THE ROLE OF PRENATAL LOW INTAKE AND LOW BIRTH WEIGHT AMONG DECEASED INFANT

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Abstract

Every child is our potential future "National Hero", provided that is born in a healthy and hygienic environment and in a progressive and supportive state, community, family. Majority of infants born in Pakistan today face the risk of premature death. Moreover, low birth weight due to the mothers' insufficient diet is a common factor amongst one third of these casualties. Hence, this study attempts to explore the prevalence of two factors that is low intake during pregnancy and low birth weight between the less than one year olds and their subsequent mortality during their first month of life. This study was cross sectional in nature and conducted in Peri-urban areas of district Malir, Karachi, Pakistan. Infants under one year of age were included and accidental/injury related cases were excluded. Furthermore, the study instrument involved administration of a structured questionnaire as a data tool. Data was analyzed through using SPSS version 15.0. The result revealed an incidence of a total 259 deaths occurring in infants of less than one year of age. There was a strong relationship between one year old infants' birth weight and their mothers' age ($P = 0.05$). Proportions of deaths due to low nutritional intake of the mothers during pregnancy were high in low birth weight as compared to normal birth weight ($P=0.05$). It was concluded that low intake during pregnancy increased the risk of low birth weight, which consequently contributed towards infants' mortality. Hence, a larger proportion of death occurred during the neonatal period.

Key Words: infant mortality, low intake, low birth weight, prenatal

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Introduction

Nutritional Status is very important in maternal health and infant morbidity and mortality (Abu-Sad & Fraser, 2010). Poor maternal nutritional status has been associated with low birth weight (Anderson& Bergstrom, 1997).Appropriate Birth weight is an indicator of neonate's probabilities for long term child growth and survival.(Naeem, Huma&Afridi,2003). Low birth weight babies are exposed to a double risk of death during the initial 12 Months of their lives (Blanc & Wardlaw, 2005). It refers to as a birth weight less than 2.5 kg and also includes premature deliveries (WHO, 2011).

Worldwide low birth weight levels are approximately 15.5 percent; meanwhile, least developed countries show an even higher proportion of low birth weight levels i.e., 18.6 percent (UNICEF, 2004). According toan estimate, 18 million babies are born with low birth weight every year; out of these, 9.3 million are found in South Asia alone (UNICEF, 2004).Diet habit is an underlying cause in infant mortality (World Hunger Report, 2013), butit is also a significant secondary factor in 60 to 80 percent of Neonatal deaths (Bang, Reddy, Deshmukh, 2002).Malnourished children suffer from a minor illness such as diarrhea or an ARI[1],leading to sudden death during the first month (Baqui, et al., 1993).

Around three million children are born every year (UNICEF, 2011). However, near about 400,000 infants die during the first twelve months of their life (Express Tribune, 12 March, 2011). Pakistan has 8th rank in infant mortality history; however, there has been a marked decline in infant mortality; for instance, the 1992 infant mortality rate recorded 86 per 1000 Lb[2]; the 2006infant mortality rate recorded 78 per 1000 Lb(PDHS, 2007).

The Aga Khan University (AKU) developed a primary health care center in six Peri-urban areas of Karachi, Pakistan. The IMR[3]in these areas was 126 per 1000 lb. This rate decreased in five years i.e., 49 percent (Bryant et al., 1993). However, remarkable risk factors identified in these areas for mortality included poor nutritional status of the mothers, lack of proper breast feeding habits in mothers, short interval between births and lack of vaccination practices(D'Souza & Bryant, 1999).

Each year, almost 5 million females, out of the 30 million women of child bearing age, become pregnant. However, unfortunately most of them do not neither take in the required diet nor receive proper health care during pregnancy (PAIMAN, 2009).The high child mortality rate in Pakistan is associated with high number of pregnancies, which are considered as the biggest risk factor for mortality amongst less than one year olds. Moreover, maternal health status is significant in child health and mortality. Likewise, the role of skilled health personnel is crucial in instructing mothers as to how to take care of themselves and their newborns during pregnancy (USAID, 2010). Meanwhile, the economic status of the participants couldn't be determined as an

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[1]ARI* Acute Respiratory Infection
[2] LB* Live Birth
[3] IMR* Infant Mortality Rate

independent risk factor, food shortage in these areas could be a reflection of poverty (D'Souza, &Bryant, 1999). Meanwhile, child mortality in the communities belonging to the low income strata is also reflective of dietary deficiencies and diet habit among children in general. This finding is consistent with other studies (Chen, LC, AKMA Chowdhery &St Huffman, 1980).

