ORIGINAL ARTICLE

Prevalence and Risk Factors of Low Birth Weight in Fars Province, South of Iran, 2014

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Abstract

Background: This study was conducted to assess the prevalence of low birth weight and its risk factors in Fars province, south of Iran, 2014.

Methods: In this cross-sectional study, we collected data of 3,600 neonates through multi-stage random sampling. At first, we divided the hospitals into two strata, private and public. Then by stratified random sampling, we selected the neonates from delivery list in each hospital. In univariate analysis, the variables in which the p-value was less than 0.2 were entered into multivariate logistic regression analysis model for adjusting. Two-sided P<0.05 were statistically considered significant.

Result: The prevalence of low birth weight in Fars province was 8.7% (95% CI: 7.8%-9.7%). In term birth, factors such as mother's age>35 years, multiple birth and duration <24 months with previous pregnancy were risk factors of low birth weight (P<0.05) and just the father's literacy was a protective factor for low birth weight.

Conclusion: The prevalence of low birth weight in Fars province was low in comparison to that of the world and other districts of Iran. But we should plan for reduction of low birth weight to achieve world health organization's goal. Variables of pregnancy interval of less than 2 years, multiple births, mother's age over 35 years and father's level of education could predict low birth weight of the neonates.

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Introduction

Low Birth Weight (LBW) is one of the most important factors in neonatal and post-neonatal mortality, and infant and childhood morbidity.[1,2] According to the World Health Organization (WHO) definition, LBW is defined as the weight at birth less than 2500 grams (5.5 lb.). LBW continues to be an important public health problem globally and is related to a range of both short- and long-term consequences including low oxygen level at birth, inability to maintain body temperature, infection, breathing problems, and sudden infant syndrome.[3] It has been shown that 60% to 80% of all neonatal deaths have been attributed to LBW[4] in comparison to normal-birth weight infants. LBW increased the risk of death by 40 times and infants with very low birth weights (<1500 g) had a 200-foldgreater risk of death.[1] Also, the risks of early growth retardation, infection, developmental delay and death during infancy and childhood for LBW infants are high.[5,6]

Overall, it is estimated that 20.6 million infant are born with LBW in the world. The prevalence of LBW rates across the world is different. The highest and lowest prevalence of LBW is in South-Central Asia (27.1%) and Europe (6.4%), respectively.[7] The percentage of LBW rates has increased in different parts of world.[8] In the US, this indicator increased from 6.7% in 1984 to 7.8% in 2002,[9] and in England and Wales LBW rate increased by 11% between 1993 and 2000.[10] In Iran, the results of a systematic review

showed that the percentage of LBW was 7% and the trend was upward between 1999 and 2010.[11] LBW involves preterm neonates (defined as birth before 37 completed weeks of gestation), small for gestational age (SGA, defined as weight for gestation<10thpercentile) neonates at term, etc.[12] However, the consequences of LBW for preterm infants who are small for gestational age are worst. These three classes have their own subgroups, with individual elements related to several causative factors and long-term effects, and distributions across populations that depend on the prevalence of underlying causal factors.[13-15] Clarifying and differentiating different categories and their subtypes of LBW is a fundamental and first step in preventing these problems.[16-18]

One of the goals of WHO is to attain a 30% decrease in the number of LBW infants by the year 2025.

This means that we should have 3% reduction in the prevalence of LBW per year between 2015 and 2025 and a reduction from approximately 20 million to about 14 million LBW infants.[19]

Considering the aim of WHO for reduction of LBW, monitoring the status of LBW is necessary. On the other hand, if we intend to prevent LBW, we need to consider the explained classification of LBW. Therefore, this study was conducted to assess the prevalence of LBW and its risk factors in term and preterm infants in Fars province, southeast of Iran.

Materials and Methods

In this cross-sectional study, we collected demographic data, as well as pregnancy and delivery data from neonates who were born in hospitals of Fars province, south of Iran in 2014. The sample size was 900 newly born infants according to confidence 95%, precision 0.02 and prevalence 10%. As multistage random sampling was used, the design effect was considered 1.34 and based on sub-population analysis, it was multiplied by 3 and finally a total sample size of 3600 was determined. We listed all public and private hospitals by name. Then, through proportionate stratified random sampling method, we selected the hospitals within two strata. The questionnaire was validated by 3 independent specialists including a Neonatologist, Obstetricians and Epidemiologist. Kappa and intra-class correlation coefficient (ICC) were in the acceptable range of 0.7-0.94. To check the internal consistency of the questionnaire, we measured Cronbach's alpha which was 0.8.

