Original Article

IJHS
International Journal of Health Studies

Prevalence and Risk Factors of Low Birth Weight in Shahroud in 2013-2015

Sarah Mohamadi[1], Moussa Abolhassani[2,3], Zahra Motaghi[4]*

[1] Student Research Committee, Shahroud University of Medical Sciences, Shahroud, Iran.
[2] Student Research Committee, School of Public Health, Iran University of Medical Sciences, Tehran, Iran.
[3] Department of Epidemiology, School of Public Health, Iran University of Medical Sciences, Tehran, Iran.
[4] Reproductive Studies and Women's Health Research Center, Shahroud University of Medical Sciences, Shahroud, Iran.

Abstract

Background: One of the most important causes of neonatal death is their low birth weight (LBW) (less than 2500 grams). LBW has a lot of risk factors and will cause physical, mental, and growth problems in the future. Concerning the importance of the issue, this study aimed to determine the prevalence rate and risk factors of LBW in Shahroud, Iran.

Methods: In a cross-sectional research, all mothers who had given birth at Bahar hospital from 2013 to 2015 were recruited in the study. The information of the mothers and neonates was extracted from their records. Data were analyzed using SPSS16 and t-test and Chi-square tests.

Results: A total of 6677 mothers were enrolled in the study. The mean age of mothers was 27.20±5.43. Further, %4.8 of newborn babies had weights equal to or less than 2500 grams. There was a significant relationship between low birth weight and the mothers who were under 18 years, maternal addiction, and type of delivery (Pvalue=0.001). Also, there was a significant relationship between preterm labor and prevalence of LBW, and the need to revive and hospitalization of baby in NICU (Pvalue=0.001).

Conclusions: The infants' health is one of the main factors determining the quality of health services in a community. Since the rate of LBW is still high, and this leads to numerous problems for both family and society, preventive measures are recommended.

Keywords: Low birth weight, Preterm labor, Infant, Addiction, Shahroud.

Corresponding to: Z Motaghi, **Email:** zhrmotaghi@yahoo.com

Please cite this paper as: Mohamadi S, Abolhassani M, Motaghi Z. Prevalence and risk factors of low birth weight in Shahroud in 2013-2015. Int J Health Stud 2019;5(1):20-23.

Introduction

Neonatal mortality is one of the most important concerns in developing and developed countries. Although infant mortality rate (IMR) is declining in the world, the descending rate of neonatal mortality is so low. Preterm labor and low birth weight (LBW) are the common causes of neonatal mortality. The normal weight is between 2500 and 3999 g; the weight less than 2500 is defined as LBW, while the weight greater than 3999 g is defined as macrosomia.[1] LBW refers to weights from 500 to 2500 grams at birth, regardless of gestational age.[2-5] Birth weight is a reliable factor in the control and assessment of the success of health programs for pregnant women.[6] Studies have shown that the mortality rate of infants with the weight between 1500 and 2500 grams is 20 times greater than the rate of those more than 2500 grams.[7] It is estimated that about 15.5% of all babies in the world are born with LBW. Specifically, 95% of low weight infants are born in developing countries where the LBW rate is twice as large in comparison with developed countries.[2,8] The LBW rate is estimated more than 15% in developing countries, and about 7% in developed countries.[9-11] In a study in Ethiopia, the rate of LBW was estimated as beyond 10%.[12] Systematic studies in Iran have estimated that the rate of LBW is around 7%, which increased within 1991-2010.[13]

LBW can be due to preterm labor (earlier than 37 weeks of pregnancy) or intrauterine growth restriction.[14] The risk factors for LBW occurrence include maternal hypertension, maternal weight gains during pregnancy, body mass index before the pregnancy, low socio-economic status, inadequacy of maternal nutrition, maternal addiction, severe physical activities, and inadequate care during pregnancy.[2,15-17]

LBW can lead to disorders such as mental retardation, learning problems, high blood pressure, diabetes, and heart disease in the neonate's future.[1,18] Diminished longevities, increasing risk of infections and respiratory diseases, anemia, hypothermia, chromosomal abnormalities, nutritional and health problems are other consequences of LBW.[17]

In studies conducted in Iran in 2013, the rate of LBW was about 2.9% in the north of the country,[11] more than 11% in the southern provinces,[19] about 8.8% in the center of Iran,[20] and specifically more than 7% in Shahroud, located in the northeast of Iran.

