Research Article

Socioeconomic determinants of infant and under - five mortality, in wad-madani pediatric teaching hospital- Gezira State, Sudan

Osama B. Albasheer*

Department of Family and Community Medicine, College of Medicine, Jazan University, KSA

*Correspondence:
Dr. Osama B. Albasheer,
E-mail: drosama802@gmail.com

ABSTRACT

Background: Infant and child mortality constitute the highest rate in the developing world, compared to the mortality of other age groups. Sudan is one of the countries were infant and children are under risk. This study was done in Wad-Madani Pediatric Teaching Hospital, to determine the association between the socio-economic factors and basic life services differences and high level of infant and under- five mortality.
Methods: The study utilized cross sectional, hospital based study. The data were collected by using structured questionnaire addressed to 96 mothers in their reproductive age (15- 49 years), experienced infant and under- five death in the hospital in the study period. The data were analyzed descriptively and then by statistical test based on chi-squire conducted to determine the relationship between death of infant and children and socio- economic factors.
Results: Our study revealed, differences in mortality levels are related to community differences and differences in living condition. Infant mortality was higher than child mortality. Indicators like birth order, birth interval, mother education, and distance for health services, have great impacts on infant and under- five mortality.
Conclusions: The study recommended that there is a real need to continue sensitizing the public about dangers associated with early child bearing, short birth interval, and hence stress upon family planning. Increasing level of education of the parents was recommended for further utilization of health services, good antenatal care, and self learning about family planning, nutrition during pregnancy and breast feeding.

Keywords: Infant mortality, Under- five mortality, Socioeconomic factors, Mother education, Wad-madani, Sudan

INTRODUCTION

Infant and child mortality rates are often used as indicators of the socioeconomic development of a country. Infants and children under five are more than any other age group of population; they depend heavily on the socioeconomic status of their families for survival. Thus, the level of infant and child mortality would present a measure of how well society meets the needs of its people.[1]

According to Mosley and Chen at least 97% of newborn infant should be expected to survive the first five years of live. Reduction of this survival probability could be caused by variation in social, economic and environmental factors. They observed a set of 14 intermediate variables grouped into five factors, environmental factors, nutrient availability factor, injury factors, personal illness control factors and maternal factors, such as age of the mother at birth, birth survival and parity.[2]

The level of infant and under five mortality has declined during the last two decades. Infant mortality rate has declined from 82 per 1000 live birth during the late 1960s and early 1970s to 70 per 1000 live birth during the early 1990s. under five mortality has declined during the same period from 147 per 1000 live birth to 113 per 1000 live birth.[3] Despite this decline, infant and child mortality rates in Sudan are still among the highest in the world.

Approximately one child out of every six dies before reaching the age of five, compared with other developing countries.[4] According to the (SDHS 1989/90), infants and under five mortality rates were 70 and 123 per 1000 live birth respectively.[5]

Study done in Wad-madani, to determine the causes of infant and child mortality in Sudan revealed that immunization, child order, child birth weight, birth interval and mother education had significant influence on under five mortality.[6]

METHODS

Study area

Wad-Madani town is the capital of the Gezira State and lies on the bank of the Blue Nile. It is population is 430,487 (214,670 males and 215,817 females), According to the fourth national census. Wad-madani Pediatrics' Teaching Hospital is one of the major pediatrics' hospitals in the Sudan. It is a referral hospital, receiving cases from outreaches with variable socio-economic and demographic factors. The hospital provides emergency services free and even offer support for those admitted for medical or surgical care. General and special wards, special care baby unit, and the out- patient emergency and refer clinics were used for data collection.

Study design

The study utilized cross sectional, hospital based study. A number of 96 women were selected for this study. The data were collected through questionnaire designed to obtain information's from parents of children under-five died in the hospital during the study period. The questionnaire was made of 40 questions, using variables such as maternal age at first birth, level of education for parents, parity, birth spacing, family income, birth weight and breast feeding. Pre-test of the questionnaire was applied for 10 women. The interview was conducted by medical officers, working in the hospital in the study period (March- August 2007).

Analysis was made by using statistical package for social science (SPSS). Frequency distribution and cross tabulation was made. Chi squire test was used to study the strength of association between socio-economic factors tested and infant and child mortality.