Causes Of Low Birth Weight

Lack of or Lowly Quality Antenatal Care

Proper antenatal care is the most significant factor in the prevention of low birth weight babies. The recommended (>=4 visits) number of antenatal checkup and the quality of care is also important. A relevant study of low birth weights revealed that amongst the group of mothers who delivered underweight babies (equal and less than 2.5 kg) Black et al. (2013)27 percent did not get any antenatal care as compared to the 22 percent of mothers who gave birth to babies weighing more than 2.5kg Saima (2013). It was also found that of all neonatal deaths in the low birth weight babies, about a quarter take places amongst those infants whose mothers did not receive antenatal care.

Socio-economic Factors

Class factor also affects the nutritional needs of the pregnant women and consequently affects their infants' birthweight. Women of poor classes not only suffer from chronic illness and diet habit but they continue to correspondingly do manual labor in the fields until a very late stage during their pregnancy UNICEF (2004).

Similarity and Sex

A large proportion of the underweight babies comprise first born; and after the fourth pregnancy, the risk of prenatal mortality is high. However, despite there being a higher incidence of low birth weight amongst female babies, the overall mortality rate is still higher among male infants (Care of the Newborn in Developing Countries, 2013).

Multiple Pregnancies

Multiple pregnancies lay an important role in infant birth weight. In case of more than one pregnancy, the average birth weight is lower than normal but the infants are found to be more mature than the birth weight would indicate.

Maternal or Fetal Illnesses

Almost low birth weight infants are delivered following the onset of pre-term labor or the pre labor rupture of membranes. Approximately, fifteen to twenty five per cent pre-term infants are delivered amidst the circumstances of maternal or fetal obstacles of pregnancy. Common maternal illnesses which interfere with fetal growth are hypertension, heart disease and anemia, including sickle cell anemia. The overall effect of these factors contributing to low birth weight is significant Black et al. (2013).

Objectives

1. The purpose of this paper is to see the maternal factor of low birth weight infant mortality.
2. To assesses the socio-economic status of the family.

Hypothesis

Firstly, low dietary habit during pregnancy caused low birth weight that is contributed as a factor leading to infant mortality.

Secondly, a younger woman has high risk of LBW[4] babies.

Literature Review

Some recent maternal outcomes and social demographic aspects studies particularly with regard to their infant mortality in the Global and Pakistan level. The studies of Abu-Sad and Fraser (2010), Naeem (2003), Blanc (2005), and Anjum et al. (2011)highlight maternal nutrition as a risk factor related to birth outcomes, as they are discussed as the association between mother diet and low birth weight. Almost all studies prove that the less than required pregnancy dietary habits caused low birth weight that is, leading towards illnesses. Baqui et al. (1993) opine that malnourished children are exposed to a double risk of diseases at an early age, such as diarrhea and other communicable diseases, and may consequently lead to natural expiry. D'Souza and Bryant (1999) have conducted a case control study at six slums of Karachi, Pakistan and found out that 76 percent of infant deaths were related to maternal factor and socio-demographic factors.

Limitations of the Study

This research was conducted carefully, yet methodological issues required to be underlined. Although Death is definitive incident, which is easily measured, our inclusion criteria were less than one year deceased's infant. This means that the infants exclusively under two years of age and their mothers are at the time of interview also alive, which would estimate their mortality through using the reported age at death or at interview time with reference to mothers. Age categories were based on days and months before conducting door to door survey for the purpose of identification of the households containing the deceased up to 0 to 12 months. Three months was not enough for this identification as the sample size was too large.

