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Trends and Gender Disparities of Child Mortality in Haryana state, India

Kharb Priyanka S

Assistant Professor, Department of Geography, MKJK College, Rohtak-124001, India

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***Corresponding Author**
Email: priyankaskharb@gmail.com

ABSTRACT

Child mortality rates are very high in India even higher than neighbouring countries. Different states of the country have extreme differences in child mortality as health facilities are responsibility of state Governments. The present study has been carried out to analyse the trends and patterns of child mortality in Haryana state for the period of a decade from year 2008 to 2017 by collecting the data from sample registration system. These trends of child mortality were analysed using two major indicators i.e. under 5 mortality rates and infant mortality rates. Differentials in child mortality by residence and sex were also studied. Haryana state has shown effective fall in child mortality during study period in form of U5MR as well as IMR. The state has shown a decrease in U5MR by 46% and IMR by 44% during ten years period of study. High child mortality rates in rural areas of Haryana have been reported while comparing with urban areas. Residential gaps in U5MR and IMR in Haryana have been reduced by 50 and 53% respectively. While considering the gender disparities in child mortality, female child mortality rates were higher than male in U5MR as well as IMR. The gender gap in IMR has been reduced significantly (50%), however this reduction was not satisfactory in U5MR indicating the need of more emphasis on gender equality awareness programs.

1. Introduction

Children are highly valuable assets for a country and their health is highly important for the development of a society. Child mortality is considered as ideal parameter to assess the development of health facilities or it can be said that child mortality is proxy indicator of health. Heavy rates of child mortality are recorded globally every year. As per the global health observatory data, 5.6 million children below the age of 5 years die annually throughout the world with Africa and south-east Asia regions contributing maximum deaths (WHO, 2018). By observing such high rates of child mortality, the United Nations set the targets for the reduction of child mortality throughout the world which are known as millennium development goals 4 (MDG-4). According to MDG-4, the child mortality has to be reduced by two-thirds between 1990 and 2015 (80 infant deaths per 1000 live births in 1990 to 28 in 2015). Though, rates of child mortality have reduced globally, but the pace of reduction is slow. So, 128 out of 137 developing countries including India are not in a state to achieve the targets of MDG-4 by 2015 (Lozano et al., 2011). These mortalities can be easily reduced by following effective preventive and treatment measures. Now, the reduction in mortality of children is among the utmost priorities of Governments all over the world. To assess the child mortality various indicators *viz* early neonatal mortality rate (ENMR; during first 7 days of life), neonatal mortality rate (NMR; first month of life), infant mortality rate (IMR; children of 0 to 1 year age) and under-5 mortality rate (U-5MR; children below 5 years of age) have been studied, however, among these IMR and U5MR are considered as ideal indicators.

The reduction rate of child mortality in India in the past few decades is significant but its performance in comparison with other south-east Asian countries is not impressive. The country is still at the top of table among highest child mortality rate countries throughout the world. According to UNICEF reports, U5MR is highest in India all over the world with 1.08 million deaths in year 2016 (UNICEF, 2017) contributing 19% of worldwide U5MR. Moreover, heavy inter-state differentials with low child mortality rates in some states comparable with western countries on one hand and some states having high child mortality comparable with poorest countries of the world on the other hand are present in the country. Presently, India is having 33 IMR and 37 U5MR in 2017 with large inter-state disparities having highest IMR of 47 in Madhya Pradesh and lowest IMR of 7 in Nagaland. Similarly, U5MR is highest in Madhya Pradesh (55) and lowest in Kerala (SRS). The disparities are also prevalent by residence and gender among all states of India. Highest IMR of 51 has been reported in rural areas of Madhya Pradesh and lowest IMR of 7 in urban areas of Mizoram and Nagaland states. Similarly, Highest U5MR of 62 has been reported in rural areas of Madhya Pradesh followed by rural Chhattisgarh (53). In gender disparities, female child mortality is higher than male child throughout the country. Actually, the healthcare in India is sole responsibility of states and various determining factors as population size, socio-economic factors, health facilities etc. are responsible for large inter-state disparities in the country.

