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Levels and Trends of Infant Mortality in Sikkim during the Last Two Decades

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Abstract

The objective of this study was to explore the use of Sample Registration System (SRS) data to analyze the levels and trends of infant mortality in Sikkim and to compare with national levels figures between 1990 and 2013. The study was a descriptive, retrospective study based on the secondary data published by Registrar General, Government of India. The percentage of overall rates of declination in infant mortality rate was 50% in India while it was 69% in Sikkim. Significant differences in infant mortality rates were existed between the national and the state during the study period.

Keywords: Infant mortality, Trends, India, Sikkim, SRS, RGI

Introduction

Infant mortality is an indicator that is used to measure the health status, level of utilization of maternal and child health services and the level of socio-economic development of a country [1]. It is one of the most universally accepted indicators of health status not only of infant, but also of whole population and of the socio-economic conditions under which they live. In addition, the infant mortality rate is a sensitive indicator of the availability, utilization and effectiveness of health care, particularly perinatal care [2]. An infant mortality rate (IMR) is an outcome rather a cause and hence directly measures results of the distribution and use of resources [3]. There are significant variations in child mortality among the various regions of the world. About half of under-five deaths occur in only five countries: India, Nigeria, Democratic Republic of the Congo, Pakistan and China. India (22%) and Nigeria (11%) together account for a third of all under-five deaths [4]. There is substantial variation in infant mortality even within India and within states. According to the latest report of SRS published by Registrar General of India, IMR in the state of Madhya Pradesh (54 per 1000 live births) was highest in India and was lowest in Goa (9 per 1000 live births) followed by Manipur (10 per 1000 live births) and Kerala (12 per 1000 live births). Infant mortality rates in India has reduced from 80 in 1990 to 68 in 2000, 50 in 2009 and further decline to 40 in 2013 [5].

The level of infant mortality rate is one of the most revealing measure of how well as society meet the needs of its people and the infant mortality shows how well government distribute the available resources for health education, food distribution, sanitation enhancement of the status of women and the other priorities in public spending. Deprivation among the people of a particular region, class or ethnic group within a country is likely to show up in the form of an increased IMR [6]. Many studies had shown that infant mortality influenced by a number of bio-demographic, socio-economic, environmental and maternal's health care factors. However, the relative importance of these factors in relation to infant mortality varies with the level of social and economic development of a society [7]. The study was conducted to determine the levels and trends of infant

mortality rates in Sikkim and to compare with the national levels figures during 1990 to 2013.

Materials and Methodology

The present study was a descriptive, retrospective study. The study was based on the various annual bulletins reports of SRS data published by Registrar General, Government of India during the time period of 1990 to 2013.

Sample Registration System (SRS)

With a view to generate reliable and continuous data on various vital event indicators, the Registrar General of India (RGI) initiated the scheme of Sample Registration of Births and Deaths in India popularly known as Sample Registration (SRS) in 1964-1965 on a pilot basis and on full scale from 1969 -1970 following the Registration of Births and Deaths Act, 1969. Since the Civil Registration System (CRS) is deficient in India, Sample Registrar System, (SRS) is the only source that provides reliable estimates of mortality data. The SRS is a dual record system, consisting of a continuous enumeration of births and deaths by an enumerators and an independent half-yearly survey by an investigator. The half yearly survey, in addition, serves as an independent verification on the events recorded by the enumerator, produces base population required for computing various rates. The SRS since 1970 has been providing the estimates on several fertility and mortality indicators including the perinatal mortality rates as well as the stillbirth rate , while estimates of early neo-natal mortality rate has recently been included in SRS report since 1996. Estimation of infant mortality for India and major states are provided annually by SRS. An infant mortality rate in Sikkim is based on three-year period like for 2012 report its estimation was based on 2010-12 [5].

