Full Length Research Paper

The impact of parental education on infant mortality in Gaza strip, Palestine

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A society's infant mortality rate is considered an important indicator of its health status. Maternal education has been accepted almost unanimously as a major socio-economic factor in infant mortality. In addition, it is one of the few measures of health status for which data are widely available in most countries. Many research studies have been done on this topic, but never in Palestine. This study was carried out in 2008 with the objective of determining the relationship between educational level of parents and infant mortality in the Gaza strip. Face to face interviews were carried out on 550 mothers of infants (275 dead infants and 275 live births) in the Gaza strip. Binary logistic regression analyses were used to identify the relationship between health behavioral factors and infant mortality. The result of this study showed that the families with lower educational level had a much higher risk of infant mortality. There was a positive statistical association between parental education and survival of infants. The findings underscore the importance of explicit attention to health education.

Key words: Parental education, social factor, infant mortality, Gaza strip.

INTRODUCTION

Infant mortality rate has declined dramatically during this century.Yet, despite the high quality and widespread availability of infant intensive care technology all over the world, the infant mortality rate in Palestine remains higher than that of many developed nations. The infant mortality rate is an important measure of the well- being of infants, children, and pregnant women because it is associated with a variety of factors, such as maternal health, quality and access to medical care, socio-economic conditions, and public health practices (Sohler et al., 2003). Education acts as a proxy for the socio-economic status of the family and geographic area of residence (Desai and Alva, 1998). There is a huge literature focusing on the determinants of infant and child mortality notably, on the influence of parental education directly or indirectly on child survival (Jahan, 2008; Stockwell et al., 2008; Hargreaves, 2007). Most demographic research indicates that there is a strong statistical association between

maternal education and infant mortality (Mustafa, 2008; Bicego and Boerma, 1991; Hobcraft, 1993; Mensch et al., 1985). These findings have led some researchers (Caldwell 1979; 1994) to conclude that there is a causal relationship between mother's education and child health and mortality. Other researchers (Desai and Alva, 1995) reject the existence of a strong causal

relationship. A mother's education may influence/enhance child health and mortality through different pathways (Rosenzweig and Schultz, 1982; Caldwell and Caldwell, 1993; Hobcraft, 1993) among which are: (1) the acquisition and use of health knowledge. (2) the use of health services. (3) increasing family resources, either through their own work or that of their husband, which in turn affect the health of family members. (4) affecting preferences for child health and family size. Generally, mothers with higher education also have higher incomes or marry husbands who have higher incomes. They also tend to live in rich communities with better access to health services (Palloni, 1981). In the United States, about one-third of infant deaths occur after the first month and are influenced greatly by social or environmental factors, such as educational level of

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parents (Medicinenet Report, 2010).

In this study, we aim to assess the relationship between paternal education and infant mortality and formulate applicable intervention to decrease infant mortality.

MATERIALS AND METHODS

Dead infant and alive birth controls were enrolled into a case-control study conducted in the Gaza Strip. This design was selected, because it is relatively simple, requires few subjects and is logistically easy and less expensive. Individual matching was applied by selection of one control for each case. Matching for location of residence, gender, and civilian status were done. The study was conducted in all Governorates of Gaza (North, Gaza, Middle, Khanyounis and Rafah). The inclusion criteria were: children who died between birth and the age of one year in the Gaza Strip during 2008; all live births born in the period between 1st June, 2007 and 31st May, 2008 and are still alive were used as the control group. We excluded cases who had a dead infant and a live birth in the same household.

Systematic random sampling technique was used for selecting cases. First identified was the needed sample size, which was 330 dead infants (300 for the main study, 30 for the pilot study). Then, the total number of the population (990 dead infants) was divided with the sample size to obtain the sampling fraction (3). Approval was received from all participants, the Ethical Committee of the Academic Hospital of the Free University of Brussels and the Ministry of Health in the Gaza Strip prior to the start of the study.

