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Prevalence of Low Birth Weight and Some Associated Factors in Markazi Province, 2013-2014

[1]Mehdi Ranjbaran, [2]Hadi Jafary-Manesh, [3]Leila Sajjadi-Hazaneh,
[3]Soraya Eisaabadi, [3]Shahnaz Talkhabi, [4]Arefeh Sadat Khoshniyat, [5]Mohsen Shamsi,
[1]Babak Eshrati, [3]Fatemeh Sadeghi and [3]Soheila Moradi-Rizi

[1]Department of Epidemiology, Faculty of Health, Arak University of Medical Sciences, Arak, Iran
[2]Faculty of Nursing and Midwifery, Arak University of Medical Sciences, Arak, Iran
[3]Research Committee, Faculty of Health, Arak University of Medical Sciences, Arak, Iran
[4]Faculty of Humanities, Arak University, Arak, Iran
[5]Department of Health Education and Health Promotion,
Faculty of Health, Arak University of Medical Sciences, Arak, Iran

Abstract: Low birth weight (LBW) is one of the contributing factors of infant's morbidity and mortality. LBW prevalence varies according to health status and social conditions. The aim of this study was to determine prevalence of LBW and related factors in Markazi Province, Iran. Materials and Methods: This cross-sectional study was conducted on 461 infants born alive in the period of 21 March 2013 to 20 March 2014. The data were collected using prenatal and child care information in health records of rural and urban health centers covered by Arak University of Medical Sciences. The data were analyzed by SPSS-20, using descriptive statistics, chi-square, fisher exact and logistic regression tests. Results revealed that in the mean score of infant's weight was 3201.38 ± 1545.89g and low birth weight prevalence was estimated as 6.7%. A significant relationship was observed between multiple birth (P<0.001), gestational weight gain (P=0.013) and gestational age (P<0.001) and LBW. Controlling the effect of other variables, multiple birth and gestational age were significant predictors of newborn infant's weight. In Conclusion: Considering the low prevalence of LBW in this study, preservation and promotion of this situation seems necessary regarding the important predicting risk factors.

Key words: Low Birth Weight · Prevalence · Infant · Markazi Province

INTRODUCTION

One of the factors involved in morbidity and mortality of children is low birth weight [1, 2]. The birth weigh less than 2500g is considered low. Mortality of low-weight infants is 40 times more than infants with normal weights [3]. Also, LBW can be one of the important and influential factors causing poor growth, increased rates of illness from infectious diseases in infancy and childhood, compromised cognitive and behavioral development [1, 4-6]. The remarkable point is that recent epidemiological studies showed that risk of occurrence of diseases in middle age such as blood pressure, kidney diseases, diabetes, stroke and obesity is more in people born with LBW [7].

LBW both in developed and developing countries imposes an extraordinary pressure on health care services and family members [8]. Care services devoted to low-weight infants compose more than one third of the health care expenses [9].

In Iran, two third of mortalities among infants in the first 24 hours after birth happen in low-weight newborn infants as well. Since the last two decades, the rate of low-weight infants has decreased [7]. Every year, over 20 million (or in other words, 15.5%) newborn infants in the world are born with low weight. This rate is 7% in developed countries, 16.5% in less developed or developing countries and 18.6% in countries with the least development. A research has shown prevalence of LBW in Iran as 11.56% in 2003 and 8% in 2007. This rate was reported in Isfahan as 9.5% in 2009 [10].

Corresponding Author: Mehdi Ranjbaran, Department of Epidemiology, Faculty of Health, Golestan St., Daneshgah Ave., Arak, Iran. Tel: +086-33686446, Fax: +086-33686443.

Many factors affect LBW among which the most important ones are genetic, environmental, fetal, placental and maternal factors [11-13]. In addition, studies have shown that low socioeconomic level, inappropriate nutrition, anemia, different diseases, pregnancy cares, medicines, midwifery complications, miscarriage, pregnancy in younger age, short interpregnancy intervals, weight and height of mother are associated with low birth weight of newborn infant [14, 15].

The results of a study in 2005 in swede indicated higher mortality of infants and higher rate of low birth weight infants in women with lower education [16]. In a study in 2004 in India, prevalence of low birth weight has been reported as 39.1% which has been related with age, weight and height of the mother and number of her pregnancies [17].

In multiple studies, different factors such as drugs use, alcohol use, socioeconomic status and chloride water use have been recognized influential in pregnancy complications including low birth weight infants, small infants for gestational age and preterm delivery [18-20].

Determining the factors influential in low birth weight will help health managers and practitioners in order to plan strategies for planning and implementing appropriate interventions toward promoting health [21]. Therefore, birth weight is considered as one of the important health indices in assessing pregnancy cares and the determining scale for infants' health in the society which is closely related to the process of growth, development and survival of infants. In addition, recognizing and controlling risk factors of low birth weight, occurrence of LBW infants can be prevented. Prevalence of LBW varies in different social and health conditions. Thus, it is necessary to examine this situation in different regions. Therefore, this study aimed at examining prevalence of low birth weight and some related factors in infants in Markazi Province of Iran in 2013.