Statistical methods

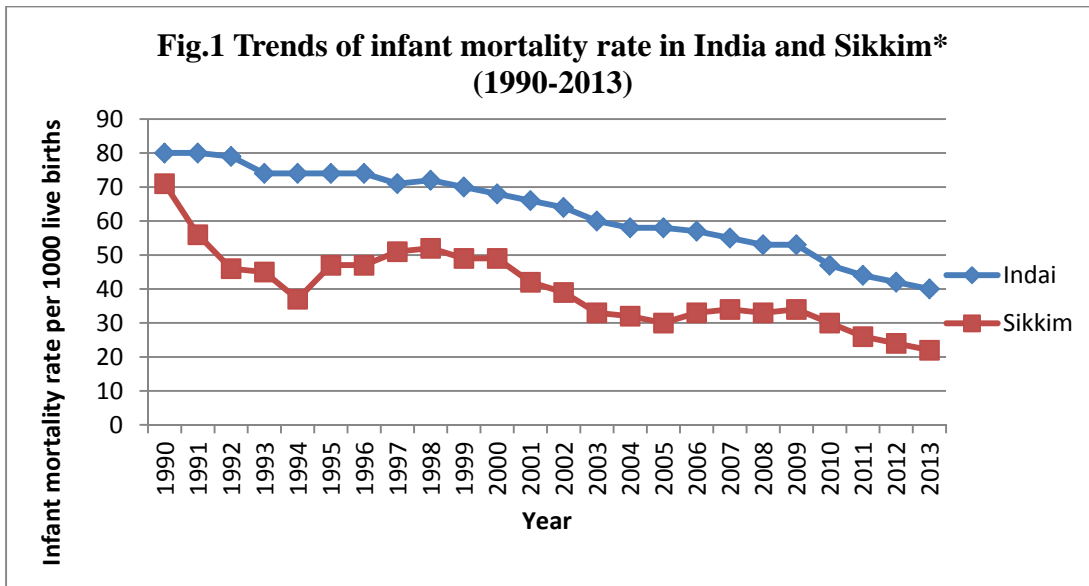
Frequencies of observed rates were check for any mistake or errors from different sources. All the data were entered into a computer database using Microsoft Excel and were analyzed in SPSS (version 16.0.) Time series analysis was used to compare the trends in infant mortality

rates. The parametric t-test was used to find the significant differences in mortality rates between national levels and Sikkim. No ethical consideration was required since it was based on secondary data.

Results

As per the latest SRS bulletin, released by the Registrar General of India (RGI) in September, 2014, India's IMR dropped at 40 per 1000 live births while IMR in Sikkim state came down to 22 which was 24 per 1000 live births in 2013. It was also observed that the rates of declination in IMR at the national levels were more consistent as compared with Sikkim state (Fig.1). The rates of declination were the same in both in national and Sikkim state during 2011 to 2014 (2 each per 1000 live births). The mean value of IMR in national levels was found to be 60.04 with a standard deviation of 12.32 while in Sikkim it was observed 40.08 with a standard deviation of 11.56 per 1000 live births. The normality of data was check by applying the Kolmogrove-Smirnov test as an assessment of the normality of data is a prerequisite for applying the parametric t-test. It was observed that the observations were normality distributed. The results indicate that there were significant differences in mean values of the mortality rates between the national levels and Sikkim state during this period ($t=6.66$, $d.f= 46$, $P<0.001$, $95\% CI= 1.01-29.90$). Figure 1 showed trends of 3 years moving averages of India's IMR and Sikkim state during 1990 to 2013.

Fig. 1 showed that between 1990 and 2013, the national figures of IMR ranges 40 to 80 per 1000 live births while it ranges 22 to 71 per 1000 live births in Sikkim. The overall decreased in infant mortality rate in India was 50% while in Sikkim it was 69%. There was a gap of 19% differences in declination rates between the national's IMR and Sikkim state during these two decades. The infant mortality rates remained the same during 1993 to 1996 which was 74 per 1000 live births in national levels whereas it ranges from 37 to 51 per 1000 live births in Sikkim during the same periods of time.