Data collection started on 1st September, 2009 and finished at the end of January, 2010. Face to face interviews were carried out on the mothers of cases and controls. Five female qualified staff members with social and medical backgrounds performed the interviews with the mothers at home. Their work was supervised on the spot by Walid Sabah, Head of the Health Education Department of the Ministry of Health in the Gaza Strip. The completed questionnaires were scanned and sent as soft copies through the internet to the researcher working at the Department of Medical Sociology of the Free University of Brussels. Hard copies of the questionnaires were printed out in Brussels, where the data entry took place.

The questionnaire included questions about family characteristics (maternal and paternal histories), pregnancy history, latest pregnancy (course of pregnancy, perinatal care use and delivery), health behavior and lifestyle habits (during pregnancy and after delivery) and living conditions.

Pilot testing was done prior to the start of the main study with the aim of checking the reliability and validity of the questionnaire as well as to evaluate the possible outcome. We also wanted to have an idea of the obstacles we were going to face during data collection, such as accessibility of the participants, in order to minimize the non-response rate in the main study. The pilot study was carried out on 60 participants (30 cases and controls each), representing 10% of the main study. The pilot study was conducted in the Gaza Governorate, because it is the biggest governorate and the most representative of the sample (including refugees, non refugees, low and high socioeconomic levels). Four staff members carried out the pilot study during ten days. Every interviewer did one to two interviews daily at the home of the mother. As a result of our pilot study, some questions of our questionnaire were updated, such as question 57 (what type of sport did you exercise?). We also added two new questions which yielded important supplementary information for our study, such as the type of citizenship of the mother (refugee or not refugee). As access to the participants proved to be rather difficult, we recruited one more interviewer

for the main study.

For the main study, 300 dead infants were selected as case. We selected equal numbers for control. Coggon, Barker and Rose (2003) states that when the cases and controls are available and when there are more than 100 participants and the cost is the same, the most efficient is to have the same number of cases and controls. The response rate was 92% (275 cases and controls each).

Variables

Educational level was categorized as never, once a week, twice a week and more than two times a week. Exclusive breast feeding was defined as the mother breastfeeding her baby for six months. Adequacy of antenatal care was classified according to the number of visits to antenatal care service. This study adopted the WHO criteria. It was categorized into two categories: risk ANC (< 4 ANC visits) and accepted ANC (>4<7 ANC visits).

Until now, international consensus about the definition of vulnerable age of the pregnant mother has been lacking. Therefore, our study adopted the definition of the World Health Organization, which considers less than 20 years and over 35 years as risky age for pregnant mothers. The age of the mother was categorized as young mother (< 20 year), normal age (20 – 35 year) and elder mother (> 35 year).

Occupational type was categorized as unskilled, semi-skilled and skilled. Income was measured by the net income (salaries) of all household members. The income was expressed in the New Israeli Shekel (500 NIS = 100 Euro). Income was categorized as low (< 300 Euro) and good (> 300 Euro). We used this cut offs according to the mean value of income.

Statistical analyses

All analyses were performed with the statistical package for social sciences (SPSS), Version 18. Descriptive statistics (Frequencies, cross tabulation and chi-square value) were used to describe the main features of the data and to study the firsthand relationship between the variables. Odds ratios (ORs) and 95% confidence intervals (CI) were calculated as estimates of relative risk. Logistic regression (for binary outcome) was used to assess the statistical relationship between parental education and the dichotomous dependent variable (dead infant or not).

This research also aimed to recognize the influence of educational level on the number of antenatal care visits and exclusive breast feeding. A significant result means that the p-value for the ordinal level measure is less than 0.05 and the confidence interval (CI) is 95%.

RESULTS

Descriptive statistics

Table 1 presents descriptive statistics for the variables used in the study. Over 82% of the mothers of dead infants had a low education status (secondary school or less), about 42% of the mothers of live births had a high education status (diploma and above). Only 5% of the mothers of dead infants were illiterate and the same percentage was among the mothers of live birth.

Over 75% of the fathers of dead infants had a low educational level; about 51% of the fathers of live birth

Table 1. Educational level factor in Gaza Strip, 2008.

