Original Article

The relationship between biological cognitive and psychosocial characteristics of parents and the weight of infant at the time of birth in Isfahan

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ABSTRACT

Introduction: The present study was connected in order to evaluate the relationship between biological, cognitive and psychosocial characteristics of mothers and the weight of infant at the time of birth. **Materials and Methods:** In order to conduct this research a sample of 910 women among recently delivered mothers of Isfahan province in 2009 were selected. From stratified sampling and cluster sampling according to the percentage of population in each of the cities of Isfahan Province was used. The data was gathered with a questionnaire prepared by the researcher in order to evaluate the biological cognitive and psychosocial characteristics of mothers, in addition to the Enrich marital satisfaction test. After collecting data, the analysis of the data was done with SPSS software in two categories of descriptive and inferential statistics by using logistic regression model. **Results:** The results showed that the prevalence of low weight infants was 9.5 percent and 38.7 percent of pregnancies was unwanted. Twenty-nine percent of mothers had marital dissatisfaction. 15/6 percent of pregnancies were below 20 years old and 22 percent was above of 35 years old. 38.9 percent of mothers were exposed to cigarette smoke. The average of weight gain during pregnancies was 9 kilograms. Thirty three percent of mothers had high blood pressure during pregnancy, 26.7 percent had history of abortion and 31.9 percent had history of bleeding. 23/1percent of women was employed during pregnancy, 19.8 percent gave twin birth and 21/1 percent of parents were relative of each other, 29.7 percent of deliveries were done in cesarean way. **Conclusion:** The results of this study showed that severe marital dissatisfaction, abnormal blood pressure during pregnancy, being employed during pregnancy, weight gain less than 5 Kg during pregnancy, pregnancy below the age of 20 can meaning fully increase the possibility of low birth weight in infant (α=0.05). The results were consisting with the previous findings and indicated that some of the applicable benefits of this research can be recording of information about each delivery in the whole country with holding training workshops of before and during pregnancy skills by welfare organization.

Key words: Low birth weight, pregnancy, prenatal care, risk factors

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INTRODUCTION

The weight of a neonatal infant is one of the basic determining elements in his future survival, physical and mental maturation. It is also a reliable sign of intrauterine

growth.[1] One of the most important hygienic indicators in every country is its infant mortality, and this indicator is related to mothers' health, the quality of care during pregnancy and financial-social elements.[2] In addition to the psychological problems, families with low birth weight (lbw) infants have both psychological and financial problems and they are mostly the poor people of the society.[1] The expenses for hygienic cares for lbw infants are 6 times more than ordinary infants.[3] According to World Health Organization (WHO), low birth weight is defined as being less than 2500 g (5.5 pounds) at the moment of birth regardless of the age of pregnancy. Due to the researches, conducted by WHO, about 25 million lbw infants are born every year in the world which means one per six infants, and among these infants, 90% of them are from developing countries. These infants are even at a higher risk of mortality before the age of 15.[4] The mortality among low birth weight infants and very low birth weight infants are 40 and 200 times more respectively.

Minor low birth weight (LBW), which means the weight of less than 2500 grams, very low birth weight (VLBW) which means the weight of less than 1500 grams and extremely low birth weight (ELBW), which is used for infants whose weight is less than 1000 g at the moment of birth. Prematurely born infants are those who are born before 37th week of a full time pregnancy (259 days).[5] One of the aims of WHO in developing countries is reaching to 90% of births in which infants are born with the weight of 2500 g or more which demands educating mother about their hygiene and their nutrition during their pregnancy and about preventing repeated pregnancies. Thus, by determining and controlling risk factors, which are often related to environment and society, we can prevent the birth of lbw infants. Because the distribution of lbw infants is not the same in different hygienic and social environments, this obligates the examination of this problem in different environments. The amount of lbw infants in developed countries and in developing countries has been reported about 4 and 16.4% respectively. The range of lbw infants is between 4%s in Switzerland to 30% in Bangladesh. Low birth weight problem is either due to prematurely born infants, or problems of intrauterine growth.[6] In Iran, the amount of mortality below the age of 5 and 2 is 32 and 26 per thousand respectively, among which 18 per thousand die during the first month and most of them are lbw infants. The lbw rate in Iran has been reported 8%.[7] there are lots of factors related to lbw such as pregnancy in lower ages, short time between two pregnancies, weight and height of mother, low level of financial-social factors, low quality food, anemia, different diseases, lack of hygienic cares during pregnancy, drugs and abortion.[8] The researches, conducted in Bangladesh showed that the age, weight and height of mothers are among risk factors.[9] Other researches in Switzerland in 2005 showed that most of lbw infants and infant mortality were among mothers with lower education level. Factors related to LBW are:

1. The biological features of parents, especially mothers such as age, height, weight, multiple birth, nutrition, pica, method of childbirth and the problems before pregnancy and during childbirth, premature childbirth, mother's diseases and the number of children

2. The cognitive features of parents such as the level of education, cognitive abilities, the level of knowledge about cares during pregnancy

3. The mental and emotional features of parents such as the level of agreement between parents, the attitude of the mother towards pregnancy, the mental readiness of parents, wanted or unwanted pregnancy and the level of satisfaction between parents

4. The social, financial and cultural features of parents such as their job, the amount of income, the place of living, the conditions of living and social class of the family

5. The environmental features of the place of living of mother such as the weather, the level of air pollutions, the level of sound pollution, the kind of water for drinking, the presence of electrical, nuclear, chemical, military and industrial bases around the place of living.

The end of fetal period and the initiation of neonatal period have the highest number of mortality and all infants who die by the 28th day of their birth, die in this period. This mortal rate is one of the most important hygienic indicators in every society, influenced by different factors such as conditions before pregnancy, mother, and fetus and during the birth (2002). In the United States, there has been an increase in the number of lbw infants due to an increase in the number of premature births. Almost 30% of lbw infants in the United States suffer intrauterine growth problems though they were born after 37th week of pregnancy. In the developing countries, almost 70% of lbw infants suffer intrauterine growth problems. These infants are at higher risk of mortality than those who lack this problem.[6]

Among 25 million lbw infants who are born every year, more than 20 million infants (90%) are born in developing countries, besides in some vast areas in Asia, there is born one lbw infant per two, while in the Europe, its one lbw infant per 17. In Iran, 289 infant die under the age of 5 every day, among which 48% occurs by the end of the first month of their lives and most of them are below 2500 g.[10]

There are lots of indicators to show the hygienic conditions in a society. One of them is the weight of the infant at the moment of birth, because this is not only related to the quality of food, conditions of care during pregnancy, and the social environment of mothers, but to the process of growth and natural maturation of the infant.[11] By paying attention to the role of birth weight in infant mortality and its financial expenses for caring lbw infants, this study aims to investigate the rate of lbw infants and its risk factors in Isfahan province. According to a report by WHO in 2002, there are born 20 million lbw infant all together every year in the world who are 14% of all births in the world.[3] In Iran this rate is 11.56.[12] Lbw infants may suffer respiratory problems or heart problems. Their brain growth is incomplete and they will face different disorders.[13] Henly, Ramsey and Algozzine (cited by Fallah) believe that lbw leads to an increase in different

inadequacy such as mental retardation and learning disorders and has an influence on infants' cognitive growth. It is also related to visual and kinesthetic problems and also to brain paralysis.[5]

In order to propose a preventive program mothers and the areas with higher risk of lbw infants, the present researchers have gathered local data such as frequency of lbw infants' the distribution of infants' weight in different geographical districts, the frequency of wanted and unwanted pregnancies and the time average between two pregnancies.