MATERIALS AND METHODS

This cross-sectional study was conducted on 461 infants born alive in the period of 21 March 2013 to 20 March 2014. The subjects were randomly selected among infants born in 2013 in medical health centers of Arak, Khondab and Farahan covered by Arak University of Medical Sciences. The data were collected using prenatal and child care information in health records of rural and urban health centers. In this study, mother information, including age, gestational weight gain, type of delivery, intended or unintended pregnancy, education level, residence status, job, interpregnancy interval and infant information, including weight, gender, gestational age and multiple birth, were collected from existing forms in household records. Regarding ethical considerations, the purposes of the study were explained to mothers and an informed consent was obtained for their participating in the study; also, no personal question was asked in questionnaire. The data from questionnaires were analyzed using SPSS-20 and through descriptive statistics including mean, standard deviation, frequency, relative frequency and also analytical statistics including chi-square, fisher exact and logistic regression tests.

RESULTS

In this study, 461 newborn infants were studied including 221 boys (47.9%) and 240 girls (52.1%). The mean age of the mothers was 27.38±5.55. Other demographic and clinical information of infants and mothers in the study were shown in Table 1.

The results of the present study showed that average weight of the studied infants is 3201.38±1545.89g. Also, categorization of infants' weights showed that 6.7% of infants are low birth weight.

Distribution of low birth weight of infants in terms of the study variables has been provided in Table 2. Based on the results of chi-square and fisher exact tests, there was a statistically significant relationship between multiple birth ($p<0.001$), gestational weight gain ($p=0.013$) and gestational age ($p<0.001$) and low birth weight of the infants. Other variables showed no significant relationship with infants' weight ($p>0.05$).

Finally, the variables which showed a significant relationship at least at the level of 0.2 with low birth weight of the infants in univariate model, including multiple birth, mother's job, mother's education, gestational weight gain, gestational age and type of delivery, were entered multivariate logistic regression model. The results showed that by controlling the effect of other related variables, multiple birth and preterm delivery are the important variables predicting the weight of newborn infants (Table 3).

Table 1: Characteristics of newborn infants and their mothers in the study

Variable		N	%
multiple birth	singleton	448	97.2
	multiple-birth	13	2.8
mother's job	housewife	439	95.2
	employee	22	4.8
mother's education	lower than high school diploma	301	65.3
	high school diploma	125	27.1
	university degree	35	7.6
residence status	rural	227	49.2
	urban	234	50.8
number of pregnancies	3 and less	422	91.5
	more than 3	39	8.5
gestational weight gain	appropriate	267	57.9
	inappropriate	194	42.1
interpregnancy interval	less than 3	58	14.1
(in year)	3 and more	353	85.9
unintended pregnancy	yes	49	10.6
	no	412	89.4
gestational age (in week)	< 37	38	8.3
	≥37	422	91.7
type of delivery	vaginal delivery	238	51.6
	Caesarean section	223	48.4

Table 2: Factors related to low birth weight in infants

		Infants' weights N (%)		
Variable		Normal	Low-weight	P-value*
infant gender	male	209 (94.6)	12 (5.4)	
	female	221 (92.1)	19 (7.9)	0.35
multiple birth	singleton	427 (95.3)	21 (4.7)	
	multiple birth	3 (23.1)	10 (76.9)	<0.001
mother's job	housewife	411 (93.6)	28 (6.4)	
	employee	19 (86.4)	3 (13.6)	0.18
mother's education	lower than diploma	276 (91.7)	25 (8.3)	
	diploma	121 (68.8)	4 (31.2)	
	university degree	33 (94.3)	2 (5.7)	0.15
residence status	rural	212 (93.4)	15 (6.6)	
	urban	218 (93.2)	16 (6.8)	1.00
number of pregnancies	3 and less	393 (93.1)	29 (6.9)	
	more than 3	37 (94.9)	2 (5.1)	1.00
gestational weight gain	appropriate	174 (89.7)	20 (10.3)	
	inappropriate	256 (95.9)	11 (4.1)	0.013
Interpregnancy interval (in year)	less than 3	53 (91.4)	5 (8.6)	
	3 and more	332 (94.1)	21 (5.9)	0.39
unintended pregnancy	yes	384 (93.2)	28 (6.8)	
	no	46 (93.9)	3 (6.1)	1.00
gestational age (in week)	< 37	21 (55.3)	17 (44.7)	
	≥37	409 (96.9)	13 (3.1)	<0.001
type of delivery	vaginal delivery	227 (95.4)	11 (4.6)	
	Caesarean section	203 (91.0)	20 (9.0)	0.066
mother's age (in year)	<20	25 (92.6)	2 (7.4)	
	20-30	274 (92.6)	22 (7.4)	
	<30	131 (94.9)	7 (5.1)	0.65