Among the states of India, Haryana is also having high rates of child mortality. According to census of India (2011), the state is jointly at 7th position with Bihar having 44 IMR equal to the national average and 51 U5MR lower than country's average. The child mortality rates are continuously decreasing in the state; however, disparities by sex and residence in IMR and U5MR are still high in Haryana. The causes for these differentials can be preference for son, female feticide, less importance of health care for female children, lower female literacy rates, poor health care facilities in rural areas etc. In the present study, IMR and U5MR of Haryana state have been

studied during the period from year 2008 to 2017 by keeping in view the following objectives:

- Trends of IMR and U5MR in Haryana and India
- Gender and residential disparities in IMR and U5MR

2. Study Area

Haryana is the seventeenth state of India (created on 1 November 1966) located on the north western heartland of the country. It is a landlocked state surrounded by Uttar Pradesh and Delhi in East , Punjab and Himachal Pradesh in north and Rajasthan in south and west , located between 27º 39' to 30 º 35' N latitudes and between 74 º 28' and 77 º 36' E longitudes. The altitude of Haryana varies between 200 to 1200 meters above mean sea level and sloping from north to south but slope reverses in south and southwest due to presence of Aravalli hills. The state has geographical area of 4.42 mha which is 1.4% of the total geographical area of country making it 21st largest state by area. Geographically, Haryana state is divided into four main regions named as Yamuna-Ghaggar plain (very fertile largest part of state), Shivalik hills (north-east region), Bagar tract (semi-desert sandy region in the south-west) and Aravali hills (south region). The state has been divided into four administrative subdivisions having 21 districts, 125 blocks, 154 cities & towns and 6841 villages. According to census (2011), population of Haryana is 25.35million of which 13,494,734 are male and 11,856,728 are females. The state has literacy of 75.55% with 84.06% male literacy and 65.94% female literacy. Among the total child population of 0-6 years age group, 1,843,109 are male and 1,537,612 are female children. Total fertility rate of the state is 2.3 with infant mortality rate of 44 and under 5 mortality rate of 51. Location map of the study area is shown in figure 1.

Figure 1 Location map of study area

3. Materials and Methodology

IMR and U5MR analyses in the present study are based on secondary data collected from various bulletins and annual statistical reports of Sample registration system (SRS), four rounds of national family health surveys (NFHS) carried out during years 1992-93, 1998-99, 2005-06 and 2015-16, census of India etc. Office of Registrar General of India through SRS collects the data related to IMR, U5MR throughout the country and publishes in form of bulletins and reports. Simple statistical methods were applied to analyse the trends and differentials in mortality rates.

Formulas used for computing the mortality rates:

1) $U5MR_{(n)} = D(0\text{-}4,n) / B_{(n)} \times 1000$

Where:

n: Calendar year

D(0-4,n): Number of children (aged 0 to 4 year) died during year n

B(n): Number of live births occurring during year n

2) $IMR = D_0 / B \times 1000$

Where:

D_0: Number of deaths under 1 year age in a year

B: Number of live births in the same year

4. Results

Various indicators of child mortality *viz* U5MR, IMR and NMR have been assessed for declining deaths of children below the age of five years in Haryana state. These rates were further compared with India's average in achieving the targets of MDG in IMR and U5MR (table 1).

Table 1
Trends of U5MR, IMR and NMR in Haryana (2008-2017)

Year	U5MR		IMR		NMR	
	Haryana	India	Haryana	India	Haryana	India
2008	65	69	54	53	34	35
2009	60	64	51	50	35	34
2010	55	59	48	47	33	33
2011	51	55	44	44	28	31
2012	48	52	42	42	28	29
2013	45	49	41	40	26	28
2014	40	45	36	39	23	26
2015	43	43	36	37	24	25
2016	37	39	33	34	22	24
2017	35	37	30	33	22	22

Source: Sample registration system

The trends of U5MR, IMR and NMR in Haryana show continuous decline and the U5MR as well as NMR are slightly lower in number than India average. However, the IMR in Haryana is slightly upper side than India average during initial years but goes down after year 2013 indicating greater pace of reduction in Haryana than country's average reduction (fig 2).