Table 1: Demographic and other characteristics of mothers and neonates in LBW and without LBW infants

Variable	Category of variable	Birth weight N (%)		P value
		≥2500 gram	<2500 gram	
Place of living	Rural	1018 (92.9)	78 (7.1)	0.02
	Urban	2262 (90.6)	236 (9.4)	
Sex of neonate	Boy	1660 (91.7)	151 (8.3)	0.44
	Girl	1617 (90.9)	161 (9.1)	
Age group of mother (year)	18-35	2767 (91.9)	244 (8.1)	0.008
	<18	77 (89.5)	9 (10.5)	
	>35	427 (87.7)	60 (12.3)	
Father job	Employee	599 (88.9)	75 (11.1)	0.15
	Labor	514 (91.5)	48 (8.5)	
	Free Job	1861 (91.9)	163 (8.1%)	
	Skilled Professional	35 (89.7)	4 (10.3)	
	Farmer	269 (92.4)	22 (7.6)	
Mother job	Housewife	3004 (91.5)	278 (8.5)	0.18
	Teacher and other jobs	275 (89.3)	33 (10.7)	
Interval with previous pregnancy	>2	1422 (93.0)	107 (7.0)	0.006
	<2y	475 (89.3)	57 (10.7)	
Total income / month (tomans) (1 USD=3650 tomans)	<500,000	1255 (91.0)	124 (9.0)	0.06
	500,000-1,000,000	1589 (92.1)	137 (7.9)	
	1,000,000-2,000,000	356 (88.1)	48 (11.9)	
	>2000,000	63 (94.0)	4 (6.0)	
Type of pregnancy	Wanted	2741 (91.1)	267 (8.9)	0.122
	Unwanted	515 (93.1)	38 (6.9)	
Type of delivery	Normal	1308 (92.5)	106 (7.5)	0.034
	Section	1953 (90.5)	206(9.5)	
Home violence	Yes	110 (93.2)	8 (6.8)	0.45
	No	3124 (91.2)	300 (8.8)	
Prenatal care	yes	3153	293 (8.5)	0.08
	no	116 (87.2)	17 (12.8)	
Gestation age	Preterm(<37 week)	432 (68.2)	201 (31.8)	<0.0001
	Term (≥37week)	2783 (96.4)	103 (3.6)	

Statistical analysis: Univariate analysis was performed using Chi-square and T-student independent test. Multivariate logistic regression analysis model was used for adjusting and removing the confounding variables. For conducting logistic regression analysis, the variables which had a P-value less than 0.2 in univariate analysis were entered into the backward model and finally the variables which predicted LBW werere identified. Two-sided P<0.05 were considered to be statistically significant.

Results

Demographic data of the study participants are presented in Tables 1 and 2. The number of preterm delivery was 409 (12.7%). The prevalence of LBW in Fars province was 8.7% (95% CI: 7.8% 9.7%). The prevalence of LBW in preterm delivery was 31.8% (95% CI: 35.4% 28.1%) and in term birth it was 3.1% (95% CI: 4.3% 2.9%). Demographic and maternal characteristics of the neonates are shown in Tables 1 and 2. The result of univariate analysis showed that the variables significantly related to LBW in term birth included sex of the neonate, age of the mother, pregnancy interval, multiple delivery, father's level of education, and the number of mothers' referral to the health care centers. In preterm infants, the variables significantly related to LBW included place of residence, father's job, mother's job, pregnancy interval, multiple birth, and parents' level of education. According to Table 3, the results of multivariate logistic regression indicated that pregnancy interval less than 2 years, multiple delivery, and mother's age over 35 years and father's level of education could predict the odds of LBW in term infants. Table 4 shows the results of multivariate logistic regression for preterm neonates in which variables of mother's employment, first pregnancy, pregnancy interval less than 2 years, and multiple birth could predict the odds of LBW in preterm infants.