Secondly, data collected from families who had experienced the tragedy of child mortality gave verbal consent because society feels insecure in sharing personal information of this sort. We assessed the nutritional status of the mothers that is their practice of intake during pregnancy and birth weight as per new born weight in kilogram at the time of birth. Assessment of mothers' health was based on self-reported data.

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[4] LBW* Low Birth Weight

Only socio-economic and demographic characteristics covered infant mortality at the time of interview. Inclusion of Peri-urban areas was done on the basis of inclusion of those located within 30 kilometers from central city.

The focus of the research was on measuring the real value of community; life and living style in Karachi's rural areas. Also, since the researcher is not fluent in Sindhi, Balochi, Punjabi and other local languages in order to interpret the data, her deficiency should be acknowledged in this regard. Lastly, human and material resources were some of the crucial hitches faced during this study.

Material and Methods

The present study was a cross sectional study, using data or medical records of infant who had expired before two years in the Peri-urban areas of Karachi, Pakistan. However, all accidental/ injured illnesses were excluded. A pretested questionnaire was used as primary data tool. Affiliation was sought from the concerned department and the study was conducted from September 2010 to September 2012. In the first stage, 79 Peri-Urban areas were picked through simple random sampling in order to identify the families of the deceased's infants rather than assess the households of the deceased ones through purposive sampling.

The structured proforma was designed to collect information in a precise way. Data gathered information on maternal diet habit associated to low birth weight of the deceased child's age, gender, maternal health and practices during pregnancy, marital duration, baby birth weight, and Socio-economic status.

During the study period, 259 infant mortality cases were observed. Data were analyzed in descriptive statistics age, gender, and work and diet practices during pregnancy, current health, marital duration, and socio economic status. Maternal diet habit was analyzed in term of relation of age, gender, low birth weight, economic status, etc., to mother's and child's health. Likewise, ethical approval was obtained from the Health department.

Appropriate statistical SPSS software version 15.0 was used to analyzethe data. Correlate statistics were used for analyzing the maternal diet habit's relation with low birth weight and all data present as number and percentage.

Results

Many factors contribute to infant mortality such as the mothers' health, age, pregnancy term and occupation, etc. Hence, these results were calculated on the basis of demographic and pregnancy characteristics of the mothers who gave birth to underweight babies and those who gave birth to babies having normal birth weight. These demographic characteristics include: Age of Mothers; Age at Marriage; Duration of Marriage; Current Health of Mothers; Duration of Pregnancy; and During pregnancy Work Practices. Data reveals that age of mothers and their health are two significant factors affecting infants' weight during the first month of their lives. Maternal complications in terms of mothers' ages and health conditions affect their infants' weight. Infant mortality due to low birth weight is associated may be with factors like

mothers' age, pre mature birth, poor maternal nutritional status, lack of prenatal care, maternal sickness during pregnancy, and occupational stressors. Hence, birth weight is an important indicator of an infant's chances of survival and his/her overall health.

Figure1: Mortality of Children <=1 year of Age, by Gender with Birth weight
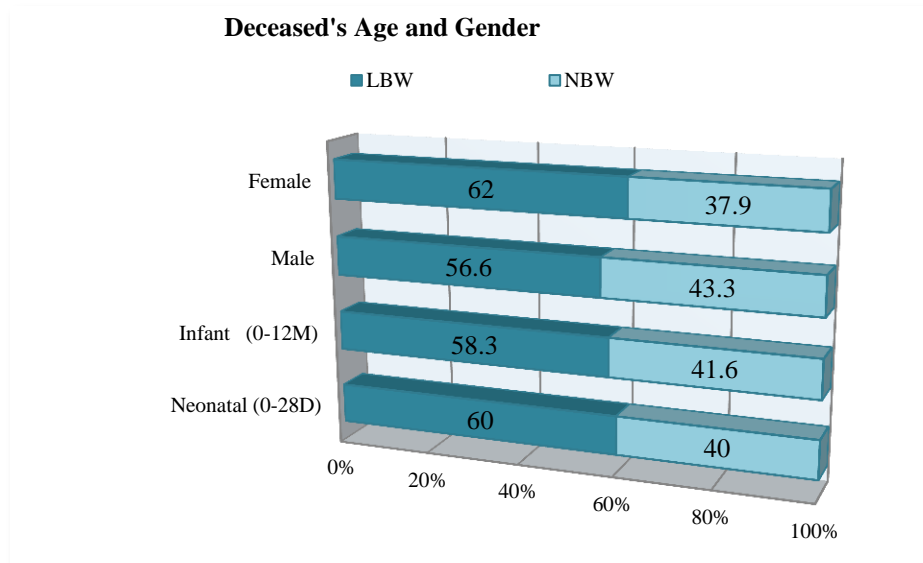
The study observed total 259 deaths among infants of age less than one year. A highest gender specification showed that 62 percent were females, having low birth weight and 56 percent were males. Almost 60 percent deaths occurred during Neonatal Period during the first month of the life and the infants were 58 percent[5].

