death Review (2010), Delivery Points (DPs), Web Enabled Mother and Child Tracking System, A Joint MCP (Mother-Child Protection) Card, Tracking of severe Anaemia during pregnancy & child birth by SCs and PHCs and Technical Guidelines & Service Delivery Posters to standardizing the quality of service delivery (Background, n.d.).

Initiatives by Government of India for Reducing Inequality

Both the sexes are equal and drawing line for discrimination by any mean is unhealthy. To remove this man-made barrier the government and various non-governmental organizations are working hard. Following are government measures taken to remove it and promoting women health:

1. Safety

a. One Stop Centre Scheme- is introduced to reduce gender based violence (Women Empowerment Schemes, Ministry Of Women & Child Development,

n.d.).

b. Women Helpline Scheme- exclusively designed to support women affected by violence, both in private and public spaces, including in the family, community, workplace etc (Women Empowerment Schemes, Ministry Of Women & Child Development, n.d.).

c. Working Women Hostel- A Scheme to Provide Safe and Affordable Accommodation to Working Women (Women Empowerment Schemes, Ministry Of Women & Child Development, n.d.).

d. UJJAWALA - A Comprehensive Scheme for Prevention of trafficking and Resue, Rehabilitation and Re-integration of Victims of Trafficking and Commercial Sexual Exploitation (Women Empowerment Schemes, Ministry Of Women & Child Development, n.d.).

2. Empowerment

a. Rajasthan Scheme: Bhamasha Yojana is an initiated by Rajasthan government to empower and make them independent to take their family decisions. All cash and non cash incentives are linked with the Bhamasha card. This is a biometric card which is linked with the bank account which is issued on the name of senior female member of the family. This scheme provides all benefits e.g. rashaan distribution, social security, narega benefits, scholarship, janani suraksha yojana and health benefits schemes (Bhamashah, 2016).

b. Rajiv Gandhi National Creche Scheme for the Children of Working Mothers-Women working in the organized sector can avail day care facilities for their children which their employers are obliged to provide under various legislations, (Factories Act 1948, Mines Act 1952, Plantation Act, 1951, Inter-State Migrant Workers Act, 1980 and NREGA 2005 make provision of day care mandatory) (Women Empowerment Schemes, Ministry Of Women & Child Development, n.d.).

c. SWADHAR Greh (A Scheme for Women in Difficult Circumstances)- The scheme is meant to provide temporary accommodation, maintenance and rehabilitative services to women and girls rendered homeless due to family discord, crime, violence, mental stress, social ostracism or are being forced into prostitution and are in moral danger (Women Empowerment Schemes, Ministry Of Women & Child Development, n.d.).

d. Support to Training and Employment Programme for Women (STEP)-since 1986-87 as a 'Central Sector Scheme'. The STEP Scheme aims to provide skills that give employability to women and to provide competencies and skill that enable women to become self-

employed/entrepreneurs(Women Empowerment Schemes, Ministry Of Women & Child Development, n.d.).

e. Nari Shakti Puruskar - The awards will be conferred on 8th March on the occasion of International Women's Day (IWD) (Women Empowerment Schemes, Ministry Of Women & Child Development, n.d.).

3. Maternal Health/ Care

a. Reproductive and Child Health (RCH) Programme was launched in October 1997. The main aim of the programme is to reduce infant, child and maternal mortality rates(Reproductive and child health Programme, n.d.).

b. Indira Gandhi Matritva Sahyog Yojana (IGMSY) - A Conditional Maternity Benefit Scheme for pregnant and lactating mother to improve health and nutrition status of mother(Women Empowerment Schemes, Ministry Of Women & Child Development, n.d.).

c. Janani Shishu Suraksha Karyakram (JSSK) covers both pregnant women and sick new born till 30 days after birth are (1) Free and zero expense treatment, (2) Free drugs and consumables, (3) Free diagnostics & Diet, (4) Free provision of blood, (5) Free transport from home to health institutions, (6) Free transport between facilities in case of referral, (7) Drop back from institutions to home, (8) Exemption from all kinds of user charges (schemes, n.d.).