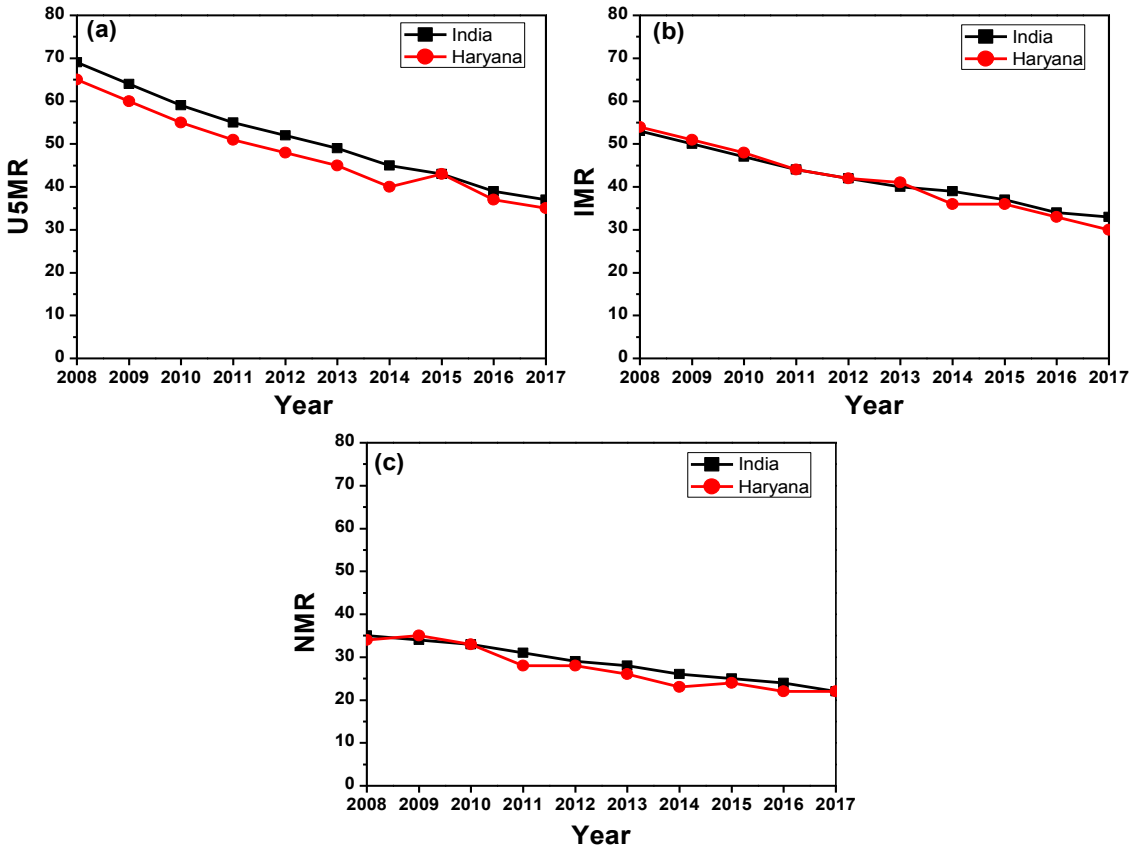

Figure 2 Trends of U5MR, IMR and NMR in India and Haryana

4.1 Under 5 mortality rates

The trends of U5MR in the state have shown a continuous decline from 65 in year 2008 to 35 in year 2017 except in year 2015 where some increase in U5MR was reported. This rate of decline in Haryana is higher than India's average decline i.e. from 69 in year 2008 to 37 in year 2017. During this period of one decade, U5MR of Haryana has been decreased by 46.15% indicating good pace in child health improvements. However, both the state as well as country (U5MR; 43) have missed a little bit in achieving MDG of 42 U5MR by the year 2015. The comparative trends of decline in U5MR in Haryana and India are shown in fig. 2. While analysing the rural-urban trends in Haryana, rural areas have reported high U5MR than urban areas, although, the rural areas (46%) have reported slightly higher rate of decrease as compared to urban areas (44%) in the ten years of study period. The urban areas of state have achieved MDG earlier in year 2011 as compared to rural areas achieved MDG in year 2016 (table 2).

