

Neonatal mortality rate at Al-Elwaya maternity hospital in Baghdad city: Retrospective study

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Objective This study was conducted to assess the neonatal mortality rate in Baghdad city during the last 10 years (2008–2017).

Methods This study was conducted at Al-Elwaya maternity hospital in Baghdad city: The retrospective study last 10 years ago (2008–2017) regarding neonatal mortality rate. This study was started in October 2017 to February 2018. The data regarding neonatal mortality rate was achieved from the data recorded in the Statistical Department in the hospital.

Results The result shows meaningful S-shaped auto-regression model tested in two-tailed alternative statistical hypothesis for two factors, time sequence per (years) factor as (Independent), and number of dead birth factor as (Dependent). Slope value was estimated and indicated that increasing with inverse transformation of one lagged period factor (1 year), occurring with a positive increment on natural logarithm transformation of the unit of dead birth number, and that estimated by (-0.95284) , and the increment was recorded as highly significant and positive effectiveness at $P < 0.01$, as well as strong and highly significant correlation ship at $P < 0.01$ between studied factors and accounted (0.69863) , with meaning determination coefficient of R -square (48.808%) , which explanation disturbances among the numbers of dead birth along with the studied periods.

Conclusion The results of this study show that the neonatal mortality rate increased with the time sequence for the last 10 years (2008–2017) in Al-Elwaya maternity hospital in Baghdad city.

Keywords retrospective study, neonatal mortality rate, prediction of Neonatal Mortality, time sequence

Introduction

The first 28 days of life during the neonatal period are the most vulnerable period for a newborn's survival. Newborns face the highest risk of dying in their first month of their life, at a global rate of 19 deaths per 1000 live births. Globally, 2.6 million newborns died in the first month of their life in 2016, approximately 7,000 newborn deaths every day most of which happened in the first week, with about 1 million dying on the first day and approximately to 1 million dying within the next 6 days.¹ The large number of the neonatal deaths are occurred in the first day and week, with about 1 million dying on the first day and approximately 1 million dying within the next 6 days. More than 60 countries will miss the reducing neonatal mortality to at least as low as 12 deaths per 1000 live births by 2030. About half of them will not reach the target by 2050. These countries carry about 80% of the burden of neonatal deaths in 2016.² Neonatal mortality accounts for a large proportion of child deaths in many countries, especially in low-income settings. Mortality during the neonatal period is considered as an indicator of both maternal and newborn health and care.³ The newborn mortality rate (NMR) is the number of deaths of newborns under 1 year old per 1000 live births.⁴ The NMR has often been used as an indicator of the standard of a country's social, educational and healthcare systems. Strategies, which address inequalities both within a country and between countries, are necessary if there is going to be further improvement in global perinatal health.⁵ In 2015, in the United Kingdom, 1360 babies who were born after 24 weeks' gestation died in their first 28 days of life. Overall, neonatal mortality rates are declining. This means that generally fewer babies per 1000 births are dying each year. In 2014, 31% of babies who died in their first 28 days of life died related to complications after birth; this was the largest cause of death. About 28% of babies died due to congenital anomalies, and

18% of deaths were due to babies being born extremely early, how early a baby is born has an effect on their chance of survival, and a high proportion of neonatal deaths in the United Kingdom are due to complications caused by prematurity. The following survival rates have been calculated from the number of live births and deaths in 2013.⁶ About 0.75 million neonates die every year in India, the highest rate of any country in the world. The neonatal mortality rate (NMR) declined from 52 per 1000 live births in 1990 to 28 in 2013, but the rate of decline has been slow and lags behind that of newborn mortality rates. Among neonatal deaths, the rate of decline in early neonatal mortality rate (ENMR) is much lower than that of late NMR. The high level and slow decline in early NMR are also reflected in a high and stagnant perinatal mortality rate. The rate of decline in NMR, and to an extent ENMR, has accelerated with the introduction of National Rural Health Mission in mid-2005. Almost all states have witnessed this phenomenon, but there is still a huge disparity in NMR between and even within the states. The disparity is further compounded by rural–urban, poor–rich and gender differentials. There is an interplay of different demographic, educational, socioeconomic, biological and care-seeking factors, which are responsible for the differentials and the high burden of neonatal mortality. Addressing inequity in India is an important cross-cutting action that will reduce newborn mortality.⁷

Methodology

This study conducted at Al-Elwaya Maternity Hospital in Baghdad City: Retrospective study for the last 10 years (2008–2017) regarding the neonatal mortality rate. This study was started in October 2017 to February 2018. The data regarding neonatal mortality rate was achieved from the data recorded

in the Statistical Department in the hospital. The following statistical data analysis approaches were used to analyze and assess the results of the study under application of the statistical package (SPSS) version 18.0: Fitted of long-term trends for simple auto-linear and auto-nonlinear regression equations, such that [inverse, (polynomial autoregression quadratic, cubic), power, compound, S-shaped, logistic, compound, growth and exponential] predicated equations are applicable for newborn death rate, incidence rates of congenital delivery, and neonatal mortality rates, as dependent variables affected by lagged sequence of times as an independent variable (per year). For the abbreviations of the comparisons significant (CS), used the followings: NS, non-significant at $P > 0.05$, S, significant at $P < 0.05$, HS, highly significant at $P < 0.01$. The neonatal mortality rate calculated with the number of deaths during the first 28 days* of life per 1000 live births in a given year.⁹⁻¹³

