

ASSESSMENT OF INFANT MORTALITY RATE (IMR) IN RURAL AREAS OF DISTRICT PESHAWAR: A CROSS-SECTIONAL STUDY

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ABSTRACT

Objective: To assess infant mortality and to find the burden of infant deaths due to infectious diseases, maternal factors, and vaccination in rural areas of district Peshawar.

Materials and Methods: We conducted a cross-sectional study from April 2021 to September 2021 in which 370 women of reproductive age (15-45 years) were selected using structured and open-ended questionnaires through convenient sampling. Results were analyzed using SPSS version 23 for Windows.

Results: Thirty-one infants died in the year 2021 out of 370 giving us an IMR of 83.7 per 1000 live births. Breastfeeding was associated with lower mortality than bottle feeding; exclusive breastfeeding during the first 6 months was quite higher among alive infants (85.5%) as compared to that in the dead (64.5%), while bottle feeding was lower among living infants (14.5%) as compared to the dead (35.5%). Meanwhile, among infectious diseases, ARIs resulted in the most deaths in infants (25.8%), followed by Diarrhea (12.9%) but overall most of the causes were other than these two (seizures, sudden infant death, etc.) accounting for 61.3% of infant deaths. Among the 31 infant deaths, only 8 (25.8%) were fully vaccinated and 23 (74.2%) were non-vaccinated, whereas, out of the 339 alive infants, 229 (67.6%) were fully vaccinated and 110 (32.4%) were not vaccinated at all. Among 31 infants who died, 8 (25.80%) were pre-term and 23 (74.20%) were at-term whereas, out of the 339 alive children, 274 (80.80%) were at-term and 65 (19.20%) were pre-term. The mean age of mothers whose infants were alive was 28.18 years while the mean age of mothers of dead infants was 24.45 years.

Conclusion High IMR in rural areas of Peshawar is mostly due to preventable causes. With access to Primary Health Care (PHC), Mother Child Health (MCH), and Family planning, it can be significantly reduced

Key Words: IMR, Maternal age, Breastfeeding, Bottle feeding, Infectious diseases, and Vaccination.

This article may be cited as: Sabih M, Javed L, Saeed A, Hanif L, Abid H, Zia L, Nawab S, Haris M, Hamza MS, Natasha Junaid N. Assessment Of Infant Mortality Rate (IMR) In Rural Areas Of District Peshawar: A Cross-Sectional Study. PMSRJ 2023 January;1(1):27-30

INTRODUCTION

An infant's first year of life is undoubtedly the most paramount phase in cementing the foundations of a healthy life and establishing a proper health structure.¹ The death of young children under the age of 1 year is termed Infant Mortality and this death toll is measured as the Infant Mortality Rate (IMR), which is deaths per 1000 live births.² Infant mortality outlines the effects of different factors such as social, economic, and environmental on general lines both on infants' and mothers' health and also define the effectiveness of a country's health care

system.³ It has been a global public health concern that consequently results in affecting millions of people across the world. ⁴ IMR is a measure of infant mortality that is accepted as a global indicator of the health and socio-economic status of a given population. ¹

In 2018, around 4 million infants died, accounting for almost 75% of all deaths under the age of 5. ⁵ The importance of this subject can be emphasized by knowing the fact that Child Mortality has been included in the Millennium Development Goals, adopted by United Nations in the year 2000, the Goal 4 of which is "Reducing Child Mortality" by two thirds among children under 5 years by 2015. ⁶ Reduction in the child mortality is still a target of Sustainable Development Goals (SDGs), under the heading of Goal 3 "Good health and well-being". ⁷

This study focuses more specifically on Infant mortality which differs from Child mortality, which is death below the age of 5 years. Following the Fourth Millennium Development Goal, globally the infant mortality rate has decreased from an estimated rate of 65 deaths per

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Date Received: 21/11/2021

Date Revised: 04/05/2023

Date Accepted: 07/06/2023

1000 live births in 1990 to 29 deaths per 1000 live births in 2018. Annual infant deaths have declined from 8.7 million in 1990 to 4.0 million in 2018.⁵ According to the studies, IMR in the United States fell from 6.2 per 1000 births in 2010 to 5.7 per 1000 births in 2017, and in India, it fell from 45.1 per 1000 births in 2010 to 32 deaths per 1000 births in 2017 but in Pakistan, IMR was 70.4 per 1000 births in 2010 and it decreased to only 58.8 per 1000 births in 2017 which is not a significant change as compared to other neighboring countries.^{8,9,10} The low status of women's education, poor economic conditions, and low level of using public health care services are closely tied to higher infant death rates in Pakistan.¹⁰