RESULTS

Socio-demographic characteristics of children

Table 1 showed the distribution of under- five mortality according to place of residence, place of delivery, duration of pregnancy, gender, birth weight, birth order, and birth interval. Mortality was higher in rural areas (68%) than in urban (32%). Gender variation in mortality was noticed and it was higher in male (51.5%) than in

female (48.5%), as have been noticed universally. Infant mortality was higher than child mortality (82.5%, 17.5% respectively). Place of delivery obviously appeared to affect the mortality with (62.9%) mortality for home delivery compared to (37.1%) of hospital delivery. The mortality characteristically increased in the first birth order (47.4%) and short birth interval of less than one year (47.4%), then dramatically decreased in second and third birth order (23.7%) with long birth interval of two or more than two years (2.1%), and then increased again when birth order increases (28.9%).

Table 1: Socio-demographic characteristics of children.

Characteristics	No. (%)
Place of residence	
Urban	31 (32%)
Rural	66 (68%)
Place of Delivery	
Home	61(62.9%)
Hospital	36 (37.1%)
Birth weight	
Small (<2.5)	29 (29.9%)
Average (2.5-3.5)	60 (61.9%)
Big (>3.5)	8 (8.2%)
Gender	
Male	50 (51.5%)
Female	47 (48.5%)
Duration of pregnancy	
Full term	82 (84.5%)
Pre-term	15 (15.5%)
Age at death	
Less than year	80 (82.5%)
More than year	17 (17.5%)
Birth order	
1	46 (47.4%)
2-3	23 (23.7%)
>3	28 (28.9%)
Birth interval	
< I year	58 (59.8%)
1-2 years	37(38.1%)
>2 years	2 (2.1%)
Total	97(100%)

Mother characteristics and under-five mortality

Table 2 showed the frequency of child mortality according to some mother's variables like the level of education, occupation, and age at child death. The mortality was higher in mothers with primary levels of education (39.9%) and illiterate (29.9%), and it was low in mothers with secondary (22.7%) or higher levels of education (8.2%). The same table showed that the mother age at child death has an important impact on mortality as the mortality increased in mothers in the age group (20-24, 42.1%), and (less than 20, 22.7%), while the mortality decreased in age group (35-39, 2%). Again same table

showed that the mortality was characteristically higher in housewives (90.7%) than in employers and workers mothers (6.2% and 3% respectively).

Table 2: Mother's education, Age, and occupation and under-five mortality.

Mother characteristics	No. (%)
Level of education	
Illiterate	29 (29.9%)
Primary	38 (39.9%)
Secondary	22 (22.7%)
University and higher	8 (8.2%)
Mothers age (years)	
<20	22 (22.7%)
20-24	41 (42.1%)
25-29	18 (18.6%)
30-34	12 (12.4%)
35-39	2 (2.1%)
>40	2 (2.1%)
Mother occupation	
Housewife	88 (90.7%)
Employer	6 (6.2%)
Worker	3 (3%)
Total	97 (100%)

Family income, housing condition, and sanitation and under- five mortality

Table 3 showed the impacts of family income, housing condition, and sanitation on under-five mortality. Mothers were asked about the daily expenditure and then multiplied the value by 30.most of deaths were to families with monthly income less than 300 Sudanese pounds (59.8%). 30.9% of deaths were to families with monthly income (300-500) Sudanese pounds, and 9.3% of death were to families with monthly income more than 500 Sudanese pounds. In the same table infant and child mortality appeared to decrease where the number of rooms increases (78.3% when number of rooms 1-2, 2.1% when number of rooms more than 4). Uses of taped water were associated with high level of mortality (71.1%), while the use of piped water accounted only for (28.9%) mortality. Also the mortality was found to be high with pit latrine (67%), rather than with toilets (33%). Absence of electricity was associated with 37.1% risk of mortality.

Table 3: Family income, housing condition, and sanitation and under-five mortality.

Income (Sudanese pound)	No. (%)
<300	58 (80.9%)
300-500	30 (59.8%)
>500	9 (9.3%)
Housing condition	
Number of rooms	
1-2	76 (78.3%)
3-4	19 (19.6%)
>4	2 (2.1%)
Water supply	
Taped water	69 (71.1%)
Piped water	28 (28.9%)
Electricity supply	
Yes	61 (62.9%)
No	36 (37.1%)
Latrine	
Pit	85 (87.6%)
Toilet	12 (12.4%)
Total	97 (100%)

Cross tabling and degree of association

Chi squire-test was used to determine the level of association between the different socio-economic factors studied and infant and child mortality.

Table 4: The association between selected variables and under-five mortality.

