

The prevalence and related factors of low birth weight

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ABSTRACT

Background and aims: The most common reason in neonatal mortality rate in the world is low birth weight (LBW). The objective of our study was to determine the prevalence and related factors associated in birth weight in Garmsar, Iran in 2013.

Methods: This cross sectional study was carried out on 683 live births which delivered in Garmsar in 2013. The required information was collected by examining the health records of pregnant women and completion of the data registration forms. Data collection was controlled by using SPSS and analyzed by using an Independent T-test, Chi-square test and logistic regression.

Results: According to the results, 32 infants out of 683 infants born in 2013 had low birth weight, i.e. the weight less than 2500g. LBW prevalence estimated in this study was 4.7%. There were significant statistical relations between low birth weight and the variables including number of births, mothers' occupation and interval of less than 3 years between pregnancies and systolic and diastolic blood pressures.

Conclusion: Although our results regarding LBW prevalence and risk factors confirm the results of other studies, it was recommended perspective studies to reconfirm the LBW risk factors.

Keywords: Birth Weight, Low Birth Weight, Prevalence, Related factors, Garmsar.

Original article

INTRODUCTION

Infant mortality is one of the serious worries in the developing and the developed countries. Despite the fact that infant mortality rate (IMR) is gradually reducing in the world, changing neonatal mortality rate (NMP) is much slower. The common reasons in neonatal mortality rate in the world include preterm childbirth and low birth

weight (LBW).¹⁻⁴ Normal weight on birth is considered 2500-3999g, lower than which is considered as low weight, and higher than that is high birth weight or macrosomia.⁵

Low birth weight is related to increasing risks of cardiac ischemic diseases, hypertension and diabetes in the later ages in life.⁶⁻¹⁰ LBW

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prevalence is different in the developing countries (5-7%) and the developed countries (19%).¹¹ According to a reviewing study, LBW prevalence in Iran is 7%, showing an increasing trend from 1991 to 2010.¹²

Birth weight in infants is affected by different factors, including maternal and environmental factors.^{13,14} By identifying and controlling the risk factors that are mainly depending on living and social conditions, the low birth weight of infants could be prevented.^{15,16} According to various evidences, maternal factors, including genetic, social/cultural elements, population factors, medical and behavioral conditions of mothers, are effective on the birth weight, both directly and indirectly.^{13,17}

Importance of the above factors and incompatibility of the results in the performed studies with each other as well as lack of adequate studies in this regard in the city of Garmsar led us towards analyzing the prevalence of low birth weight in that city in 2013. The relations of maternal and infantile factors with the birth weight in infants were also investigated.

METHODS

The present study is a cross sectional study. The total infants under Garmsar urban centers who were born in 2013 (683 infants) formed our statistical population. Collecting the required data has done by census. The criterion to enter the study included all the infants who were born in 2013, and the criteria regarding lack of admission into the study included twins or multiple births and inadequate information about the infant or the mother. The case group included infants with low weight, i.e. the infants who had birth weight less than 2500g. The control group consisted of the infants with birth weight of above 2500g. The required information was collected by considering the health file of the families, and completion of the

checklists of registering the information with variables related to the infants (sex, weight) and mothers (BMI, age, education, occupation, nationality, i.e. Iranian or Afghani). The other collected information included the number of child births, the interval of less than 3 years between the last and the previous childbirths, systolic and diastolic blood pressures and urinary tract infection. To observe moralities in this study, the required permissions were obtained from the research department of the university, the province and the city health centers, and the personal information of the participants were considered confidential, and the data were analyzed in general.

After collection and controlling again, the data were placed in SPSS19 software. The descriptive statistics (average and standard deviation) were used for describing the data, and the analytical statistics (independent t-test, chi-square test and logistic regression) were used for analyzing them.

RESULTS

According to the results, 32 infants out of 683 infants born in 2013 have low birth weight, i.e. the weight less than 2500g. LBW prevalence estimated in this study was 4.7%.