Table 2
Trends of U5MR in Haryana and India by residence and sex (2008-2017)

Year	Haryana					India				
	Rural	Urban	Total	Male	Female	Rural	Urban	Total	Male	Female
2008	70	50	65	*	*	76	43	69	65	74
2009	64	50	60	*	*	71	41	64	60	69
2010	58	47	55	51	59	66	38	59	55	64
2011	54	43	51	45	58	61	35	55	51	59
2012	52	39	48	45	52	58	32	52	49	56
2013	49	34	45	42	49	55	29	49	47	53
2014	44	32	40	37	43	51	28	45	42	49
2015	47	36	43	41	46	48	28	43	40	45
2016	41	29	37	34	42	43	25	39	37	41
2017	38	28	35	32	38	42	25	37	36	39

*Source: Sample registration system; *data not found*

Analyses of gender disparities in U5MR have shown that female U5MR in Haryana are higher than male U5MR and this is true for both rural as well as urban areas. However, the gap between male-female mortality has been reduced from 13 in year 2008 to 6 in year 2017, though following up-down patterns during these ten years. Male U5MR has been reduced from 57 to 32 while female U5MR has been reduced from 70 to 38 during the decade of study period (fig 3).

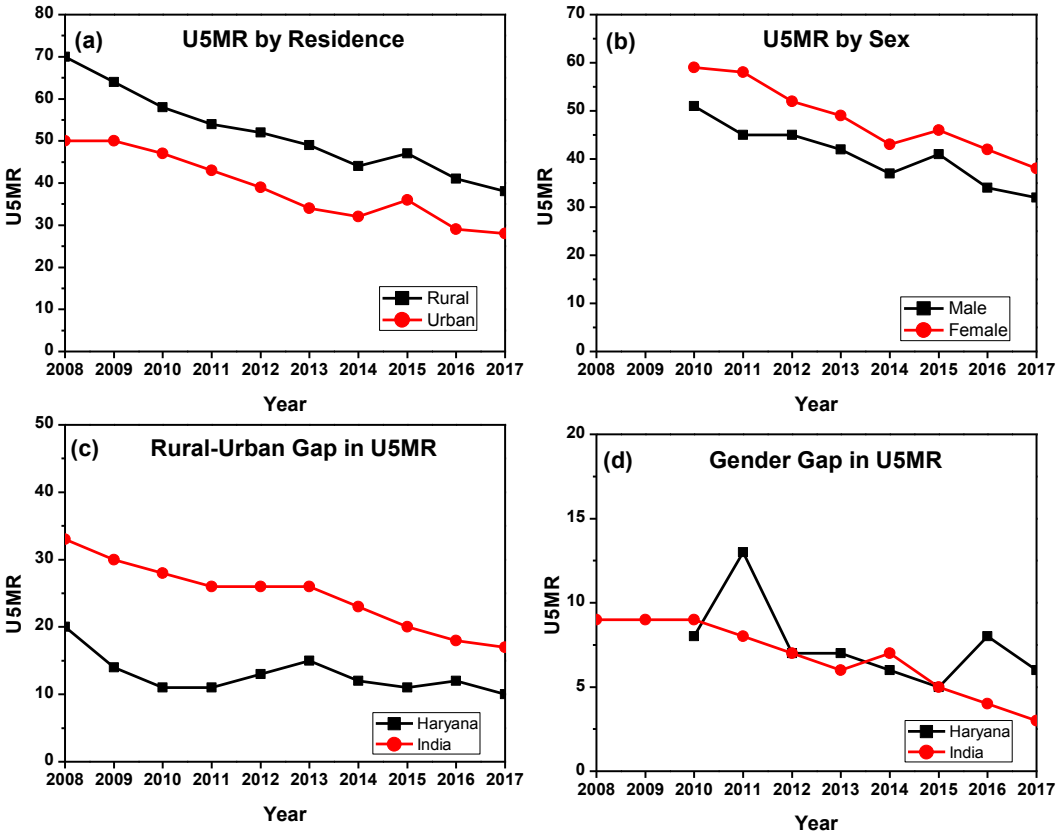

Figure 3 Trends of U5MR by residence and sex

4.2 Infant mortality rate

The trends of IMR have shown continuous decline in Haryana as well as India during the study period. IMR in Haryana has been reduced from 54 in year 2008 to 30 in year 2017 and from 53 to 33 in India during the same period. A significant decline in IMR has been observed in ten years where, IMR of Haryana has been decreased by 44.4% while IMR of India total has been decreased by 37.7%. However, both the country and state are far away from achieving the MDG of reducing IMR to 27 by the year 2015 (table 1; fig 2).