As seen in Table No. 1, the age of mothers is a significant factor in infants' health. Data shows that 64% of underweight infants were found to be born to the mother falling in the age bracket of 21-30. The relationship of one year old infants' deaths among Demographic and birth weight was strongest with mothers' age (P = 0.05). Age at Marriage shows a high Table No. 1. Infant Mortality Relationship between Low Intakes during Pregnancy with Demographic and Pregnancy Characteristics

[5]LBW* low Birth Weight and NBW* Normal Birth weight

| Demographic and Pregnancy Characteristics	LBW		NBW		p-value
	No.	percent	No.	percent	
n	**259**				
Age of Mothers					
Up to 20 Years	26	16.9	11	10.3	0.35
21-30	99	64.7	62	58.4	
Above 31 Years	28	18.3	33	31.1	
n	**153**		**106**		
Age at Marriage					
Up to 15 Years	25	16.3	25	23.5	0.54
16-20 Years	86	56.2	55	52.0	
21-25 Years	33	21.5	20	18.9	
exceeding 26 Years	9	5.8	6	5.6	
Duration of Marriage					
1-5	46	30.0	30	28.3	0.01
6-10	73	47.7	48	45.2	
11-15	25	16.3	6	5.6	
Exceeding 16 years	9	5.8	22	20.7	
Current Health of Mothers					
Healthy	103	67.3	72	67.9	0.91
Sick	50	32.6	34	32	
Duration of Pregnancy					
Preterm	33	21.5	10	9.4	0.010
Full-term	120	78.4	96	90.5	
During Pregnancy Work Practice					
Less than Usual	50	32.6	40	37.7	0.43
Usual	57	37.2	41	38.6	
More than usual	46	30.0	25	23.5	

proportion (n=86), 56 percent were 16 to 20 years old women having babies with low birth weight. 48 percent (n=73) and (P=<0.01) underweight babies were born to those women whose duration of marriage was between six to ten years. 67 percent (n=103)

small/tiny/underweight deceased's mothers were healthy; yet their infants were unable to survive. 21.5 percent (n=33) child births were preterm (<37 weeks); meanwhile 78 percent pregnancies were carried to full term. It was also found that 37 percent (n=57) women were carrying out their usual work practices during pregnancy; however, no association between this factor with low birth weight was found.

Table No.2: Association between Low Intake during Pregnancy and Birth Weight

Pregnancy Diet	Birth Weight/Size		n	p-value
	LBW	NBW		
Required	23	27	50	0.36
Low Intake	130	79	209	
N	**153**	**106**	**259**	