* Chi-square and Fisher exact tests

Table 3: Multivariate logistic regression analysis of risk factors of low birth weight in infants

variable		Odds Ratio	95% Confidence Interval	P-value
multiple birth	singleton	1		
	multiple birth	18.9	(3.31-98.93)	0.001
mother's job	housewife	1		
	employee	2.84	(0.39-21.41)	0.29
mother's education	lower than diploma	1		
	diploma	0.42	(0.12-1.47)	0.18
	university degree	0.13	(0.01-3.01)	0.20
gestational weight gain	appropriate	1		
	inappropriate	2.01	(0.79-5.09)	0.14
gestational age	<37	1		
	≥37	15.32	(5.69-41-26)	<0.001
type of delivery	vaginal delivery			
	Caesarean section	0.90	(0.35-2.33)	0.84

DISCUSSION

The aim of this study was examining the prevalence of low birth weight and some related factors in infants in Markazi Province during 2013-2014. The results of the present study showed that 6.7% of the studied infants are low-weight at the time of birth.

Based on the study carried out in Arak in 2002, the prevalence rate of low birth weight of the infants has been reported as 9% and this rate was 11.1% in newborns of Taleghani Hospital of this city in the same year [22, 23]. It seems that a decreasing trend is happening in the rate of birth of low-weight infants in Markazi Province so that number of low birth infants has desirably decreased and reached the rate in developed countries. This can indicate the excellent performance of those responsible and active in prevention and health system. Following factors may be mentioned as the most important causes of decrease in LBW occurrence in the province: increased medical and health cares provided to pregnant mothers, negative attitude of the society toward drugs and alcohol use especially by women, higher levels of education followed by mothers and easy access to many educational and medical centers. However, this should be noted that Rafiei's study has been conducted only in Taleghani Hospital while the present study has examined the subjects in a broader scope.

The rate of LBW in Markazi Province is consistent with the report of WHO on prevalence of LBW in Iran and is close to the LBW prevalence in Europe [24]. This rate is less than that in some neighboring countries such as Saudi Arabia (8.4%) [25], United Arab Emirates (8.4%) [26], Turkey (10.61%) [27] and some developed countries like America (7.8%) [28, 29] and Singapore (7.8%) [30]. However, it is higher than prevalence rate of low birth weight in Swede (4%) [31] and Australia (1.9%) [32].

In Iran, prevalence of low birth weight in different cities has been reported different. This rate is 19.1% in Hamedan [33], 7.5-16% in Tehran [34-36], 8.8% in Yazd [2], 9.5% in Isfahan [10], 7.2% in Shahroud [37] and 8.5% in Shahrekord [38].

The results of the present study showed a statistically significant relationship between multiple birth, gestational weight gain and gestational age and low birth weight of the infants. Also, logistic regression of the results showed that controlling the effect of other related variables, multiple birth and preterm delivery are among important variables predicting the weight of newborn infants. In the study of Bahrami *et al*. [39], gestational age had the most significant relationship with birth weight so that prevalence of low birth weight was higher in preterm delivery than in term delivery. The results of that study are similar to those in the present study. After the 32nd week of pregnancy, fetus growth is done through cellular hypertrophy and it is in this stage that the largest part of fat and glycogen precipitation of fetus happens so that the rate of fetus growth in the 34th week of pregnancy is 30 to 35 grams per day [40]. The results of the present study showed that low birth weight happened more in the infants whose mothers had gained less-than-normal weight during pregnancy. The results of other research indicated this point as well [41, 42]. In addition, the relationship between multiple birth and low birth weight has been shown [30].

The results of the present study showed that there was no significant relationship between other variables (infant gender, mother's job, mother's education, residence, number of pregnancies, interpregnancy interval, unintended or intended pregnancy, type of delivery and mother's age) and low birth weight.

The relationship between low birth weight and short interval of pregnancies, number of deliveries [43-45], girl infant [45] mother's age [9, 46] and mother's education [47, 48] was revealed in some different studies which is different from the present study. This can be the result of the difference in the type of the study, genetic and racial characteristics of mothers, or sampling method among these studies. It is recommended that prevalence of premature infants be reexamined some years later to allow constant monitoring of LBW trend. Also, the effect of providing integrated prevention and health services during pregnancy on reducing low weight in pregnant women can be studied.

CONCLUSIONS

Given the risk factors of low birth weight in this study including multiple birth, gestational weight gain and gestational age, it can be concluded that necessary educations and trainings should be provided to mothers, specially first-time mothers, during pregnancy period to make them able to successfully encounter and manage risks and stress entangled with pregnancy by the help of integrated support and receive required trainings to care themselves. Therefore, it is necessary to pay special attention to the above mentioned factors to reduce prevalence of low birth weight newborn infants.

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