As per the CIA World Factbook, a global comparison of the Infant Mortality Ratio shows that Afghanistan has the highest IMR in the world which is 106.75 deaths per 1000 live births. Afghanistan is followed by Somalia, Central African Republic, Niger, Chad, Sierra Leone, The Gambia, South Sudan, Equatorial Guinea, and Mozambique. As per the Factbook, Pakistan is ranked at number 18 with an IMR of 55.26.¹¹ As for IMR in Pakistan, there are large variations by regions in childhood mortality. For example, childhood mortality is highest in Punjab, where the neonatal, infant and under-5 mortality rates are 51, 73, and 85 deaths per 1,000 live births. FATA has the lowest at 18, 29, and 33, respectively.¹²

Infant mortality can be reduced by accomplishing cost-effective and suitable interventions. This includes sole breastfeeding for about six months to ensure infants' proper nutrition along with immunity. On the other hand, it also includes proper management and treatment of neonatal infections such as diarrhea and pneumonia (ARI).² The rationale of this study was to find out how infectious diseases, maternal factors, and vaccination is affecting infant mortality in rural areas and to give a preliminary idea to healthcare authorities for the initiation of healthcare projects in particular areas for infant care.

MATERIALS AND METHODS

It was a community-based descriptive, cross-sectional study conducted in two rural areas (Tehkal Bala and Palosi) of district Peshawar from April 2021 to September 2021. Using the WHO sample size calculator, 370 women of low socioeconomic status who had a live birth this year were included. Informed verbal consent was taken and those willing to participate were included.

Those who were not permanent residents and those not willing to participate were excluded. These mothers were selected through a convenient sampling technique. Semi-structured and open-ended questionnaires were used and conducted face to face interviews for the collection of data which was analyzed using SPSS version 23.

RESULTS

Out of 370, 144 participants were selected from Tehkal Bala and 226 samples from Palosi which accounted for 38.90% and 61.10% of the total sample respectively. Among the observed sample, 31 infant deaths were reported while 339 infants remained alive during the study period.

IMR came out to be 83.7 per 1000 live births. Out of 370, 219 (59.20%) were males and 151 (40.80%) were females and among 31 infant deaths, 12 were females (39%) while 19 were males (61%). Mode of feeding also affected the IMR greatly, sole breastfeeding during the first 6 months was quite higher among alive infants (85.5%) as compared to that in the dead (64.5%), while the frequency of bottle feeding was lower among living infants (14.5%) as compared to that in the dead (35.5%) as shown in Figure 1.

The age of the mother was also an important factor; the mean age of mothers whose infants died was 24.45 years and those whose infants were alive had a mean age of 28.18 years, so, babies born to younger mothers were at a greater risk of dying in their first year of life. Infectious diseases were another significant factor, out of 339 alive infants, 179 (53%) were not infected at all, while 70 (20%) suffered from ARI, 50 (15%) from diarrhea, and 40 (12%) suffered from some other infections at some point in their life before the study while among the 31 Infants deaths reported, 8 (26%) died of ARI, 4 (13%) died of Diarrhea while 19 (61%) died of other causes as shown in Figure 2.

Vaccination status was also observed, among the 31 reported infant deaths only 8 (25.8%) were fully vaccinated and 23 (74.2%) were non-vaccinated, whereas, out of the 339 alive infants 229 (67.6%) were fully vaccinated and 110 (32.4%) were non-vaccinated as shown in Figure 3, indicating that vaccination rate was much higher in alive infants. The term of birth was also taken into account, among the 31 infants who died 8 (25.80%) were pre-term and 23 (74.20%) were at-term whereas, out of the 339 alive children 274 (80.80%) were at-term and 65 (19.20%) were pre-term.