As seen in Table No. 2, the current study observed 259 cases out of these 153 low birth weights and found 106 normal birth weight babies among them. This study existent to strong evidence of low intake pregnancy and low birth weight babies (<2.5kg) led to mortality in less than one year olds. Proportions of deaths due to low nutritional intake during pregnancy were high in low birth weight infants as compared to those having
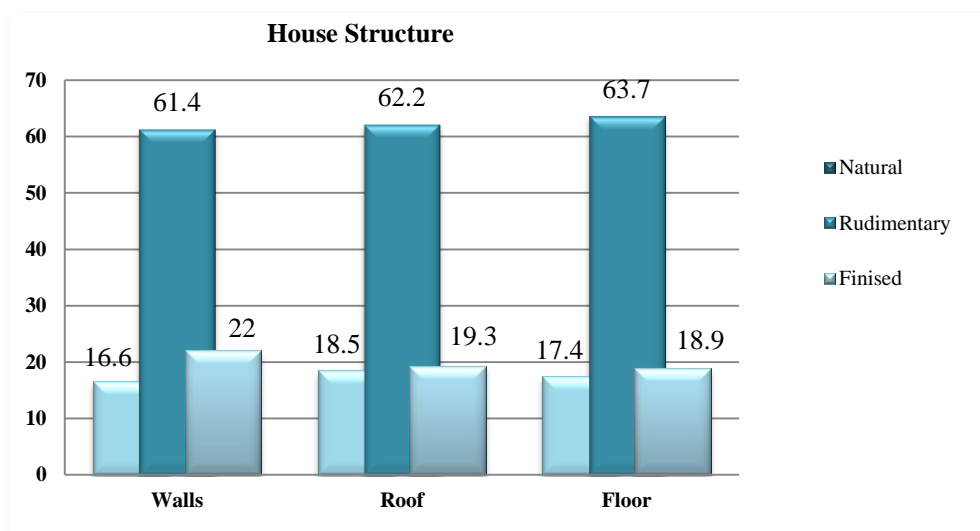
normal birth weight (P=0.05).

A larger proportion of families living in Peri-Urban areas were found to be poor in terms of having access to the elementary needs of life or the lack of it. This study noted that 61 percent structures of walls were made with rudimentary elements such as bricks only. The roof and floor were rudimentary in nature that is in 62 percent and 63.7percent cases respectively. 16.6 per cent were walls made out of Natural Mud/chat'tai, and in 18.5 percent cases, the roof were basic such as made of tin sheets/chat'tai. Those cases having natural flooring were 17.4 percent. However, those having finished walls, roof and floor were 22 percent, 19.3 percent and 18.9 percent respectively.

Table No 3. Socio–Economic Profile of less than One year Mortality

Socio-Economic Characteristics		Percentage
n		**259**
Ownership Status		
Own		87.3
Ranted		6.9
Living without Paying		5.8
Total Rooms		
< 2 Rooms		78.4
3-4 Rooms		15.4
5-6 Rooms		6.2
Family System		
Collective		50.2
Single		49.8
Family Size		
1-3 Persons		25.5
4-6 Persons		29.3
Above 7 Persons		45.2
Father's Profession		
Unemployed		7.7
Driver		1.9

Com Employee		32.0
Farmer		11.2
Daily wages		47.1
Income		
No income		7.7
<=4000 PKR		5.0
4001-6000 PKR		21.2
6001-8000 PKR		26.3
8001-10,000 PKR		12.7
Above 10,001 PKR		25.1

As seen in Table No. 3:with regard to Socio-economic results of those cases having less than one year mortality, the incidence ofliving in their own houses was 87.3 percent. Whereas, 6.9 percent were living in rented houses and 5.8 percent were living in slums, without paying anything to anyone. Total rooms in the houses of 78.4 percent families living were less than two, 15.4 per cent had 3-4 rooms, while 6.2 percent had 5-6 rooms only. Almost 50.2 percent belonged to a joint family system and 49.8 percent belonged to a single family system, with 45.2 percent having more than 7 persons in the family; 29.3 per cent had 4- 6 persons; and 25.5 per cent had 1-3 persons living in the family. Economically larger group of deceased's' fathers' profession 47.1 percent was based on earning Daily Wages, 32 per cent were working in companies, 11 per cent were farmers, 7.7 per cent were jobless, and only 1.9 per cent were drivers. The larger proportion of income 26.3 percent were earning up to 6001 to 8000, 25.1 percent were earning above 10,000, 21.2 percent earning4000–6000, 7.7 per cent had no income due to unemployment; meanwhile, 5 percent were earning less than 4000 PKR monthly.

