



STATISTICAL ANALYSIS OF INFANT MORTALITY RATE IN MIZORAM.

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Abstract

Infant Mortality Rate (IMR) is the number of children who die before completing his or her first birthday day. It is usually taken as per 1000 live birth. According to census 2011, the population of Mizoram was 10.97 lakhs only and the study of Infant Death is very important for our future. Therefore, this paper is based on statistical analysis of infant mortality rate in Mizoram. In this paper, we use secondary data from "HEALTH AND FAMILY WELFARE DEPARTMENT" Government of Mizoram. In this paper, we apply time series trend for determine the trend and estimate the parameters. We also followed the trend to forecast for the next 10 years and the Quadratic Model is the best model to forecast. Based on our findings, we need more workshops or public awareness about maternal healthcare, so that we can alienate from Mizoram and we can make a better Mizoram for the future.

Keywords: Mortality, Infant, Death, IMR, Forecast, Trend

1. INTRODUCTION

Infant Mortality Rate (IMR) is very important for the country's development. The IMR value can indicate the healthcare condition of the country. According to SRS Bulletin, 2020, the IMR Value for India is 28. If the IMR value is less, then it indicates that most of the newly born children were completing his or her first birthday is more as compared to the number of newly born children who died before reaching his or her first natal day taken per 1000 live births. According to UNICEF 2020, India is in the country who have more IMR Value in worldwide and stands in the 58th position. That means that our Indian healthcare system needs to develop like a developed country. In India, Madya Pradesh state has the highest IMR value (43), followed by Uttar Pradesh (38) and Assam (36). In North East State, the best performance state is Mizoram with an IMR value of 3, followed by Nagaland (4) and Sikkim (5). According to the SRS Bulletin, Mizoram got 27 IMR values in 2016, and in 2017, the IMR Value was 15, and in 2019, the IMR value decreased to 3 and

we still stand IMR Value of 3 in 2022. So, the performance of Mizoram for decreasing IMR value is outstanding and the Health Department of Mizoram plays a very important role in the improvement and achievement of IMR Value today we reach in Mizoram.

According to census 2011, Mizoram's population is only 10.97 lakh and it is very important to know the infant deaths in our country. If we can maintain our healthcare system, everyday life, and practices, one day we can make Mizoram free from Infant death and a better Mizoram. To decrease infant death, the people also have a responsibility, especially males play a very important role in decreasing IMR value.

2. Objective of the Study

The objective of the study is to propose models for the Infant Mortality Rate of Mizoram from 2008- 2021 using the Time Series Trend Model and forecasting the Infant Mortality Rate of Mizoram for the next 10 Years.

3. Source of Data

The Data used for this paper is secondary data extracted from the “HEALTH AND FAMILY WELFARE DEPARTMENT” Government of Mizoram. Website:- <https://health.mizoram.gov.in>.