Determinant	Frequency		Percentage		Chi square	p-value
	Case	Control	Case	Control		
Mothers' education	275	275	50	50		
Illiterate	6	5	2.2	1.8		
Primary school	25	25	9.1	9.1		
Preparatory school	56	37	20.4	13.5	42.5	0.000
Secondary school	140	92	50.9	33.5		
Post high school (Diploma)	15	46	5.5	16.7		
Graduation degree / above	33	70	12	25.5		
Father's education	275	275	50	50		
Illiterate	9	0	3.3	0		
Primary school	47	21	17.1	7.6		
Preparatory school	57	37	20.7	13.5	50.61	0.000
Secondary school	94	76	34.2	27.6		
Post high school (Diploma)	23	49	8.4	17.8		
Graduation degree / above	45	92	16.4	33.5		

Table 2. Frequency of health behavior among the mothers of dead infants.

Health behavior	Low education No.	High education No.	Low education %	High education %
Number of ANC				
< 4 ANC visits	64	38	62.7	37.3
<7 ANC visits	135	89	60.2	39.8
Breastfeeding				
Never breastfeed	42	22	65.5	34.5
Exclusive breastfeed	76	111	40.6	59.4
Age of the mothers				
Young mother < 20 yrs	58	12	83	17

had a high educational level. Maternal educational status was a significant determinant of infant mortality (chi-square value = 42.49, p-value = 0.000). There was a significant association between paternal educational status and infant mortality (chi-square value = 50.6, p-value = 0.000).

In Table 2, mothers who had a high educational level attended antenatal care visits more than the mothers with low education (< 4 ANC visits = 63% of total mothers of dead infants, < 7 ANC visits = 60% of total mothers of dead infant). Table 2 also showed that mothers who never breastfed were higher in low educated mothers. The prevalence of exclusive breast feeding was higher in mothers with a high educational status (60%) than among the mothers with low educational status (40% of total mothers of dead infants). The young mothers were less educated than normal age mothers, approximately 83% of them had low educational level. Table 3 illustrates the odds ratio for the social factors.

The risk of infant death was 3.5 times higher among mothers who had a secondary education or less compared to mothers having a diploma or a university degree. The risk of infant death was 3.2 times higher among fathers who had a secondary education or less compared to the fathers having a diploma or a university degree.

Inferential statistics

In Table 3, the binary logistic regression was used to identify the effect of education of fathers and mothers on infant mortality. Education was one step tested by the entered method.

Parental education was found to be statistically significant in infant mortality. Maternal education has a statistically significant impact on infant mortality (p-value = 0.001) and there was a good correlation

Table 3. Logistic regression; parental education and infant mortality.

	Wald	*p*-value	OR	CI (95%)	
Education of mother	21.739	0.001	3.45	2.33	5.11
Education of the father	12.445	0.029	3.203	2.23	4.6

Table 4. Correlation among social determinants.

Social determinants	Correlation	*p*-value
Occupation type / fathers' education	0.57	0.00
Income / fathers' education	0.73	0.00
Mother's education / Number of ANC	0.67	0.00

between the educational level of mothers and numbers of antenatal care visits (R = 0.67, *p*-value = 0.001) as shown in Table 4.

The father's education also has a significant association with infant mortality (*p*-value = 0.023). There was a positive correlation between the educational level of the fathers and income (R = 0.73, *p*-value = 0.000). The educational level of the fathers and the type of occupation also have a good correlation (R =.57, *p*-value = 0.010).

DISCUSSION

While infant mortality can be viewed as an important public health problem in our society, it must be viewed as one that has strong socioeconomic determinants (Schell et al., 2007). The results of this study were consistent with previous research studies showing that the risk of infant mortality was lower in highly educated parents (Mustafa, 2008; Sohler et al., 2003; McGehee, 2005).

The educational level of mothers was one of the most significant social determinants of infant mortality. Many research studies have reported on the effect of mother's education on reducing child mortality (Akmatov et al., 2006; Jahan, 2008; Khawaja et al., 2008; Basu and Stephenson, 2005; Kiros and Hogan, 2001; Wagstaff, 2000; Caldwell, 1979).