DISCUSSION

Low Birth Weight and Gender

A highest gender specification showed that 62 per cent were female having low birth weight as compared to males. The same results were found in Isiugo-Abanihe and. Okein's(2011), an African study, which clearly exhibited a relationship between birth weight and the sex of the child. However, near about 17 percent of male infants were born with low birth weight and 30 percent of female babies had low birth weight.
Low Dietary Intake, low birth weight and Infant Mortality

The present study showed a stronger association between dietary intake during pregnancy and low birth weight in neonatal mortality (60 percent) as compared to infant mortality. This was similar to the findings of study done by Black et al. (2008), which

found that Low birth weight is associated with maternal under nutrition and 60 percent deaths were of neonates.

Maternal Age Factor

The distribution of maternal age is also highest that is 65 percent in 20 to 30 years old of the mothers, which is similar to Nancy and Julien's (2006) study which found the Paternal Age as a risk factor for low birth weight. The study shows that 73 percent mothers belong to the same age group as well as the study proves the association with mother's age (P<.001). However, our study gives evidence that mother's age is strongly associated with low birth weight (P=0.05).

Furthermore, teenage marriages contribute to low birth weight, the current study results indicate towards the highest proportion of mothers' marital age that is, 56 percent were 16 to 20 years old. This trend matches to the study of Bhutta et al. (2013). Teenage pregnancy is associated with a 50 percent higher risk of stillbirths and neonatal deaths, low birth weight and increased risk of preterm birth and birth asphyxia. These important factors are indirectly related to maternal and new born dietary status and pregnancy outcomes, including early age during the first and frequent pregnancies. Those young girls who are not physically mature might get pregnant with depleted nutrition reserves.

Marriage Duration

I In order to measure the effects of teenage marriages altogether on fertility and pregnancy outcomes, those attributable to prolonged marriage happens to be the significance of early marriage. Raj and Silverman, (2009) articulate that prolonged marriage has a high opportunity for pregnancy outcomes such as high fertility and unwanted or completed pregnancy, in our study, a higher 48 percentage marriage duration was between 6 to 10 years and the prevalence level was<0.001.

Numerous influences include poor nutrition, such as women's status, poverty and cultural beliefs and practices, its performance could be barriers towards successful progrmmes. Women's status may also influence pregnancy weight gain through the family's response to the female's pregnancy. The prevalence level (P=0.05) pregnancy intake are strongly significant to low birth weight. Anjum,(2011) says in the Case control study that parental low intake during pregnancy (p-value < 0.001) were significant risk factors causing low birth weight.

This study also supported the socio-economic factors leading towards infant birth. The research question was which class handled low birth weight babies. About 78 percent families were living in less than two rooms within a joint family system and that highest proportion of families had above 7 members. Larger parts of the study population belong to daily wage earners, along with 62 percent less among than eight thousand. Likewise, the African Population study shows that the demographic and socio-economic variables are significantly associated with low birth weight, maternal attention, and behavioral factors are also one of the factors associated with low birth weight Uche C. et al.,(2011) Low social status may be a social cause of other nutritional, deadly, or communicable diseases factors that could themselves be the causal factors leading to

low birth weight in infants. Also, the influence of social class may be used through intermediate factors, which may be biologic, such as maternal weight, parity, and age, or they may be environmental, such as stress and inadequate prenatal care utilization. These socioeconomic changes are found to be present in many countries, even in those where access to prenatal care is universal; however, it is important to describe the affects of the same in developing countries.

Conclusion

The intent of present study is to find out the link between low diet during pregnancy and deceased's birth weight, which have a significant role to play in Child Mortality. It was found that maternal health and socio economic status (SES) have strong association with mortality of children of less than one years of age in Karachi, Pakistan.

In this study, the most significant variable was mothers' deficient diet during pregnancy, which causes low birth weight. Child mortality is also strongly associated with the current age of mothers and the duration of pregnancy. In conclusion, dietary involvements during pregnancy as opposed to earlier in the life of the mother should have the highest influence on birth weight.

RECOMMENDATIONS

The study recommends the following things based on the findings:

- The government policies need to increase the social and economic growth among the masses in order to decrease the incidences of child morbidity and mortality.
- Likewise, better dietary intake during pregnancy is recommended so as to improve infants' weight after birth and reduce infant mortality.
- The socio economic status of the working class needs to be improved so as to provide awareness and better health and hygiene facilities to mothers and infants.

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