d. Maternal Death Review-It gives guidelines and tools for conducting community based MDR and Facility based MDR have been provided to the States. The States are reporting deaths along with its analysis for causes of death(Background, n.d.).

e. Delivery Points (Dps)- All the States & Union Territories have identified DPs above a certain minimum benchmark of performance to prioritize and direct resources in a focused manner to these facilities for filling the gaps like trained and skilled human resources, infrastructure, equipments , drugs and supplies, referral transport etc. for providing quality & comprehensive RMNCH (Reproductive, Maternal, Neonatal & Child Health) services (Background, n.d.).

f. Web Enabled Mother and Child Tracking System-Name Based Tracking of Pregnant Women and Children has been initiated by Government of India as a policy decision to track every pregnant woman , infant & child upto 3 yrs, by name for provision of timely ANC, Institutional Delivery, and PNC along-with immunization & other related services(Background, n.d.).

g. A Joint MCP Card- Ministry of Health & Family Welfare and Ministry of Women and Child Development (MOWCD) has been launched as a tool for documenting and monitoring services for antenatal, intranatal and postnatal care to pregnant women, immunization and growth monitoring of infants(Background, n.d.).

h. Tracking of severe Anaemia during pregnancy & child birth by SCs and PHCs-Severe anemia is a major cause for pregnancy related complications that may lead to maternal deaths. Effective monitoring of these cases by the ANM as well as the Medical Officer in charge of PHC has been started to line list these cases and provide necessary treatment(Background, n.d.).

i. Technical Guidelines & Service Delivery Posters:-Gol has developed & disseminated standard technical guidelines & service delivery posters for standardizing the quality of service delivery during ANC, INC, PNC, etc from tertiary to primary level of institutions(Background, n.d.).

4. Women Development

a. Stree Shakti - to empower rural women and make them self reliant by inculcating the habit of savings and proper utilization of financial resources (Programmes of Women Development(n.d.).

b. Santhwana - Women who are victims of various atrocities such as dowry, rape, sexual harassment, domestic violence etc are subjected to physical and mental torture besides having to face social & financial problems(Programmes of Women Development(n.d.).

c. Financial Assistance to run hostels for girls from rural areas-enable girls from rural areas to avail facilities for higher education by providing stay(Programmes of Women Development(n.d.).

d. Scheme of financial assistance for remarriage of destitute widows and marriage of devadasis - financial Assistance of Rs. 10,000/- is being given for the remarriage of destitute widows. The destitute widow should be in the age group of 18 and 35 years (only at Karnataka)(Programmes of Women Development(n.d.).

e. Cell for eradication of social evils - to handle issues related to eradication of various social evils such as dowry system, child marriages, devadasi system, drug addiction and atrocities on women (Programmes of Women Development(n.d.).

f. Scheme of assistance to women for taking up job oriented courses(Programmes of Women Development(n.d.).

5. Promoting equal sex ratio

a. Beti Bachao Beti Padhao Scheme- aims at prevention of gender biased sex selective elimination, ensuring survival & protection of the girl child and ensuring education and participation of the girl child(Women Empowerment Schemes, Ministry Of Women & Child Development, n.d.).

Despite of numerous programs by government and non-government organization the maternal death remains has not significantly reduced according to WHO nearly five women die every hour in India from complications developed during childbirth, with heavy blood loss caused by haemorrhage being a major factor, WHO has said. Nearly 45,000 mothers die due to causes related to childbirth every year in India which accounts for 17 per cent of such deaths globally, according to the global health body(Bennett, 2016).

Despite of numerous efforts of government and non-government an effort in the era of development gender inequality persists, following are reasons behind it:

1. Gender stereotyping is imbibed in our cultural often compromise the females from their basic rights.
2. Enrollment in secondary and higher education levels in women is lower.
3. Patriarchal systems and property inheritance system has given birth to the son preference and dowry customs.
4. Poor and less educated women avoid utilizing health services, especially prevention services, and worsen their health standards, due to the fear of catastrophic health expenditures^[16].