Comparing the IMR by residence, rural areas have reported comparatively high IMR than urban areas. In one decade, rural IMR of the state has been declined from 58 in year 2008 to 32 in year 2017 and urban IMR has been declined from 43 to 25 during same period. The gap of IMR in rural and urban areas of the state are still significant, although, the gap has been reduced from 15 in year 2008 to 7 in year 2017 but at a very slow rate of 1 or 2 per year (table 3; fig 4). IMR decline rates in both the rural and urban areas of the state were higher than country's total decline during the study period. Moreover, the gap between IMR of rural and urban areas in state are significantly lower than country's rural-urban IMR gaps.

Comparing the IMR by sex, mortality rates of female infants were higher than male infants and continuous declining trends were reported in both during the whole study period. Female IMR of state has been reduced from 57 to 31 while

male IMR has been reduced from 51 to 28 during 2008-17. Gender gap in IMR of Haryana has also been declined from 6 in year 2008 to 3 in year 2017 (table 3; fig 4).

Table 3
Trends of IMR in Haryana by residence and sex (2008-2017)

Year	Haryana					India				
	Rural	Urban	Total	Male	Female	Rural	Urban	Total	Male	Female
2008	58	43	54	51	57	58	36	53	52	55
2009	54	41	51	48	53	55	34	50	49	52
2010	51	38	48	46	49	51	31	47	46	49
2011	48	35	44	41	48	48	29	44	43	46
2012	46	33	42	41	44	46	28	42	41	44
2013	44	32	41	40	42	44	27	40	39	42
2014	40	29	36	35	38	43	26	39	37	40
2015	39	30	36	36	37	41	25	37	35	39
2016	35	27	33	31	35	38	23	34	33	36
2017	32	25	30	28	31	37	23	33	32	34