The educational level of the father was also a significant determinant of infant mortality. This finding is supported by previous research studies (Macassaet al., 2003). In Table 4, the educational level of fathers was correlated with the type of the fathers' occupation. In this study, we found that the fathers with high education had skilled and semi-skilled occupations and most research studies have proved that infant mortality was less among fathers with skilled occupation. Other research studies such as Lee (1995) suggests that occupation should be the core socio-economic variable as it reflects educational attainment.

Net income was influenced by the educational level of the fathers as shown in Table 4. In this study, we found that the fathers, who had a higher education, had jobs. In addition to having a job, the well educated fathers have higher salaries than those fathers with a lower educational level. Many studies indicate that infant mortality rate is inversely correlated with the distribution of lower salaries and with post-neonatal mortality rate in particular (Jahan, 2008; Schell et al., 2007; Goldaniaet et al., 2001; Stockwell and Laidlaw, 2088; 1977; Hosseinpoor et al., 2006).

Figure 1 illustrates how parental education can affect infant mortality. This figure shows the impact of low education on other factors, which are also considered as determinants of infant mortality in the Gaza Strip.

In this study, efforts were made not only to assess the relationship between education and infant mortality, but also to know how the educational level of both mothers and fathers influence other factors such as income, occupation, age of the mothers and numbers of antenatal care visits. This study has been able to identify what effects the educational level has, directly or indirectly on infant mortality in the Gaza Strip. Until today, such a study has not been carried out in the Gaza Strip. One of the main weak points of this study is the ignorance of the level of education of other household members who live in the same place and might affect the relationship between parental educational level and infant mortality. Thus, researchers should take this into consideration in future studies.

Conclusion

We found an inverse association between parental education and risk of infant mortality in the Gaza Strip. The mothers with low educational level have higher infant mortality rates. While infant mortality can be viewed as an important public health problem, it must be viewed as one that has strong socioeconomic determinants.

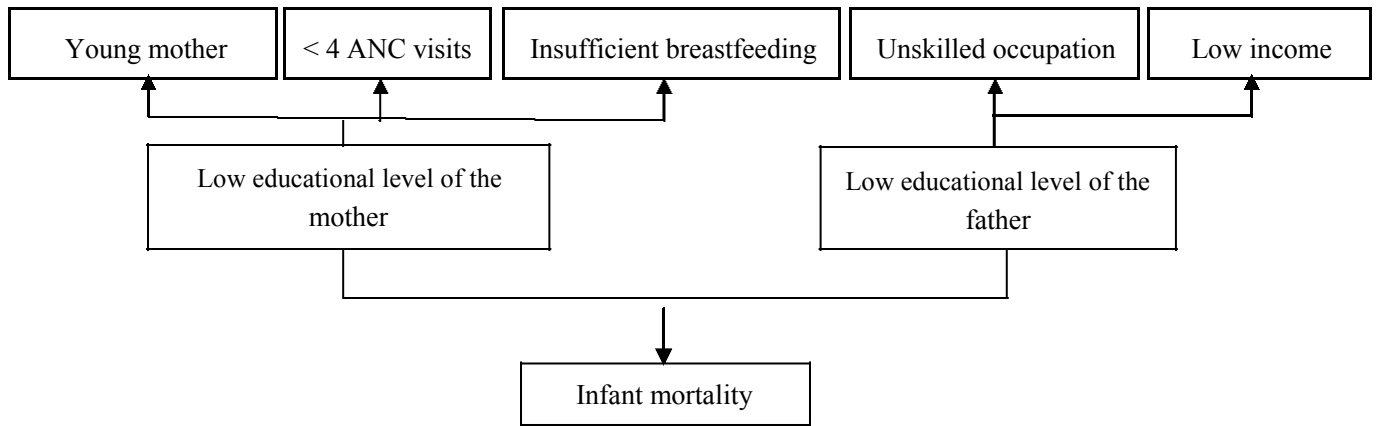One of the most important policy conclusions is that there is a need for vigorous educational campaign