Concern of today's era regarding development is that despite of numerous efforts of government and non-government efforts still why gender inequality persists. Following are reasons for inequality persist.

Vital maternal health indicators was used for the study Maternal mortality ratio (modeled estimate, per 100,000 live births) maternal mortality ratio is the number of women who die from pregnancy related causes while pregnant or within 42 days of pregnancy termination per 100,000 live births. The data are estimated with a regression model using information on the proportion of maternal deaths among non - AIDS deaths in women ages 15 -49, fertility, birth attendants, and GDP^[14].

There are various organizations which measures the performance of countries against set performance benchmark i.e. Global Gender Gap Index, Gender Inequality Index (GII), and Human Development

Index (HDI) etc to measure performance of countries on development issues.

In our study we have compare MMR with HDI, as HDI emphasize that people and their capabilities should be the ultimate criteria for assessing the development of a country, not economic growth alone. It can also be used to question national policy choices, asking how two countries with the same level of GNI per capita can end up with different human development outcomes (Human Development Index, n.d.).The HDI is published by United Nations Development Programme (UNDP) every year and ranks countries on four tiers of human development.

And the Human Development Index (HDI) is a composite index focusing on three basic dimensions of human development: to lead a long and healthy life, measured by life expectancy at birth; the ability to acquire knowledge, measured by mean years of schooling and expected years of schooling; and the ability to achieve a decent standard of living, measured by gross national income per capita Human Development Index. (n.d.).

The HDI simplifies and captures only part of what human development entails. It does not reflect on inequalities, poverty, human security, empowerment, etc(Human Development Index, n.d.).Education leads to long and healthy life and produces a better manpower for the work and eventually increases the standard of living.

Development is not only good for a section of society but the benefits are reaped by everyone. In our study we have tried to see that is the females are being benefited by the development or not by measuring association between human development and vital indicator for maternal health which is MMR.

2. Research Objective:

The following objectives were formulated for the intent to this research study:

1. To study vital indicators of maternal health (Maternal Mortality Ratio)
2. To study association between Maternal Mortality ratio and Human Development Index.

3. Study Design

Initially research design was exploratory in nature then later turns into descriptive research design. In this paper we have studied association between vital indicators related to maternal health i.e. 1) Maternal Mortality Ratio and b) Human Development Index.

3.1 Data collection

Secondary sources of data were use. Maternal Health indicator for India was captured from The World Bank Website and Human Development Index data was used from Ministry of Statistics and P rogramme Implementation website.

3.2 Research Tools:

To measure the association we have used liner trend equation and liner correlation

3.3 Statistical analysis

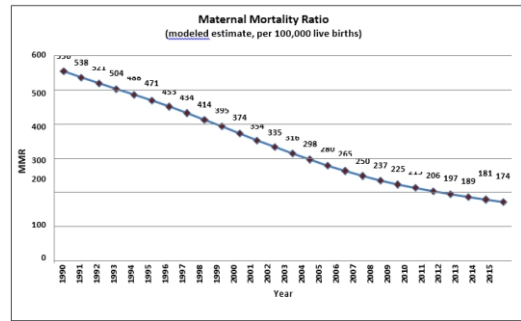
To test the hypothesis we have used linear correlation and to find trend of MMR have used linear equation and

3.4 Hypothesis:

1. H₀1: There is no association between maternal mortality ratio and Gender Gap Index

4. Analysis and Interpretation of data

4.1 Distribution of Maternal Mortality Ratio for period of year 1990 to 2015 (Graph-1) shows steady decline.



Graph-1: Distribution of MMR

4.2 Liner Trend Equation to find the trend of MMR

Liner trend represent the trend of MMR from year 1990-2015. It was calculated using Y'=a+bt

$$b = \frac{n\sum tY - (\sum Y)(\sum t)}{n\sum t^2 - (\sum t)^2}$$

$$b = \text{Slope} = -16.1962$$

$$a = \frac{\sum Y}{n} - b \left(\frac{\sum t}{n} \right)$$

$$a = \text{Intercept} = 559.8031$$

The data followed liner trend, **Least Squares Method** is used to estimate the MMR in year 2020 which shows it will be around 58 if the interventional programs to reduce MMR are continue same.