Results

Table 1 shows that the neonatal mortality rate in general increases with the sequences of the years for the last 10 years from 2008–2017, according to the data recorded in the Statistical Department in Al-Elwaya maternity hospital except in 2015, due to the loss of data related to migration.

Table 2 shows meaningful S-shaped auto-regression model tested in two-tailed alternative statistical hypothesis for two factors, time sequence per (year) factor as (independent), and number of dead birth factor as (dependent). Slope value

was estimated and indicating that increasing with inverse transformation of one lagged period factor (1 year), occurring with a positive increment on natural logarithm transformation of the unit of dead birth number, and that estimated by (-0.95284), and the increment was recorded as highly significant and positive effectiveness at $P < 0.01$, as well as strong and highly significant correlation ship at $P < 0.01$ between studied factors, and accounted (0.69863), with meaning determination coefficient of R -square (48.808%), which explanation disturbances among the numbers of dead birth along with the studied periods.

Figure 1 shows the long-term trend of time sequence (years) factor on the number of neonatal mortality rate factor.

Table 3 shows meaningful power-shaped auto-regression model tested in two-tailed alternative statistical hypothesis for two factors, time sequence per (year) factor as (independent), and NMR factor as (dependent). Slope value was estimated and indicating that increasing with natural logarithm transformation one lagged of period factor (1 year), occurring with a positive increment on natural logarithm transformation unit of (NMR), and that estimated by (0.491195), and the increment was recorded as highly significant and positive effectiveness at $P < 0.01$, as well as strong and highly significant correlation ship at $P < 0.01$ between studied factors, and accounted (0.74364), with meaning determination coefficient of R -square (55.301%), which explanation disturbances among the numbers of dead birth along with the studied periods.

Figure 2 shows the long-term trend of time sequence (years) factor on the (NMR) factor.

Table 1. Distribution of the neonatal mortality rate (2008–2017)

Years	The total number of deliveries	The total number of a life deliveries	A life males	A life females	The total number of neonatal death	Neonatal mortality rate
2008	16,912	16,653	8564	8589	0.259	15.55
2009	18,369	18,107	8972	9135	0.262	14.46
2010	20,232	20,129	10,072	10,057	0.303	15.05
2011	18,596	18,297	8192	10,105	0.299	16.34
2012	16,315	15,791	8504	7287	0.278	17.60
2013	17,579	17,279	8656	8673	0.300	17.36
2014	22,648	22,275	12,136	10,139	0.390	17.50
2015	22,001	21,675	8872	12,803	0.326	15.04
2016	19,752	19,499	9653	9846	0.353	18.10
2017	19,342	19,192	9657	9535	0.356	18.54

Table 2. Correlation of time sequence (per year) on the neonatal mortality rate

Dependent variable method ... S-shaped model no of dead birth					
Simple correlation coefficient	0.69863	Meaningful linear regression tested in two-tailed alternative statistical hypothesis			
R -square	0.48808				
F (Statistic)	8.58095	Sig. level	0.0168 (S)*		
Variables in the equation					
Variable	B	$SE.B$	Beta	t -Test	Sig. of (t)
Sequence per year	-0.95284	0.325278	-0.69863	-2.929	0.0168
(Constant)	5.769005	0.122418	-	47.125	0.0000
Predicted equation is $Y = e^{(b_0 + (b_1/t))}$ or $\ln(Y) = b_0 + (b_1/t)$					

*S: significance at $P < 0.05$, t : time sequence (per year).

Discussion of the results

In this study, the results show that the neonatal mortality rate increased with the time sequence for the last 10 years (2008–2017) in Al-Elwya maternity hospital in Baghdad city. The majority of the neonatal deaths are concentrated in the first day and within a week, Neonatal mortality accounts for a large proportion of child deaths in many countries, especially in low-income settings like Iraq. Mortality during neonatal period is considered as an indicator of both maternal and newborn health and care. Most of the pregnant woman does not receive the primary health care during pregnancy related to several causes, such as the emigration, country’s social, educational and healthcare systems and strategies. Other factors such as duration of hospitalization, birth weight, and gestational age have effect on newborns mortality and gestational blood pressure has direct effect on newborns mortality.