Figure 1. The effect of education on infant mortality and socio-demographic factors.
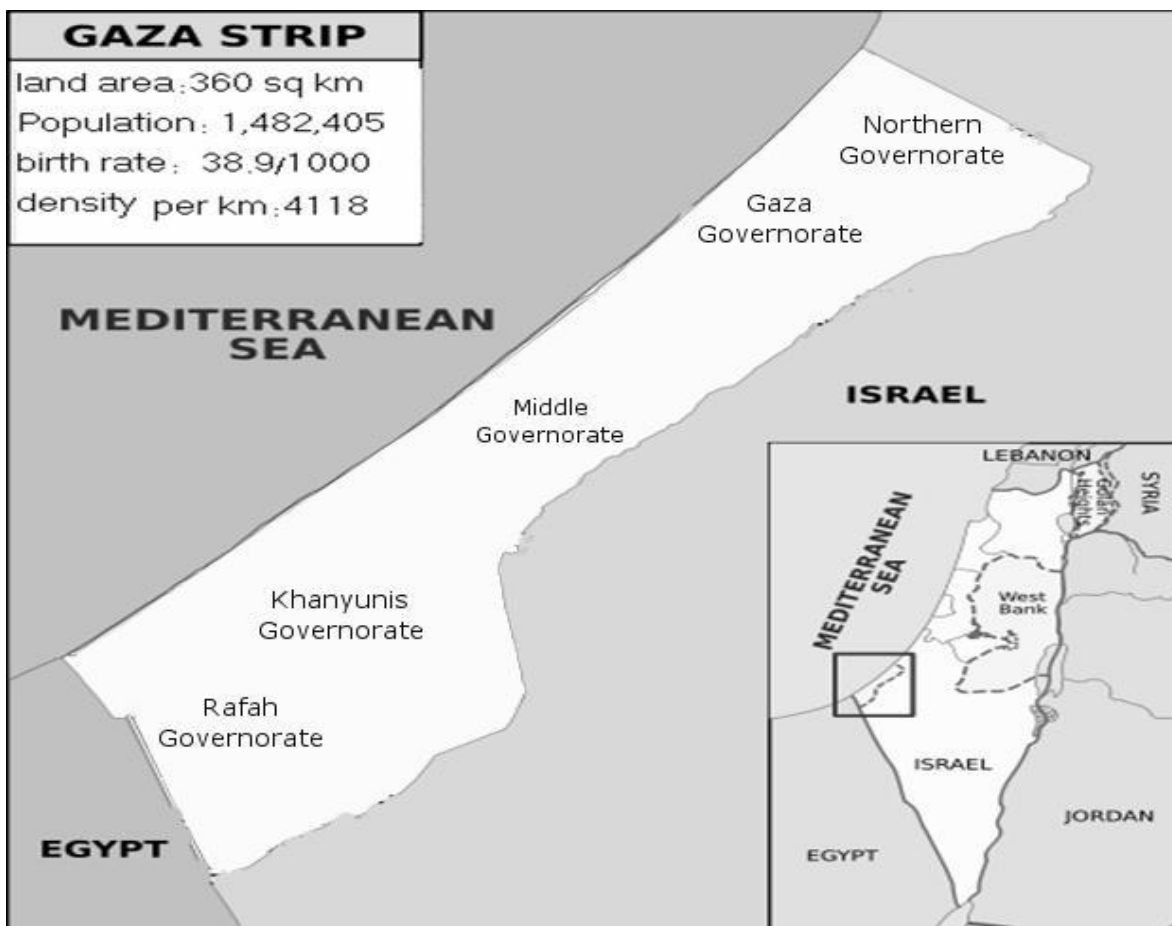

Figure 2. Study area (Gaza Strip).

in the Gaza Strip to increase community awareness of infant mortality. There is, above all, the urgent need to improve the social and economic conditions of the people. Without such an improvement, infant mortality figures will continue to stay high in the future.

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