Source: Sample registration system

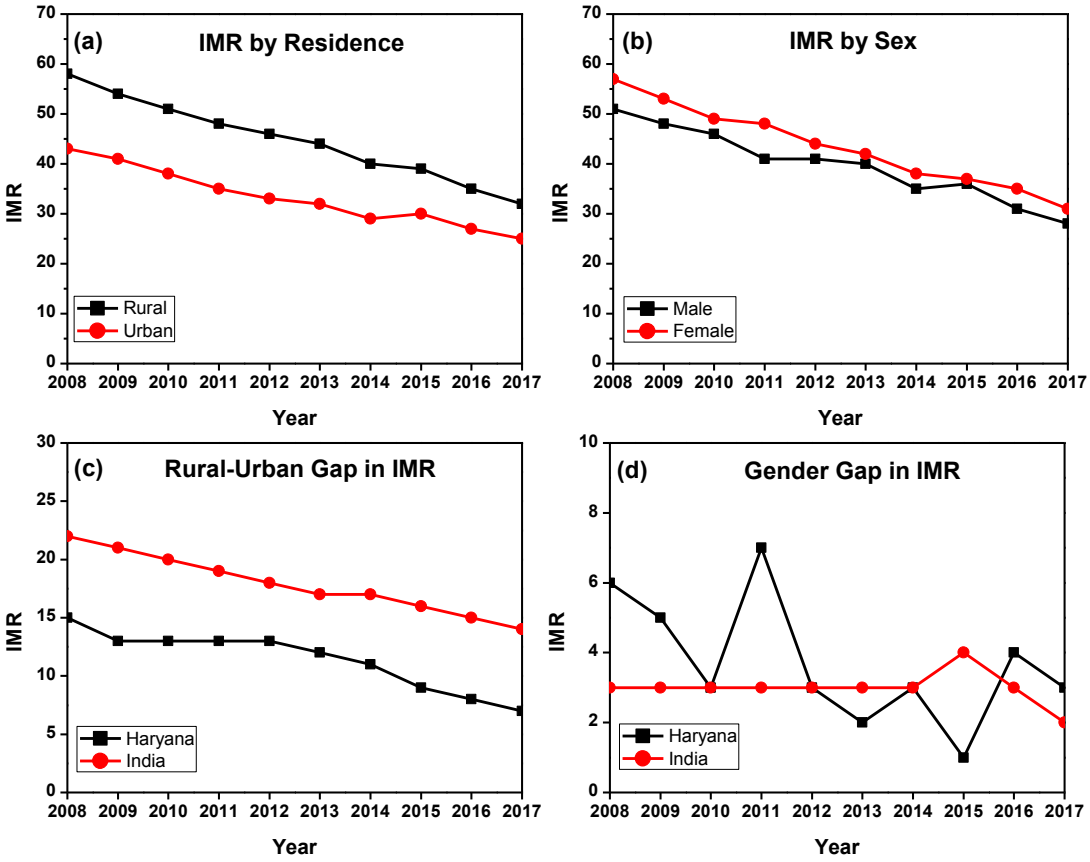

Figure 4 Trends of IMR by residence and sex

5. Discussion

India has shown good efforts in reducing the child mortality rates and achieved the MDG-4 targets of 41 U5MR in the year 2016; however, we are far away from MDG targets of 28 IMR. The situation of Haryana state is somewhat similar to the national average in achieving the MDG targets. Residential gaps in U5MR and IMR in Haryana have been reduced by 50 and 53% respectively indicating the spread of health infrastructures toward the rural areas. In most of world populations, mortality rates in females are lower than males; however, South Asia region including India has higher female children mortality rates as compared to male children (Hill and Upchurch, 1995). The situation is worst in Haryana where sex differentials in child mortality rates are still higher than country's average. The present study indicates very slow decrease in gender gaps of U5MR and IMR during ten years. The gender gap in IMR has been reduced by 50%; however, this reduction was not satisfactory in U5MR. Chowdhury et al. (2017) has also reported high female infant mortality rates than males in rural areas of Haryana by using secondary data of Palwal and Faridabad districts. Various other workers have also reported female and rural skewed child mortalities in different states of country as well as other Asian countries (Mondal et al., 2009; Lahiri et al., 2011; Bhatia et al., 2019). Khandoker and Tanjila (2016) have also reported various socio-economic and demographic factors as maternal education, wealth index and region as major contributors for high U5MR in Bangladesh. The male-female gap as well as rural-urban gap in child mortalities in Haryana still persists and these gaps could be because of various dependent factors as discrimination between male and

female children irrespective of rural or urban areas, low female literacy rate, poor health infrastructure in rural areas and various overlapping factors *viz* vaccination status, percentage of urban population, percentage of schedule caste and schedule tribe population, percentage of institutional deliveries, sex ratio etc. (Kuntla et al., 2014; Sikder and Roy, 2015).

6. Conclusion

Status of child health is an important parameter for assessment of a society's development. Haryana state has shown effective fall in child mortality during study period in form of U5MR as well as IMR. The state has shown a decrease in U5MR and IMR by 46% and 44% respectively during ten years. High child mortality rates in rural areas of Haryana have been reported while comparing with urban areas. Female children in the state as well as country are at higher risk of death. This study concludes that residence and gender disparities are reducing at good pace in Haryana. High mortality rates in female children are not biological factor but a society factor of considering females as burden and males as resource. This ill thinking of society leads to female foeticide (however, this has been banned by state Govt.), less healthcare facilities and breast feeding for female children. This social evil has to be eradicated from society by joint efforts of Govt., NGOs and local bodies by transforming the society's attitude towards girl children via education, social awareness programs to reduce the gender differentials in child mortality in Haryana.

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