Discussion

The aim of this study was to determine the prevalence and some risk factors of LBW in Fars province, Iran. The study results showed that the prevalence of LBW was 8.7% and variables of pregnancy interval less than 2 years, multiple births, mother's age over 35 years and father's level of education were significantly associated with LBW.

The results of a study in Mashhad, Iran showed that the prevalence of LBW was 11.1% in 2010;[20] other studies in Iran reported the prevalence of LBW to be 8.6-13.6%.[21-24] The global prevalence of LBW is 15.5%, and the lowest rate of prevalence was seen in Europe (6.4%); also, the highest rate of prevalence was seen in central and south Asia (27.1%).[18] In Africa, the prevalence of LBW was reported to be 22.5%.[25,26] Therefore, the prevalence of LBW in Fars province is low in comparison with the world and other parts of Iran, but we should plan for reducing the prevalence

Table 2: Mean and standard deviation of some maternal variables in LBW and without LBW infants

Variable	Birth weight (Mean±SD[a])		P value
	<2500 gram	≥2500 gram	
Father education (official schooling)	10.0±4.5	10.4±4.1	0.1
Mother education (official schooling)	10.3±4.4	10.4±4.3	0.7
Number of pregnancy	2.0±1.3	2.0±1.2	0.9
Number of delivery	1.9±1.1	1.8±1.0	0.4
Number of abortion	0.3±0.7	0.2±0.6	0.1
Number of live children	1.9±1.0	1.8±0.9	0.1
Number of cares during in this pregnancy	7.8±3.1	8.5±3.4	0.001

[a]Standard Deviation

Table 3: Result of multivariate logistic regression for term neonate

Variable	Odds Ratio	P value	95% confidence interval
Interval with pervious pregnancy <2 year	1.64	0.04	1.02-2.64
Multiple pregnancies	12.42	<0.001	6.24-24.72
Age of mother >35	1.73	0.02	1.11-2.68
Education of father	0.94	<0.0001	0.91-0.98

Table 4: Results of multivariate logistic regression for preterm neonate

Variable	Odds Ratio	P value	95%confidence interval
Employee mother	2.21	0.04	1.04-4.68
Interval with pervious pregnancy <2 year	1.92	0.04	1.01-3.65
first pregnancy	1.79	0.02	1.09-2.95
Multiple pregnancies	8.22	<0.001	4.64-14.56

of LBW in order to achieve WHO's goals.

In this study, father's education, independent from other risk factors, decreased the odds of LBW; therefore, one of the important risk factors for LBW is socioeconomic status and father's education is one of the significant elements of socioeconomic status which is a fundamental determinant of LBW.[27] In another study in Taiwan, one of the important factors effective in decreasing LBW was father's low education.[28] One of the factors that increased the risk of LBW is multiple pregnancies. Studies in Yazd, Iran,[21] Japan[29] and Italy[30] support this finding. Multiple pregnancies may develop Intra-uterine growth restriction (IUGR). Results of one study[31] showed that up to 25% of the twins had IUGR.[31] Although the growth rate of twins is similar to that of single fetuses during the first two trimesters of pregnancy, mean growth for single and twin fetuses is 220–240g and 160–170g per week by week 34, respectively. The risk of LBW is even higher in pregnancies with a larger number of fetuses; in triplets, the main reason for this is the decreased availability of substances for each fetus.[32]

One of the main risk factors for prematurity and low birth weight is short intervals between births (<2 years), as found in our study. This finding was reported in other studies.[23,33,34] Short intervals between births may cause nutritional deficiencies and incomplete return of the maternal physiology to normal levels during a short period of time.[35] In developing countries, the interval from 3 to 6 months and in developed countries the interval from 1 to 2 years with pervious pregnancy may lead to an increased tendency toward low birth weight and prematurity in subsequent pregnancies.[36] Other researchers reported an increased risk of LBW when the birth interval is shorter than 1 year.[36-38] One of the limitations of this study was different qualities of recording pregnant mother's information which was out of control of the researcher.

Conclusion

The prevalence of LBW in Fars province is low in comparison to that of the world and other districts of Iran, but we should plan for reduction of the prevalence of LBW in this province. Factors that predict low birth weight in Fars province were pregnancy interval less than 2 years, multiple pregnancy, father's education and mother's age over 35 yeras. Almost all of these factors can be prevented by prenatal consultation and education.

Conflict of Interest: None declared.

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