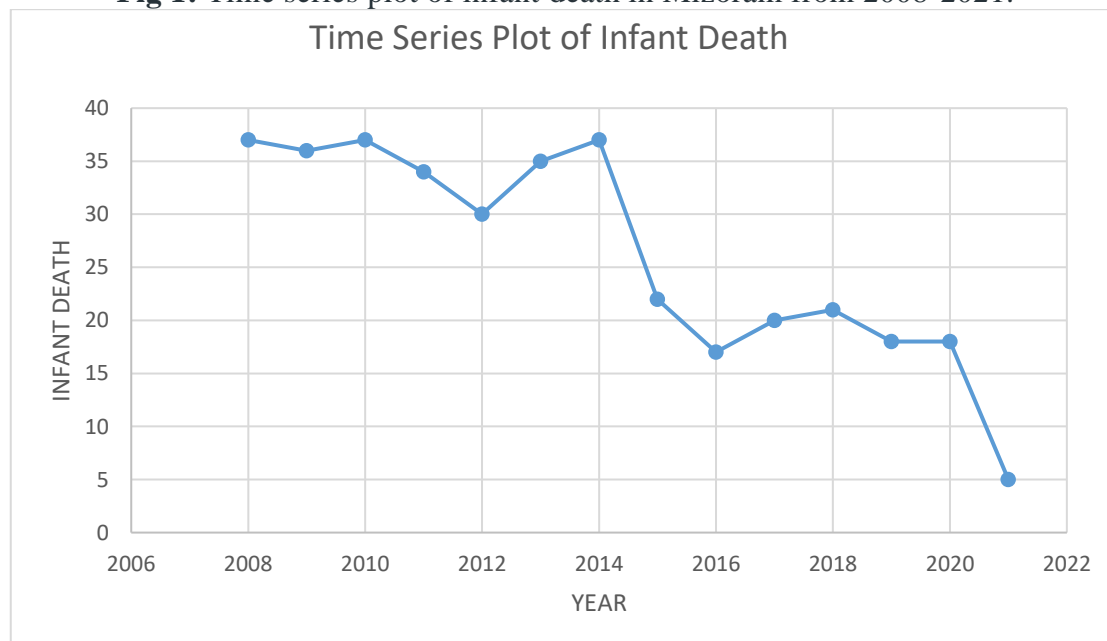
4. Methodology

Time Series Analysis is a specialized set of regression techniques aimed at revealing patterns within data over a span of time. This intricate methodology integrates historical observations and previous errors within those observations to predict future values. Time series data comprises a sequence of data points tracking a particular variable across a chronologically ordered timeframe. Its prevalence is swiftly increasing, making it a pivotal category of databases. Industries across the spectrum rely on time series data to fathom and predict trends within information sets. Hence, when preparing such data for modelling, it becomes imperative to meticulously scrutinize time series components or patterns. Among these components, the concept of “Trend” holds significant importance.

A “Trend” is a discernible pattern within data that indicates a consistent shift of a series towards either higher or lower values over an extended duration. In simpler term, a trend manifests when there is a noticeable upward or downward incline in the time series graph. This tendency typically endures for a substantial period before dissipating. It doesn't follow a cyclical recurrence.

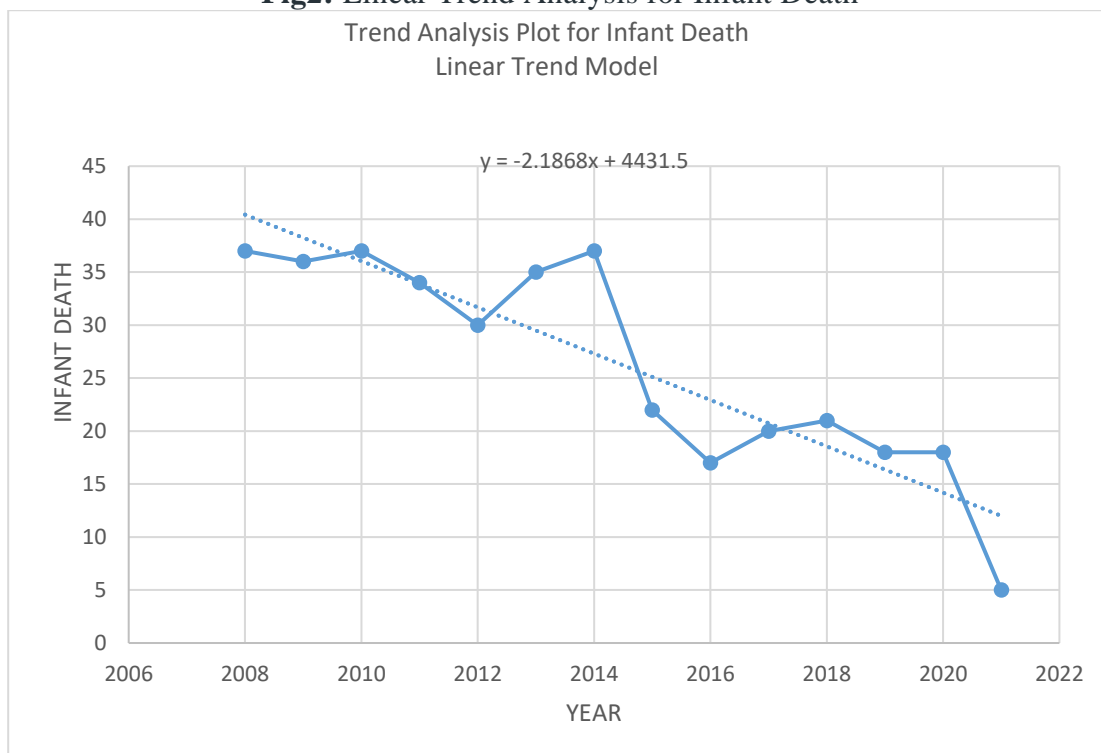
Time Series Plot

Fig 1: Time series plot of infant death in Mizoram from 2008-2021.



