

Research Article,

Socioeconomic Factors and Infant Mortality among Female Married Teachers and other Employees in Primary School for Girls in Makkah

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Received: 01 June | Accepted: 15 June 2020 | published: 16 June 2020

Abstract:

Background: Mortality rate of infant happens to be pointers by which a nation's population health and wellbeing can be measured. The main objective of the research was to find out what influences infant death among married female teachers and employees in primary schools for Girls at Al-Jumoum Province.

Methods: A case control study was conducted with a questionnaire designed for collecting data from total sample of married female teachers and employees. One hundred and fifty-two married female teachers and employees from different primary school for Girls participated. Total sample size of 152 with 75 controls and 77 cases. The collected data were reviewed and coded. Data were analyzed using SPSS (version 18.0) software for analysis. Chi – Square test was used to make comparison between study and control groups.

Results: The result of study confirmed relation between knowledge of teachers and employees toward diabetes during pregnancy and infant death. There was a significant association between knowledge of teachers and employees about type of child feeding toward stillbirth immunity and infant death rate. Moreover, a highly significant association was found between awareness of teachers and employees regarding number of births among family and infant mortality rate.

Conclusions: The results indicated that infant mortality is associated with some socioeconomic factors such as knowledge of type of child feeding toward infant immunity, infection with diabetes during pregnancy knowledge and awareness about number of birth among families.

Key Words: Infant mortality; Female teachers; Primary Schools; Makkah.

Introduction:

Mortality rate of infant is a known sensitive indicator by which population is assessed for economic and health status [1]. Researchers continue to explore the relationships between infant mortality, health

inequalities and income in high-income countries [2]. Infants are considered sensitive groups in societies. As such, infant death rate helps in assessing the health system and it is one of extreme serious indicators of the environmental health and socioeconomic status among population in the world. Some social factors related to infant mortality include, mother's educational level, Age of mothers in first pregnancy. Prematurity, type of birth, child weight at birth, the type of milk (whether is it natural or artificial) child had, unemployment, multiparity and consanguineous wedding [3, 4]. Many studies revealed that socioeconomic factors effect on infant death rate through many factors such as directly or indirectly. The factors include consanguineous marriage, the mother's age and body mass index where higher risk of mortality was found among infants born to very young and very old mothers [5,6]. Over half of a million neonatal deaths occur annually in the Eastern Mediterranean Region from nearly four millions neonatal deaths worldwide forming 15.6% of global burden [7]. Deaths among children before their first birthday per 1000 live births.. In Saudi Arabia, IMR is 15.08 per 1000 live births [8]. There have been suggestions for continuous efforts to lower the infant mortality rates in Arab regions [9]. A study by Bobak of 1989–92 showed effects of different socioeconomic factors on risk of death from injuries and possible interactions between individual socioeconomic factors [10]. Infant mortality becomes an indicator by which care of a nation towards its future generation is assessed [11].

Methods:

Study area, Al-Jumoum province is located in the Western part of the Makkah, Saudi Arabia. It is bordered by the East of the Taif, from the South by Makkah, from the North by Al-Kamel and Khulais and from the West by Jeddah. Studying this community is unique in that the WHO named Al-Jumoum Governorate as the first healthy city in the region and third in the Kingdom [12]. This is a case control that used questionnaire for collection among married female teachers and employees. One hundred and fifty two married female teachers were used. The collected data were reviewed and coded. This population-based case-control study consists of 111 married female teachers and 41 employees. For each case, one control was selected to achieve matching of one-to-one to the case considering some socioeconomic variables. Cases were those who have infant mortalities while the controls were those without infant mortalities. There were total sample size of 77 for cases and 75 for controls. The questionnaire used generated information about, “socio-economic background of these female teachers and employees such as,” housing environmental situation, educational mothers, and type of milk for infant, age of mothers in first pregnancy, establish consanguineous marriages.

Ethical Consideration: The study was approved by both the Ethics Research Committee of the Faculty of Public Health and Health Informatics and the Ministry of Education. The Ministry of Education approval facilitated permission from each school used. The consent form was translated to Arabic for easy understanding and this was completed by subject in the study after through explanation of the study purpose.