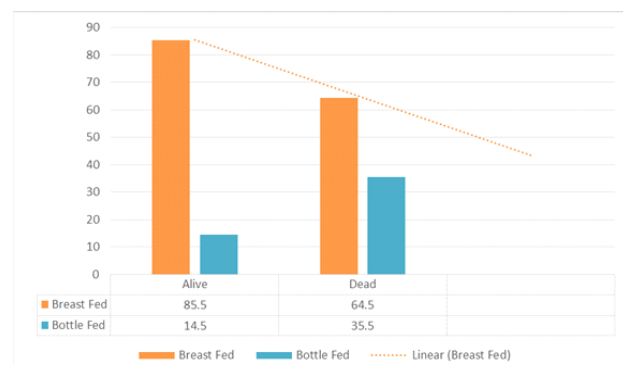


Fig 1: Feeding Mode among alive and dead infants

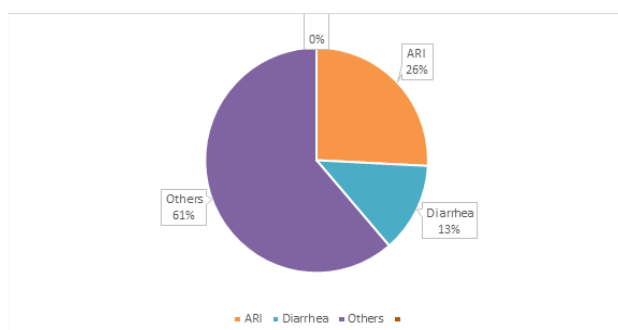


Fig 2: Infectious causes among dead infants

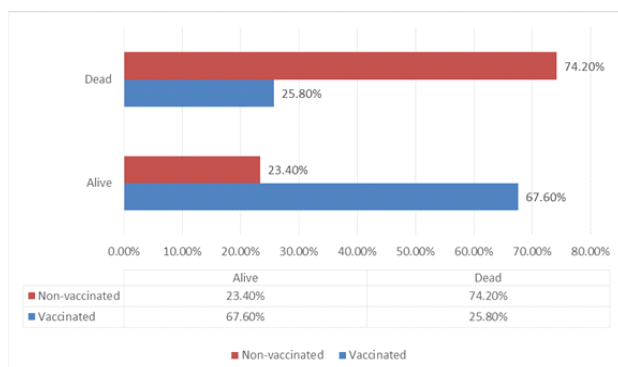


Fig 3: Vaccination status among alive and dead infants

DISCUSSION

In 2019, the infant mortality rate in the United Kingdom was at about 3.7 deaths per 1,000 live births, in China was at about 6.8 deaths per 1,000 live births, in India was about 28.3 deaths per 1,000 live births and in Pakistan, it was about 55.7 deaths per 1,000 live births.²²⁻²⁵ From the above statistics, it is quite clear that the infant mortality rate is quite higher in Pakistan as compared to other countries. Our team visited two villages of district Peshawar named Tehkal Bala and Palosai and collected 327 samples through interview-based written questionnaires from the mothers. Out of the total 370 live births, 31 infant deaths were reported while 339 infants remained alive during the study period.

According to our study, the calculated IMR for 6 months was 83.7 per 1000 live births in rural areas of district Peshawar. This is quite high even if compared to Pakistan's overall IMR. Gender-wise, 12 (39%) were females and 19 (61%) were males. A previous study conducted in the district of Peshawar showed a male-to-female ratio of 1.9:1.¹⁷ Further studies should be conducted to sort out gender-based infant mortality in these areas.

Out of the total 31 infant deaths reported, 8 died due to acute respiratory infections, 4 died of diarrhea and 19 died due to some other causes. Two other studies conducted in the district of Peshawar clearly demonstrate acute respiratory infections and diarrhea as the major causes of infant mortality.^{17, 26} Similar findings were noted

in the present study which indicates that these preventable diseases are still the major causes of infant mortality in peripheries of Peshawar. Sole breastfeeding during the first 6 months was quite higher among alive infants (85.5%) compared to that in the dead (64.5%), while the frequency of bottle feeding was lower among living infants (14.5%) as compared to the dead (35.5%).

Our study indicated that preterm babies were less likely to survive as compared to at-term babies. A study published in the 'Social Science and Medicine journal' stated that "nearly 71.1% of all neonatal deaths occurred in the early neonatal period, with small size for gestational age or low birth weight (17.7%)".²⁷ This can be extrapolated to our study which suggests a positive correlation of IMR with early birth. Regarding the vaccination status, among the 31 reported infant deaths, only 8 were fully vaccinated and 23 were non-vaccinated whereas out of the 339 alive infants 229 were fully vaccinated and 110 were not vaccinated indicating that the vaccination rate was much higher in alive infants.

CONCLUSION

It is concluded that in rural areas infant mortality is high in our study. Effective strategies are needed to address the causes associated with infant mortality. Studies should be done in all areas of district Peshawar to find the exact mortality rate of the whole province.

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CONFLICT OF INTEREST: Authors declare no conflict of interest

GRANT SUPPORT AND FINANCIAL DISCLOSURE: NIL

AUTHOR'S CONTRIBUTION

Following authors have made substantial contributions to the manuscript as under

- | | |
|------------------|---|
| Sabih M: | Concept, planning, study design, study conduction, critical review, analysis, manuscript writing. |
| Javed L: | Critical review, discussion, interpretation, manuscript writing, study conduction. |
| Saeed A: | Analysis, critical review, study conduction. |
| Hanif L: | Critical Review, study conduction, interpretation. |
| Abid H: | Study design, study conduction. |
| Zia L: | Study design, study conduction. |
| Nawab S: | Critical review, discussion. |
| Haris M: | Planning, Study conduction, analysis |
| Hamza MS: | Study design, study conduction. |
| Junaid N: | Study conduction, critical review. |

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.



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