Trend Analysis Plot for Infant Death for different Models

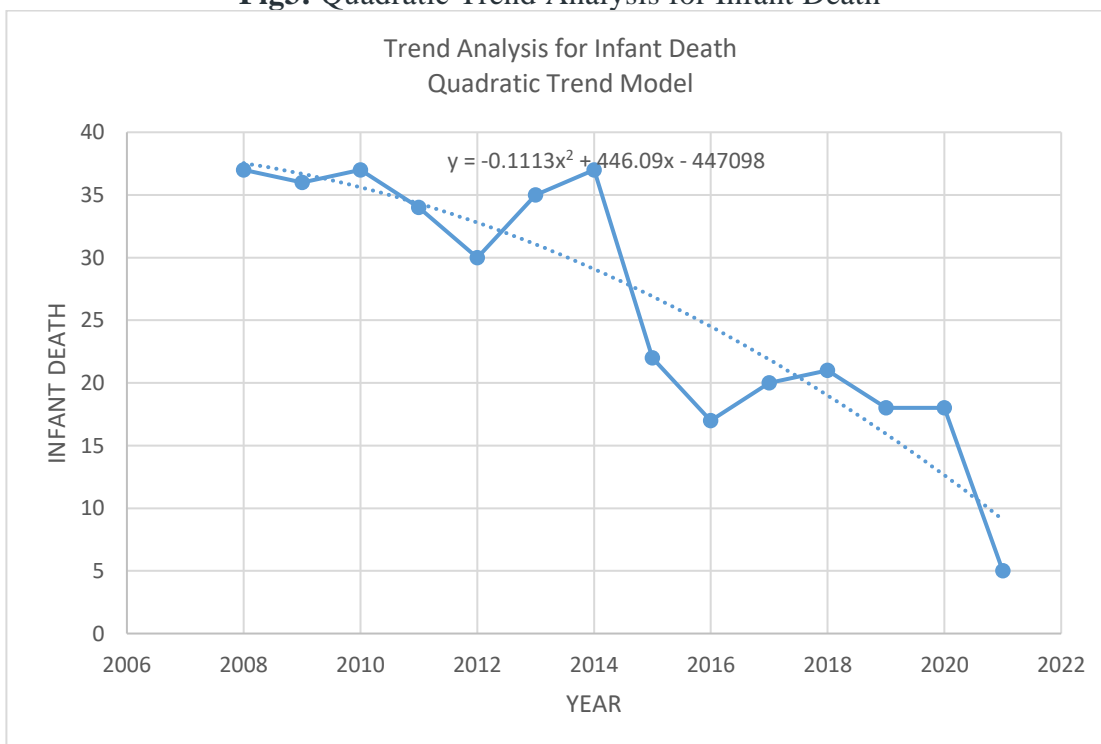
Fig2: Linear Trend Analysis for Infant Death



Fitted Trend Equation

$Y_t = -2.1868x + 4431.5$; Accuracy measure; MAPE:0.089, MAD:0.126, MSD:4.329

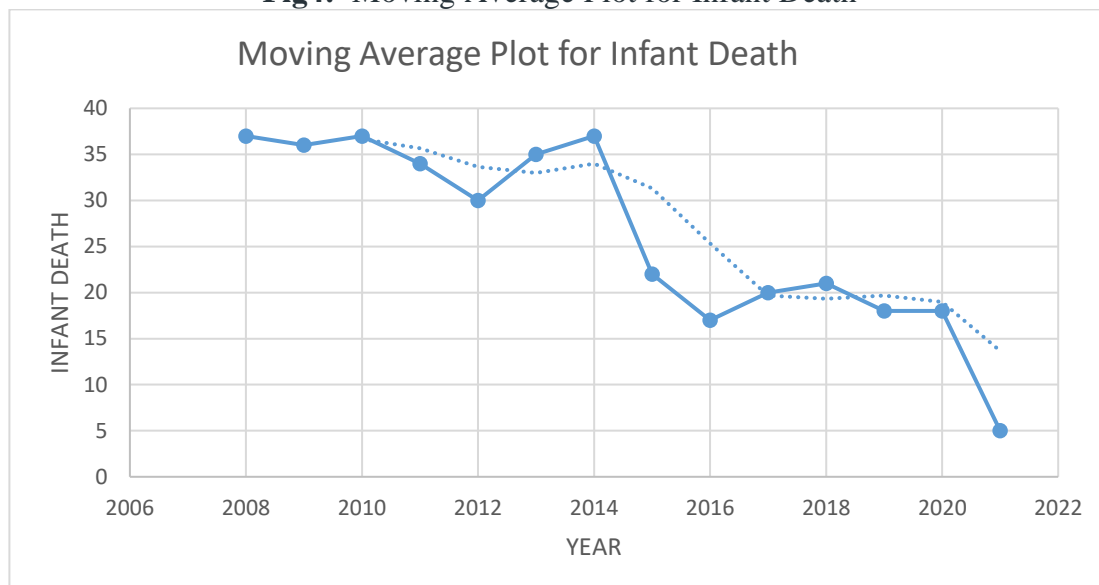
Fig3: Quadratic Trend Analysis for Infant Death