Overall neonatal mortality rates have declined over the past several decades in the under developing countries; the Southeastern states have remained the leading states in high infant death in the United States. In the previous study, the researcher studied the differences in infant mortality in the United States from 2005 to 2009 according to mother’s characteristics (age of mother, marital status, maternal race, maternal education), birth characteristics (month when

maternal prenatal care began, birth weight), and infant’s characteristics (age of infant at death). In the previous study, data suggested that mothers with no prenatal care had a very high overall neonatal death rate. It is suggested that better education and living quality should be available and improved for the mothers.⁸ In Uganda, NMR remains high at 27 deaths per 1000 live births. There is paucity of data on factors associated with NMR in rural communities in Uganda. The objective of this study was to determine NMR as well as factors associated with neonatal mortality in the rural communities of three districts from eastern Uganda. The neonatal mortality was found to be 34 per 1000 live births. Neonatal mortality in rural communities is higher than the national average. The use of CHW’s to mobilize and sensitize households on appropriate maternal and newborn care practices could play a key role in reducing neonatal mortality.¹⁴ Variables such as duration of hospitalization, birth weight, gestational age have negative effect on infant mortality, and gestational blood pressure has positive direct effect on infant mortality that at whole represented 66.5% of infant mortality.¹⁵ Results of another study suggest that the current community based newborn survival intervention should provide an even greater focus to essential newborn care practices, low birth weight newborns, and female education.^{16–18}

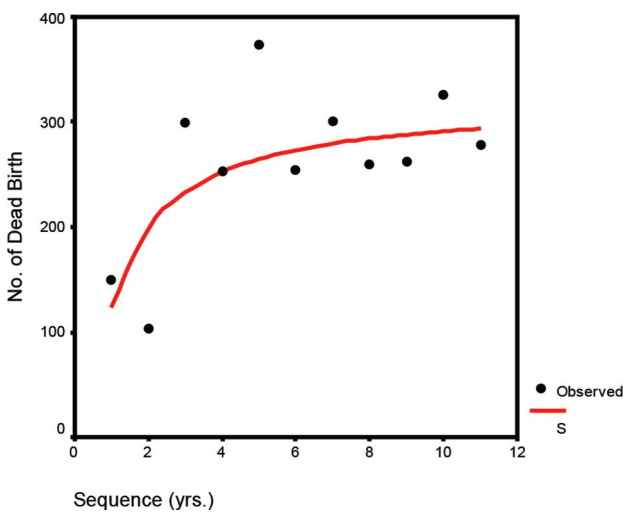


Fig. 1 Long-term trend scatter diagram correlation of time sequence factor on neonatal mortality rate factor.

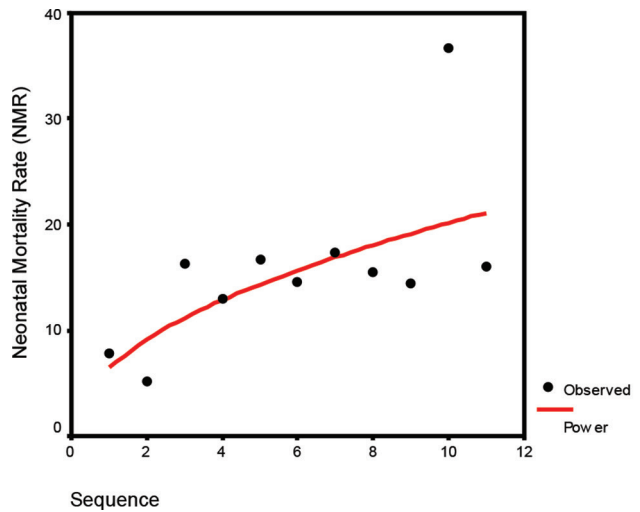


Fig. 2 Long-term trend scatter diagram correlation of time sequence factor on the NMR.

Table 3. Correlation of time sequence (per year) on the NMR

Dependent variable method ... power – S-shaped model no of dead birth					
Simple correlation coefficient	0.74364	Meanful linear regression tested in two-tailed alternative statistical hypothesis			
R-square	0.55301				
F (Statistic)	11.13457	Sig. level	0.0087 (HS)*		
Variables in the equation					
Variable	B	SE.B	Beta	t-Test	Sig. of (t)
Sequence per year	0.491195	0.147203	0.743645	3.337	0.0087
(Constant)	6.502163	1.667833	–	3.899	0.0036
Predicted equation is $Y = b0 \times (t^{b1})$ or $\ln(Y) = \ln(b0) + (b1 \times \ln(t))$					

*HS, highly significance at $P < 0.01$, t: time sequence (per year).

Conclusion

The results of this study show that the neonatal mortality rate increased with the time sequence for the last 10 years (2008–2017) in Al-Elwaya maternity hospital in Baghdad city.

Recommendations

1. Decrease incidence of infection and injuries during delivery.

2. Enhance the services that are provided in Neonatal Intensive Care Unit.
3. Enhance the primary health care services.
4. Increase the awareness of pregnant women about the important of prenatal care.
5. Further studies about the causes of neonatal death in all governorate in Iraq. ■

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