Results:

Table 1: Distribution of study population according to occupation

Participants	Number	Percentage
Employees	41	27
Teachers	111	73
Total	152	100

The study population is 152 consisting of 111 (73%) married female teachers and 41 (27%) employees (those who are non-teaching staff). Table 2 presents the 9 primary schools randomly selected for the study. All the married with children staff of the schools selected were included as belonging the cases or comparative groups. There were 111 married female teachers and 41 married employees in the 9 selected for the study.

Table 2: Distribution of participants by selected primary schools

Name of School	Married female teachers		Married female employees	
	Number	%	Number	%
School 1	11	9.9	6	14.6
School 2	12	10.8	3	7.3
School 3	8	7.2	4	9.8
School 4	12	10.8	5	12.2
School 5	16	14.4	3	7.3
School 6	14	12.6	3	7.3
School 7	13	11.7	7	17.1
School 8	15	13.5	6	14.6
School 9	10	9.1	4	9.8
Total	111	100	41	100

Table 3 shows various characteristics of participants in the two groups with the number and percentages and chi square test to compare the two groups regarding association with infant mortality. Nationalities of participants are simply classified as Saudi and non-Saudis. Majority of both groups are Saudi while only few are non-Saudi. The results of comparison show no significance difference ($p>0.05$) in mortality. As per age distribution of participants, this ranges from 25 to over 40 years. There is no statistical relationship ($p=0.81$) between age group and infant mortality. Age at first birth of participants is presented. The results of both groups comparison show no significance difference ($p=0.96$) in infant mortality. In Table 3 also, association between mothers' numbers of child birth and infant mortality is displayed. The results of comparison show significant difference ($p=0.008$) in number if children and infant mortality. In Table 3, association between mothers with diabetes in pregnancy awareness and infant mortality is displayed. The results of comparison show significant difference ($p=0.011$) in both groups. This table also displays association between infant mortality in the participants and endogamy practice. The results of comparison show no significance difference ($p=0.48$) in mortality in both groups. Mothers' awareness of breast feeding benefits and infant mortality show significant difference ($p=0.03$).

Table 3: Association between certain respondents' characteristics and infant mortality

Participant characteristics	Cases		Control		X ²	P-value
	No	%	No	%		
Nationality						
Saudi	69	48.6	73	51.4%	3.687	0.055
Non Saudi	8	80.0	2	20.0%		
age group of participants						
25-29	12	46.2	14	53.8	0.255	0.880
30-40	48	51.6	45	48.4		
+40	17	51.5	16	48.5		
age at first pregnancy						
15-24	42	57.5	31	42.5	3.418	0.181
25-35	33	45.8	39	54.2		
>35	2	28.6	5	71.4		
number of child birth						
1	3	18.8	13	81.3	11.960	0.008
2	10	37.0	17	63.0		
3	25	54.3	21	45.7		
>3	39	61.9	24	38.1		
diabetes during pregnant						
Yes	22	71.0	9	29.0	6.426	0.011
No	55	45.5	66	54.5		
duration of breast feeding						
1year	57	51.4	54	48.6	1.055	0.590
2years	20	50.0	20	50.0		
>2years	0	0.0	1	100.0		
breast feeding awareness						
Yes	66	47.8	72	52.2	4.807	0.028
No	11	78.6	3	21.4		
type feeding						
Breast feeding	53	56.4	41	43.6	3.230	0.072
Bottle feeding	24	41.4	34	58.6		
interval between births						
<1year	13	50	13	50	3.221	0.359
1year-3yeas	50	51.5	47	48.5		
4years-6years	14	53.8	12	46.2		
>6	0	0.0	3	100		
<1year	13	50	13	50		
Endogamy marriage						
Yes	33	54.1	28	45.9	0.483	0.487
No	44	48.4	47	51.6		
Weight at birth						
Normal	66	49.6	67	50.4	0.455	0.500
Low	11	57.9	8	42.1		

Regarding type of infant feeding of participants, more (56.4%) participants with infant mortality breastfed their babies and more (58.6%) among the control gave bottle feeding. There is no significant difference ($p=0.07$) in mortality between groups. Association between duration of breast feeding of infants among mothers' shows that participant in both groups breastfed their babies for duration of between 1 to 2 years. The results of comparison did not show significant difference ($p=0.59$) in mortality in both groups. The table also displays association between infant mortality and the participants' age at first pregnancy. The results of comparison show no significance difference ($p=0.18$) in infant mortality in both groups. In Table 3, association between weight of children at birth and infant mortality is displayed. The results of comparison show no significant difference ($p=0.50$) in mortality in both groups.