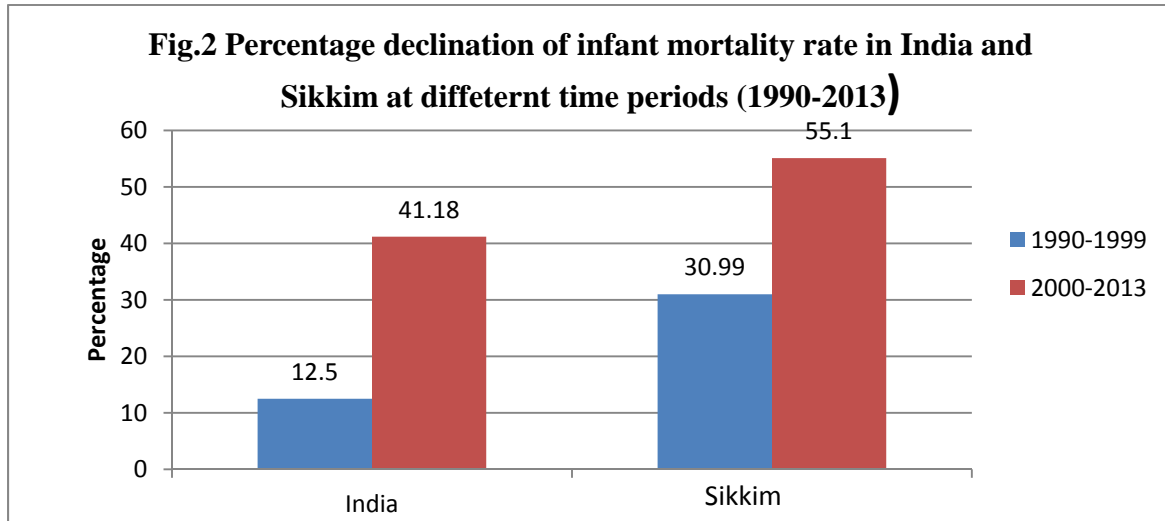
Source: Various SRS bulletins of respective years, Registrar General of India, Govt. of India.
 * Infant mortality rates are based on three-year period

We split up the years in two different time periods for making comparisons about the tempo of declination in infant mortality rates. Figure 2 showed the percentage declination of infant mortality rates at different time periods that is 1990 to 1999 and 2000 to 2013. It was observed that IMR declined from 80 in 1990 to 70 deaths per 1000 live birth in 2000, registering 12.5% decline in the national levels whereas 30.99% decline in Sikkim during the same period of time. However, the pace of decline became faster during the next decade, in which 41.18% reduction was recorded in India. During 2000 to 2013, the percentage of declination in Sikkim was 55.10%. It showed that the rate of declination in IMR during 1990s and 2000s were much faster in India as compared with the state. It was 3.2 times in India whereas it was observed 1.7 times in Sikkim between 1990-1999 and 2000-2013.

Discussion

The overall rates of reduction were higher in Sikkim as compared with the national figure during the last two decades. The infant mortality declined from 80 in 1990 to 40 per 1000 live births

giving a reduction of 50% in India. The overall declined in IMR in Sikkim was 69% where IMR decline from 71 in 1990 to 22 in 2013 per 1000 live births. The average IMR in India was found to be 60.04 while in Sikkim it was 40.08 per 1000 live births. Significant differences in IMR were observed between them during the study period.



It was also observed that the rate of declination were much faster in national as compared with the state during 1990s and 2000s. It was also observed that the rate of declination in IMR for the national was 3.2 times in 2000s as compared to during 1990s whereas it was 1.7 times in Sikkim during the same period of time.

For the year 2000, the IMR was estimated to be 49 deaths per 1000 live births for the state as a whole. The rate is well below the states’ targeted level of less than 60 infant deaths per 1000 live births, a level that is set to be reached, among others, to achieve the Goal of “Health for All” of Government of India (2000). The percentage differences in IMR were 24.44% during 2000-2013 as compare with the previous decade in Sikkim.

Conclusion

During these two decades there were considerable decline in infant mortality in both national and Sikkim state. It was also observed that the pace of declination in IMR was more consistent in

national figures whereas in Sikkim there were fluctuations during these periods. Tracking the trends in infant mortality will help to set priorities, shape policies, design programmes and to monitor progress towards the maternal's and child's health policies at the state level.

A community based research study is recommended in order to reduce the infant mortality at a faster rate and in order to achieve this objective it is also important to identify the specific determinants of infant mortality in the state.

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