Year	Estimated Maternal Mortality Ratio
2020	57.71

4.3 Human Development Index period of Year 2006-20015 (Table-1)

Year	Human Development Index	Income	Health	Education
2005	0.527	0.528	0.678	0.553
2006	0.537	0.540	0.638	0.568
2007	0.547	0.552	0.688	0.583
2008	0.554	0.556	0.693	0.600
2009	0.560	0.566	0.698	0.600
2010	0.570	0.578	0.702	0.617
2011	0.581	0.586	0.706	0.650
2012	0.583	0.591	0.710	0.650
2013	0.586	0.595	0.714	0.650
2014	0.609	NA	NA	NA
Change	-39.10%	-40.50%	-28.60%	-35.00%

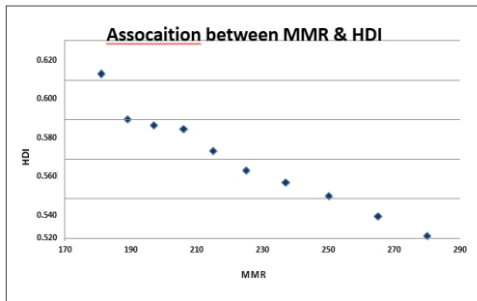
Table-1 shows depict negative growth HDI and all factors comprising it, negative growth here signifies positive on country part that HDI is improving over time. Total 39.10% growth is observed in HDI and income factor in HDI has observed highest growth 40.50% which means per capita income is raising at the fastest pace in comparison with other factor comprising HDI.

4.4 Association between Maternal Mortality Ratio, HDI and composition of HDI

Association was measured by Pearson Correlation and following result was found

Correlation (r) (2005-2014) MMR - HDI	-0.93141	Shows strong negative linear relationship Negative, but it signifies positive association: that MMR is decreasing and HDI is improving
Correlation (r) (2005-2013) MMR-Income	-0.99537	
Correlation (r) (2005-2013) MMR-Education	-0.97596	
Correlation (r) (2005-2013) MMR-Health	-0.81206	

There is a strong negative association between MMR and HDI as depicted by scattered correlation plot (Graph-2) and calculation - 0.93141.



Graph-2: Shows association between MMR and HDI

5. Result

Hull hypothesis is not accepted as there is strong association between MMR & HDI

6. Limitations

There are many other factors linked with constant decline in maternal mortality ratio which can be studied. Women education, health and employment can be more precise to compare.

7. Scope for Further Research:

To prove association of MMR and HDI we can compare data of other countries and further women specific indicator related to education, health and employment can be study in future.

8. Suggestions to improve women status

1. Strengthening the government programs – initiative taken by government are multi- dimensional, it's just they have to be strengthen to reach the lay person.
2. Job reservation- more than the community reservation it's time to promote the female reservation.
3. Government policies should link with the women empowerment/participation.
4. Women security plan has to be strengthened. As Crime against women in the capital has gone up by 20% this year as compared to 2014, and there has also been a 27% increase in registration of rapes cases (Somreet, 2015).
5. Technological-to improve safety of women more applications can be deigned to track the location, information sharing with family members, information regarding government policies for women and their updates.
6. Online Portal to file and grievance or misconduct.

9. Conclusions

Study indicates significant associations between HDI and maternal mortality ratio -0.93141; education is a factor of HDI which shows highest association with MMR. Our findings suggest that the initiatives to curtail discrimination and prioritizing women's rights should be focus. Holistic multidimensional initiatives to be planned by government to focus on social well-being of women and reduce gender barriers are the need of the hour.

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