Table 4: Association between some Socio economic characteristics and infant mortality

Socio economic characteristics	Cases		Control		X ²	P-value
	No	%	No	%		
Occupation						
Teacher	54	48.6	57	51.4	0.67	0.42
Employees	23	56.1	18	43.9		
# rooms in the house						
2-3	11	50.0	11	50.0	0.05	0.98
4-5	37	50.0	37	50.0		
5>	29	51.8	27	48.2		
number of children in the family						
1-2	3	30.0	7	70.0	3.99	0.26
3-4	32	50.8	31	49.2		
5-6	28	48.3	30	51.7		
6>	14	66.7	7	33.3		
Family Income in SR (US\$)						
2000-5000 (533-1,333)	15	51.7	14	48.3	0.81	0.85
6000-8000 (1600-2,133)	13	43.3	17	56.7		
9000-11000 (2400-2,933)	21	52.5	19	47.5		
Over 11000 (over 2,933)	28	52.8	25	47.2		

Table 4 shows near distribution of infant mortality with slightly higher among teachers (56.1%) compared to employees (43.9%). The results are not significant statistically ($P<0.415$). Income distribution of participants is presented in Table 6. Income ranges between SR 2000 (533.3 USD) per month to over SR 11,000 (2,333.3 USD). There is no significant difference ($p=0.85$) in mortality between groups and income. Number of children in the family in the participants ranges from 1 to 6 and above. The results of comparison show no significance difference ($p=0.26$) in mortality in both groups. As per number of rooms in participants' home and infant mortality, there are between 2 and more than 5 rooms reported in both groups. There is no significant difference ($p=0.98$) in mortality between regarding the number of rooms and infant mortality in both groups.

Discussion:

Association between education of mothers and infant mortality rates;

In our study, participants are classified into two (Teachers and others – employees). Educational levels of teachers are almost similar to employees with first degrees and above. The results found no statistical significance ($P<0.415$). A large body of research suggests that a causal relationship exists between maternal

education and childhood health and mortality [13]. Infant mortality is viewed as a measure of the health and well-being of children and the overall population health of a community. For example, in the USA, over the past decades, significant improvements in infant health have been made with rates of infant mortality falling from 10.9 infant deaths per 1,000 live births in 1983 to a record of 5.8 infant deaths per 1,000 births in 2013 as recorded by the National Center for Health Statistics 2013 [14]. Researchers in demography like Boerma and colleagues [15] as well as Mensch and colleagues [16] found strong significant link regarding education of mothers and deaths before the first year of live though, other researchers such as Desai and Alva [17] could not find such stated association which was similar to current findings.

Association between child weight at birth and infant mortality rate;

Low birth weight and premature births are high-risk births. A number of fetal complications and newborns requiring special and expensive medical care [18] often accompany these births. Low birth weight children are at greater risk for birth defects and / or associated disability, and represent a higher proportion of prenatal deaths [19]. Therefore, the death rate among low birth weight children contributes to a high overall infant mortality rate, especially during the early period of life. Some of studies [20,21] that reported increased infant mortality with low birth weight in both developed and developing countries with particular reference to birth defects and premature births without consideration to socioeconomic and demographic factors and household living conditions of the infants and mothers. In our study, results of comparison show no significant difference ($p=0.50$) in infant mortality and birth weight in both groups.