We can prevent the occurrence of LBW by identifying and controlling the risk factors that usually depend on living and social conditions. As mentioned above, various factors such as genetic, social, cultural, demographic, medical, and health factors as well as maternal behavioral conditions directly and indirectly influence the birth weight.[1]

This study was done with the aim of examining the occurrence rate of LBW, as a two-year research, in Bahar hospital in Shahroud. The reason of choosing it was critical importance of LBW in the neonatal health at birth in in the future, and also due to the high economic costs of caring for these babies on the shoulder of both community and family

Materials and Methods

This is a cross-sectional study. The sampling of this research began after obtaining the necessary permissions from the research council and ethics committee of Shahroud university of medical sciences. The target population of this study was all mothers who were enlisted at the Bahar hospital for delivery from May 5, 2013 to May 5, 2015. During this period, 6891 mothers were recruited in the study, some of

whom were eliminated due to some incomplete information of mothers and infants in their records, where finally 6677 mothers remained. The inclusion criterion was delivery of mothers during May 5, 2013 to May 5, 2015 in Bahar hospital. On the other hand, the exclusion criteria were intrauterine fetal death, the death of the baby after birth, and not completing one or some of the sections of the records or incomplete records. The data collection was conducted through data record forms completed by two midwifery experts. In the forms based on mothers' documents, the information such as the gestational age of infants according to the first day of last menstrual period, maternal age, mother's education, residence location, nationality, type of delivery, infant's gender, requiring resuscitation for the infant, baby's condition, and birth weight of the baby were recorded. Then, the data were introduced into the SPSS16. T-test and chi-square tests were used to determine the relationship between variables. Significance level was set at 0.05.

Results

According to some incomplete extracted records, 6677 mothers were examined. The mean age of mothers was 27.20 ± 5.43. Other demographic information is given in table 1.

Table 1. Demographic information

Variable	Number(N)	Percent (%)
Mother's Education		
− Illiterate	226	3.38
− Elementary	982	14.71
− High School	1690	25.31
− Diploma	2760	41.34
− Undergraduate / Bachelor	1010	15.13
− Master's Degree / PhD	9	0.13
Nationality		
− Iranian	6632	99.30
− Non Iranian	45	0.70
Location		
− City	4381	65.60
− Village	2296	34.40

The average weeks of gestational age was 38.56 ± 1.72, and the mean weight of newborns was 3126.09 ± 484.31. Further, 563 newborns had a birth weight equal to or less than 2500 grams, according to which 8.43% of these neonates born in this two-year study were LBW. Other information related to pregnancy and labor, and infantile information is reported in table 2.

The mean age of mothers with LBW infants was 28.00 ± 5.64, and the average weeks of gestation was 35.60 ± 3.40. With increase in pregnancy over the age of 35 years old, and also under the age of 18, the occurrence risk of LBW increased significantly (Pvalue = 0.03). Also, 64.1% of these infants were born by cesarean delivery, and 36.1% of these infants were hospitalized in NICU after birth. Further information is given in table 3.

As shown in Table 3, there is a significant relationship between maternal addiction and LBW occurrence (Pvalue = 0.022). Also, there is a significant relationship between gestational age less than 37 weeks and preterm labor and the occurrence of LBW (Pvalue = 0.001). There was a direct and significant relationship between the premature rupture of membranes (PROM), cesarean delivery, the need of newborn

resuscitation, the hospitalization of a newborn in a NICU and an infant weight equal to or less than 2500 grams (Pvalue = 0.001).