The average age of mothers who gave birth to infants with less than 2500g of weight was 27.8+ 1.3, and the average age of mothers in the group bearing infants with over 2500g of weight was 27.6+0.2. This indicates that their age difference was not statistically significant (P=0.877). The average systolic blood pressure in the mothers having low-weighted infants was 10.91, and it was 10.31 in mothers having infants with the weight of over 2500g (P=0.001). The average diastolic blood pressure in mothers having infants with low weight was 7.03, and 6.62 in mothers having infants with the weight of over 2500g (P=0.004).

Sixty two point five percent of the women, who gave birth to infants with the weight less than 2500g, and 46.7% of the women, who had

infants with the weight of over 2500g, had normal BMI.

According to Table 1, there were no significant relations between low birth weight

and the variables including infants' sex, mothers' education and urinary infections during pregnancy, nationality, mothers' ages and mothers' BMI rates.

Table 1: Distribution of variables related to maternal and neonatal variables of infants with low birth weight

Variable		Low birth weight	P
BMI	Thin	5(7.4%)	0.099
	Normal	20(6.1%)	
	Over weight	5(2.8%)	
	Obesity	2(1.9%)	
Number of births	1	25(6.8%)	0.015
	2	5(2.2%)	
	>2	2(2.3%)	
Mother occupation	Housewife	19(3.5%)	0.027
	Practitioner	13(10.1%)	
	Student	0(0%)	
	Illiterate	2(3.2%)	
Mother education	The diploma and diploma	15(4%)	0.475
	Collegiate	15(6.1%)	
The interval of less than 3 years between the last and the previous childbirths	Yes	27(5.9%)	0.024
	No	5(2.2%)	
Mother urinary tract infection	Yes	7(4.6%)	0.211
	No	25(4.7%)	
Nationality	Iranian	30(5%)	0.414
	Afghani	2(2.3%)	
Infant sex	Male	15(4.4%)	0.698
	Female	17(5%)	

There were significant statistical relations between low birth weight and the variables including number of births, mothers' occupation and interval of less than 3 years between pregnancies and systolic and diastolic blood pressures.

The predicting rates by logistic regression analysis of different variables in

emergence of low weight can be seen in Table 2. The variables relating to low weight (number of births, mothers' occupation and interval of less than 3 years between pregnancies and systolic and diastolic blood pressures), or the ones close to being significant (BMI) were used in the logistic model. And, then we observed that LBW

had significant relations only with systolic blood pressure, occupation of mothers and

BMI, when the effects of other variables are under the control.

Table 2: Distribution of predictive variables in low birth weight infants using logistic regression analysis

Variable		Low birth weight	P	OR	95% confidence interval for OR
BMI	Thin	5(7.4%)	0.031	1.677	1.047-2.684
	Normal	20(6.1%)			
	Over weight	5(2.8%)			
	Obesity	2(1.9%)			
Number of births	1	25(6.8%)	0.198	1.678	0.72-4.898
	2	5(2.2%)			
	>2	2(2.3%)			
Mother occupation	Housewife	19(3.5%)	0.037	0.490	0.250-0.959
	Practitioner	13(10.1%)			
	Student	0(0%)			
The interval of less than 3 years between the last and the previous childbirths	Yes	27(5.9%)	0.702	1.313	0.326-5.282
	No	5(2.2%)			
Systolic pressure	-	10.91	0.050	0.620	0.384-1.001
Diastolic pressure	-	7.03	0.512	0.817	0.445-1.497

DISCUSSION

According to the results, 32 infants out of 683 infants born in 2013 had low birth weight, i.e. the weight less than 2500g. LBW prevalence estimated in this study was 4.7%. There were significant statistical relations between low birth weight and the variables including number of births, mothers' occupation and interval of less than 3 years between pregnancies and systolic and diastolic blood pressures.