Fitted Trend Equation

$Y_t = -0.1113x^2 + 446.09x - 447098$, Accuracy measure; MAPE:0.047, MAD:0.103, MSD:3.538

Fig4: Moving Average Plot for Infant Death



Moving Average: Length 3; Accuracy Measures; MAPE:0.267, MAD:3.472, MSD:22.305

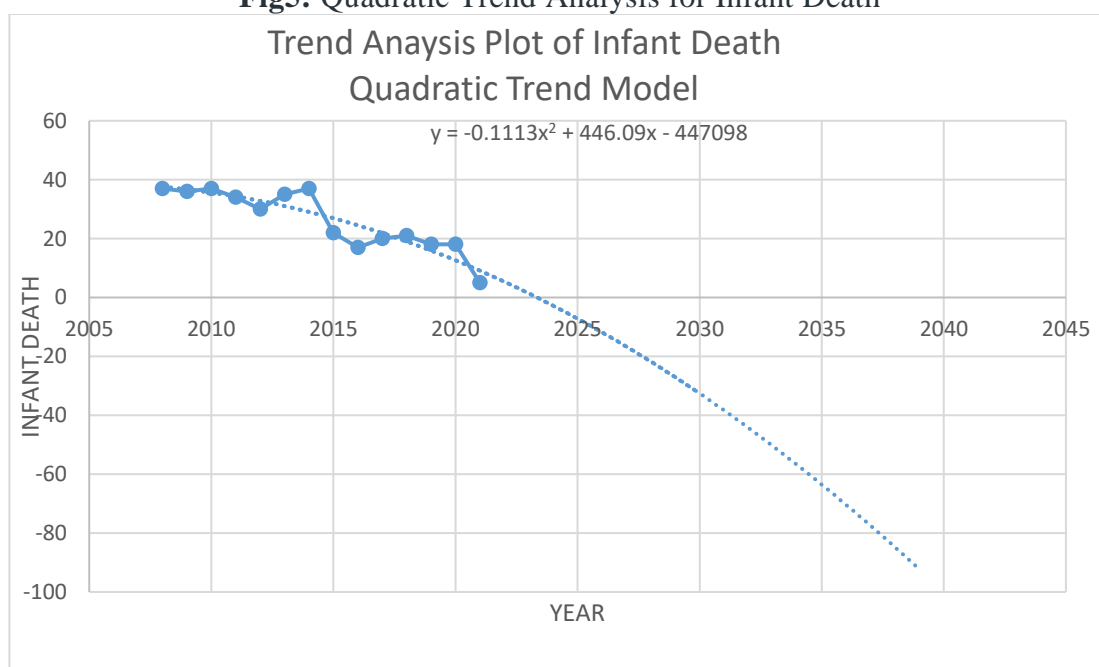
TABLE 1: Accuracy Measure of the three different Model

Accuracy Measure	Linear Trend	Quadratic Trend	Moving Average
MAPE	0.089	0.047	0.267
MAD	0.126	0.103	3.472
MSD	4.329	3.538	22.305

Table 1 shows that the accuracy measure of the three different trend model and from the results, we can conclude that the Quadratic Trend Model has the least accuracy measure and hence it is the best model to fit the data.

5. Forecast Using Quadratic Model

Fig5: Quadratic Trend Analysis for Infant Death



Fitted Trend Equation

$Y_t = -0.1113 x^2 + 446.09x - 447098$, Accuracy measure; MAPE:0.047, MAD:0.103, MSD:3.538

6. Forecast

YEAR	Forecast
2022	0.567
2023	-152.289
2024	-156.407
2025	-160.748
2026	-165.312
2027	-170.098
2028	-175.107
2029	-180.339
2030	-185.793
2031	-191.47

The above shows that the forecast value of the Infant Mortality Rate of Mizoram for the next 10 years using Quadratic Trend Model. As from the table, we can say that Mizoram State is predicted to have a least or likely to have zero infant death in future.

6. Discussion

The Time Series Trend Model has been used to analysis of infant mortality rate of Mizoram from 2008-2021. From this study, we can conclude that Quadratic Trend Model is the most appropriate model to fit our infant mortality rate data having the least accuracy measure. From that the Trend analysis, we can see that the trend showed a downward trend and we can clearly say that there is a continuous decrease in the number of infants death in Mizoram. From the forecast value, we can conclude that Mizoram State was predicted to have a least or likely to have zero infant death in future. To make Mizoram State have a zero infant death, we need more awareness about maternal healthcare in urban and rural area, especially in rural area, because there are so many infant death in rural area which is not recorded in file (due to insufficient of worker, etc.).

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