Table 2. Information related to pregnancy and labor

Variable	Number (N)	Percent (%)
Type of Delivery		
− Cesarean Section	3588	53.7
− Vaginal Delivery	3068	45.9
− Vacuum	21	0.3
Gestational Age (Week)		
− Normal (37-41 w)	5587	83.7
− Under 37 Weeks	948	14.2
− Over 41 Weeks	142	2.1
Baby's Sex		
− Girl	3249	48.7
− Boy	3426	51.3
− Unknown	2	0.0
Child's condition		
− Rooming in Mother and Infant	6154	92.2
− Hospitalization	111	1.7
− Transfer to NICU	412	6.2

Discussion

The aim of this study was to investigate the rate of LBW and its risk factors in Shahroud, a city in northeast of Iran. According to the inclusion criterion of the study, the information of pregnant women who had given birth at Bahar hospital during a two-year period of 2013 to 2015 was examined. Of these, 8.3% of infants were born with a weight equal to or less than 2500 grams. Various studies in Iran have reported the LBW rates from 2 to about 11%.[1,12,13,19-24] The occurrence rate of LBW in other countries such as United States, China, Kenya, Ethiopia, and Brazil varies from 3 to more than 16%.[5,12,25-32] This rate is 22.9 and 29.6% of all births in India and Ghana, respectively.[28,31] It seems that the inappropriate socioeconomic status of the negro race and receiving poor pregnancy services can be major factors in the occurrence of LBW.

In this study, the differences of mean age of mothers in two groups of infants weighing less than 2500 grams and more than 2500 grams were not significant. However, with increase in pregnancy over the age of 35 years old, and also under the age of 18, the risk of occurrence of LBW increased significantly, and this result is consistent with the studies of Aldous,[33] Lee,[34] Wunech,[12] Chaman[21] and Momeni.[23] There was a significant relationship between maternal addiction and low birth weight. Hulse et al. observed that use of drugs such as heroin during pregnancy, could reduce the birth weight of a newborn.[35] Kandall,[36] Hulse,[37] Vahdanian,[24] and Knopik[38] also reported this relationship in other studies.

There was a significant relationship between preterm labor and the weight equal or less than 2500 grams. Studies conducted in Iran[19-23,39] as well as other countries obtained the same results.[5,12,30] According to the studies, one of the risk factors for LBW occurrence is premature labor. This LBW in preterm labor can be associated with inappropriate weight gain of fetus in the embryonic period and especially during the third trimester of pregnancy.[40]

Table 3. Further information

Variable	Infant birth weight ≤2500 g (n = 563)		Infant birth weight ≥2500 g (n = 6114)		Pvalue based on chi-square test
	Number	Percent	Number	Percent	
Location					
−City	355	63.05	4027	65.86	0.089
−Village	208	36.94	2087	34.13	
Mother addiction					
−Yes	8	1.42	21	0.34	0.022
−No	555	98.57	6093	99.65	
The week of pregnancy					
−Between 37 to 41 full weeks	199	35.34	5388	88.12	
−Less than 37 full weeks	360	63.94	588	9.61	0.001
−More than 41 weeks	4	0.71	138	2.25	
The premature rupture of membranes					
−Yes	103	18.29	345	5.64	0.001
−No	460	81.70	5769	94.35	
Type of delivery					
−Cesarean section	361	64.1	3226	52.76	
−Vaginal Delivery	202	35.9	2867	46.89	0.001
−Vacuum Extraction	0	0	21	0.34	
Need for baby's resuscitation					
−No	453	80.46	5922	96.85	
−primary resuscitation actions like warming and drying	50	8.88	131	2.14	
−Ventilation with c-pap	38	6.74	52	0.85	0.001
−Heart massage	22	3.90	7	0.11	
−Use medication	0	0	2	0.03	
Child's condition					
−Mother and baby roommate	314	55.77	5841	95.53	
−Hospitalization	47	8.34	64	1.04	0.001
−Transfer to NICU	3.41	209	35.87	202	

Acknowledgement

Conflict of Interest

The authors declare that they have no conflict of interest.

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