LBW prevalence is 9.9% in Pakistan.¹⁸ and 7.4% in Japan.¹⁹ This rate is reported in Ardabil to be 6.3%, 7.2% in Shahroud, and 7% in Rafsanjan.^{20,21} According to the results of this study, LBW prevalence was 4.7%, indicating

less prevalence in comparison with similar studies.

Increasing the number of childbirths reduces lower birth weight, significantly.²² In other words, there is a significant positive relation between the numbers of childbirths and increasing birth weight.²³ By increasing the number of childbirths, the birth weight shows also an increase in this study, but this relation was not significant.

The results of some epidemiologic studies showed that the rate of emergence of low birth weight at the beginning and the end of fertility, i.e. between 15 to 19 years of age and between 35-40 years of age, is higher.^{24,25} It is believed that the possibility of LBW emergence is higher

in women over 35 years of age. However, there is a lot of doubt about it. Many researchers have suggested that this risk is not related to mothers' ages, but it is related to problems like many chronic diseases (diabetes and blood pressure).²⁶ Anyhow, no significant relation was observed in this study between the average age of mothers and low birth weight. These results were in conformity with the results of studies by Lio et al., Yogo et al., and Delbaere et al.²⁷⁻²⁹

In many studies significant relation was observed between LBW and the interval between pregnancies. By decreasing this interval, the rate of LBW increases.^{30,31} The intervals between pregnancies, varied in the developing countries (3-6 months) and in the developed countries (1-2 years), could increase LBW due to the pregnancy.³² In this study, a significant relation was also observed between the intervals in pregnancies of less than 3 years and low birth weight.

The results of some studies showed the relation between hypertension and LBW.³³⁻³⁵ Hypertension in mothers during pregnancy reduces blood flow in embryos, leading to reducing embryo's growth and low birth weight, but this is not approved epidemiologically.³⁴ Significant relation was observed in this study between systolic and diastolic blood pressures and LBW.

The results of the study showed that low weight in girls is more common than in boys, but the relation did not become significant. Thus, the results in this study were not in conformity with the results in the studies by Khalil et al., Orescov et al., and Hashemiannejad et al., who showed relations existing between the sex and birth weight.³⁶⁻³⁸

No significant relation was observed in this study between mothers' education and LBW. The results were in conformity with the results obtained by Chaman et al., Zeighami et al., and Delaram, but they were not in conformity with the results of Roudbari studies.^{21,31,39,40}

Mothers' weights and BMI are important factors before pregnancy, since there is a close relation between mothers' and embryos' nutritional conditions and the birth weight, and embryos' growth is a function of mothers' nutritional conditions, especially in pre-pregnancy period. Thus, mothers' BMI rates, before or at the beginning of pregnancy, could be used for evaluating the infants' weights.^{41,42} Significant relation is observed in Yodav et al., and Hassan et al. studies, between BMI and low birth weight.^{43,44} By controlling altering variables in this study, a significant relation was observed between mother's BMI and LBW of the infant.

The results of the study showed relations between LBW and the mother's occupation. It was in conformity with the results obtained by Fallah et al., and Toutouchi et al., but had no conformity with study results of Esmaeli et al.^{35,45,46}

The results showed no relations between LBW and nationality (Iranian and Afghani). It had no conformity with the result obtained by Rezaian et al.⁴⁷

The difference in the results about existence or lack of relations between LBW risk factors in different studies could be due to differences in methods, population under study and the sample volume used in the studies. A disorder in birth weight is one of the important factors in emergence of many short-term or long-term consequences in life, and is a main determining factor in health aspects. Thus, regarding the approaches that prevent the emergence of this consequence, the pre-pregnancy cares should be highly considered, so that by such cares, women could be ready for a safe and secure pregnancy.

CONCLUSION

Although our results regarding LBW prevalence and risk factors confirm the results of other studies, it was recommended perspective studies to reconfirm the LBW risk factors.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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