Association between type of milk given by mothers and infant mortality rate;

One should be expecting association with infant mortality of certain characteristics such as endogamy marriage and between breastfeeding and bottle feeding of infants. In this study, there is no statistical significance found in both ($p=0.48$ and $P=0.072$ for endogamy and breast feeding versus bottle-feeding respectively). The result of endogamy is similar to findings in the study by Al Husain and Al Bunyan [5] in Riyadh Saudi Arabia but differ from a previous study carried out in Turkey by Tunçbilek and Koco [22]. Breastfeeding have been suggested as the optimum feeding during infancy according to WHO that recommended this for the first 6 months of child's live. Exclusive breastfeeding not only benefits the child but also mothers, environment, economy and the entire society [23]. Therefore, obstetricians are uniquely positioned to counsel mothers about the health impact of breastfeeding and to ensure that mothers and infants receive appropriate, evidence-based care, starting at birth [23]. Mothers also benefit from this practice. Those who do not practice exclusive breastfeeding will be exposed to increased incidence of premenopausal breast cancer, ovarian cancer, retained gestational weight gain, type 2 diabetes, myocardial infarction, and the metabolic syndrome [24]. The current study found no statistical significant association with infants' mortality and type of feeding.

Multiparty, consanguineous marriages and infant mortality rate;

Consanguinity is, however, a controversial topic, in part due to public misunderstanding, complicated by often exaggerated past estimates of the adverse health outcomes [25]. There were studies on consanguineous marriages, only a few were population-based studies. Post-neonatal, infant and under-5 mortalities are high in first cousin unions by comparison with non-consanguineous marriages. According to a Turkish study, first cousin marriage is a significant determinant underlying the high total fertility and infant mortality rates in Turkey [21]. Consanguineous marriages are strongly favored in the Saudi population. A population-based study of consanguineous marriages conducted in the Riyadh area showed a prevalence rate of consanguineous marriages to be 51.3% with an average inbreeding coefficient of 0.02265, which was high compared with many other countries. The most important variables affecting inbreeding

were the regional background of the family ($p < 0.001$) and the level of education, which was inversely associated with consanguineous marriage ($p < 0.001$). However, perinatal and postnatal mortalities were not significantly different between consanguineous and non-consanguineous families in the study [26]. This finding is similar to our study and findings from Turkey's study reported above. Housing, environmental situation, economic level of households and some other factors relationship with infant mortality. This study showed that some socioeconomic factors are related to infant mortality rate among female married teachers and employees in primary schools for Girls at Al-Jumoum province, Makkah Al Mukarramah, Saudi Arabia. The study found three factors with statistical significance. There are association between diabetes during pregnancy and infant mortality ($P < 0.011$). The finding is supported strongly by previous studies such as that of Reddy and colleagues [27] and Persson and colleagues [28]. In Reddy and colleagues [27] retrospective cohort study in which pregnancy risk factors were compared in 712 singleton antepartum stillbirths with 174,097 singleton live births at or after 23 weeks of gestation. Pre-existing diabetes was independently associated with increased risk of stillbirth; (2.7, CI 1.8– 3.9). In Persson and colleagues population-based study [28], comparative analyses of obstetric and perinatal outcomes between type 1 diabetic pregnancies and the general obstetric population. More common Stillbirth and perinatal mortality were significantly found in type 1 diabetic as compared to control pregnancies. The number of births by mothers and infant mortality is statistically significant ($p < 0.008$) in this study. Studies in the past have found association between birth order and mortality. For example, Miller et al et al [29] used data from Bangladesh and the Philippines to prove that children born within 15 months of a previous birth are 60 to 80% more likely to die in the first two years of life than other children.

A study documented correlation between households without sanitation facilities and life expectancy at birth ($R^2 = 0.83$, $B = -0.088$, $P = 0.0007$); infant mortality rate ($R^2 = 0.87$, $B = 0.611$, $P < 0.0001$); and maternal mortality rate ($R^2 = 0.54$, $B = 8.297$, $P = 0.002$) [30]. It has also been reported that age of mother and order of birth behave in a U-shaped manner in relation to infant mortality whereby relationship is first decreasing and then increasing or vice versa [31]. There is no significant difference ($p = 0.98$) in mortality regarding the number of rooms and infant mortality in the current study. Our study found statistical significance in mothers' awareness of relationship immunity that breast milk confers on infants and infant mortality ($p = 0.028$). Previous study by Pertson, Patton and Hamosh [32] demonstrated that infants are protected by innate immune factors in milk.

Conclusions: Infant mortality is not necessarily associated with some notable socioeconomic factors but other factors like number of children in the family and underline disease such as diabetes. Awareness program should therefore focus on factors such as promotion breastfeeding and prevention of diabetes with diabetes during pregnancy and number of birth among families.

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