Selected variables	Less Educated Mothers		Far Distance to Health facility		Low monthly income		Worker's mothers	
	X value	P. Value	X value	P. Value	X value	P. Value	X value	P. Value
Delivery	5.408	0.144	0.454	0.3	2.299	0.3	0.061	0.1
Birth weight	17.165	0.009	3.923	0.8	1.845	0.8	2.907	0.6
Breast feeding	7.755	0.257	0.482	0.5	3.585	0.5	5.355	0.1
Vaccination	7.02	0.319	1.618	0.2	6.613	0.2	3.598	0.5
Development	3.850	0.005	2.029	0.08	4.942	0.08	0.527	0.768
Ante-natal care	30.77	0.00	6.782	0.001	12.74	0.001	2.102	0.7

Table 4 showed that the low levels of mother education greatly affect antenatal care attendance, birth weight, and development of the child. Far distance of living showed an impact mainly on antenatal attendance and birth weight. Same table showed the low income mainly affect antenatal attendance and development of the child.

Mother's occupation, also showed obvious effects on different outcomes, it was less significant as the level of education and distance of living.

DISCUSSION

Our study revealed, differences in mortality levels are related to community differences and differences in living condition. High mortality levels were observed in rural than in urban areas and this was same as what was found in SDHS 1990.Those in Rural areas were found to live far from health services, most of their mothers were household with high parity. They have short birth intervals, poor ante-natal care, and they used to deliver at home with all risks of home delivery. High parity and short birth intervals affect mortality by the fact that; children used to compete in same resources with poor nutrition of their mothers during pregnancies.

Keeping with literature, in our study we found that infant mortality was higher than child mortality, and it was more reported in male than in female. This may reflect that, the chance of survival is better if the child passed first year of life.

In our study we found that, 29.5-39.5% of deaths were among children whom their mothers were either illiterate or with primary education only, which was almost similar to that shown by others.[7-9] Less educated mothers have poor ante-natal care attendance, they delivered babies with low birth weight, and their children have poor development. Mother's education is important for child survival, because it can change their attitude and behaviour concerning nutrition, hygiene, family planning, reproductive care, and disease treatment.[8] Educated mothers are more able to utilize health services, expected to have more information's about immunization and disease treatment, than uneducated mothers.

Katrina et al, noted that teenage mothers are often psychologically, emotionally, socially and economically ill prepared for child bearing and old mothers are less likely to withstand the stress of pregnancy, child bearing, and breast feeding. In our study we found that, the younger the age at first pregnancy, the higher the mortality rates. The mortality was even higher when the mother is young and the child is the first order. Also we found that, with increasing birth order the mortality decreases. On the other hand, the mortality was found to increase with shortening of the interval between births, and this is similar to what found by others.[10,11,6] Younger mothers are less educated, more vulnerable to have nutritional problems during pregnancy and are at high risk of low birth weight, and they are not expert in breast feeding and child rearing. Closely spaced children used to consume similar resources, with the risk of early weaning of previous sibling and high rate of spread of infectious diseases.

Elamin, in her study in Wad-madani, reported that, family income is among the most important determinants of under-five mortality. In our study 59.8% of the mortality was found to families with low monthly income. Low income appeared to affect the degree of ante-natal care, the nutrition of the mother during pregnancy, the birth weight, and the development of the child. These entire factors act together to reduce the child chance of survival.

Children who live in households that have access to clean water supply and toilet facility experienced relatively lower mortality compared to children who do not have access to these facilities, this was similar to what was noticed by the maternal and child health survey data. Access to clean water and toilet facilities will reduce the incidence of infectious diseases, while less crowded households will reduce the spread of infectious diseases.

Mother occupation directly affects the time intensity of child rearing, it may also interrupt the breast feeding or may even terminate it earlier.[12] In contrast, in our study we found 90.7% of mortality occurred to housewives. Mother occupation was cross tabulated with mode of delivery, birth weight, breast feeding, ante-natal care and child development, to assess the degree of association. We found that; the mother education didn't affect any of the tested variables. Correlation analysis and logistic regression analysis may be needed to test the relation even more.

CONCLUSIONS

There is strong association between the socio-economic factors and increased risk of under- five mortality. Infants were more at risk of dying than children especially preterm and infants with low birth weight.

We recommended continue sensitizing the public about the dangers associated with early child bearing and short birth interval. Efforts should be made by the government to make family planning services readily accessible for rural population and to increase the chances of mother education for better utilization of the health services.

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