This study was carried out in order to provide information based for developing a preventive program the main objectives of the program are:

a. To lower the infant mortality and the expenses of caring lbw infants.
b. To lower disorders due to low birth weight such as respiratory and heart problems, mental retardation, learning disorders, visual and kinesthetic problems and brain paralysis.
c. To increase the mental hygienic level of families, because the mental atmosphere of family has an influence on mental health of parents and children.[5] According to researches, the presence of an abnormal infant in a family can influence on every aspects of family such as finance, satisfaction between parents, social contacts out of family and its mental health.[14]

In order to analyze low birth weight, we should have a deep insight into different aspects of biology, psychology and society. Most of researches about lbw, conducted in Iran, have been conducted based on medical and paramedical view, in medicine, hygiene and nutrition universities and there has been paid little attention to psychological aspects such as the attitude of mother towards pregnancy, mental readiness, satisfaction between parents, depression and stress during pregnancy, violence in family and emotional atmosphere. One of the most important strategies for preventing paralysis is through lowering the rate of lbw and premature infants.[14] The basic aim of this study is to investigate the relationship between biological and social-mental features of parents and the weight of infant at the moment of birth and the frequency of lbw infants and preventing the biological, cognitive and mental-social consequences of low birth weight phenomenon.

MATERIALS AND METHODS

This study uses the descriptive statistic, correlation coefficient and regression multiple logistic analysis. The population of this study is all the infants born in private or public hospitals and maternity hospitals in Isfahan in 1388. The sample of present study is 910 alive infants, who were selected through random selection. The main variable of this research is low birth weight at the moment of birth and the previous researched performed in Isfahan province reported that lbw infants are 10% of all infants. Thus by using the formula of the size of sample for ratio and by reliability of 95% (α=0.05) and d = 0.02 we calculated the size of sample for the study. The sampling of this study was done in three phases: The first phase: Stratum sampling according to the ratio of population in every city in Isfahan province which are Isfahan, Shahreza, Najaf Abad, Kashan, Dehaghan, Mobarakeh, Semirom, Khomeiny Shahr and Zarrin Shahr. The second phase: Stratum sampling based on seasons, in other words, dividing the sample in every city based on four seasons. The third phase: Cluster sampling, which is selecting one day in each season randomly for sampling and selecting all the births in that day and the days after, until we had enough questionnaire.

In this study, we used Enrich marital satisfaction questionnaire (a 47 items and 5 alternatives test) with alpha level of 0.71 to 0.92 for different subscales. The alpha level of this questionnaire in 1989 was 0.71 to 0.92 for different subscales of questionnaire in Olson report.[5] A researcher-made questionnaire was used to gather data about biological, cognitive and mental-social features of parents based on variables related to the low birth weight of infants (Cronbach coefficient alpha). The method used was that after primary studies and gathering questionnaires, we wrote the final questionnaire of the study. In order to achieve the content validity of the questionnaire, we counseled three persons mastered in the field and the questionnaire performed on a 20 persons sample, the alpha level was calculated which was 0.85. We used SPSS program for analysis of the data. In descriptive part and in inferential statistics, frequency distribution of variables and the logistic regression model was used respectively.

RESULTS

In this research the total number of sample was 910 alive born infants. Table 1 shows the frequency distribution of biological, cognitive and mental-social features of parents and lbw infants.

In inferential statistics regression multiple logistic models was used and the meaningful variables entered into the model in this analysis were shown in Table 2 under B multiples tab.

Multiple regression logistic analysis in stepwise method shows that there is a meaningful relationship between mothers activity and resting, mother's height, Apgar score, abnormal sibling, mother's knowledge about cares during pregnancy, mother's bleeding and mother's poisoning and these may strikingly leads to the birth of lbw infants.

In this study there is no meaningful relationship between father's biological features (weight, age and height) and the birth of lbw infants.

The results of the study shows that there is a meaningful relationship between mental features of parents (the level of agreement between parents, previous psychiatric sicknesses, mother's attitude towards pregnancy, mother's mental readiness for gestation, wanted or unwanted pregnancies) and the weight of the neonatal infant (α = 0.05).

Table 1: The frequency distribution of demographic information of parents and lbw infants based on different variables in Isfahan province in 2009

Variables	Variables classification	Number	%
Gender	Male	465	51.1
	Female	445	48.9
Birth weight	Less than 1000 grams	56	6.2
	Between 1000 and 1500 grams	99	10.9
	Between 1501 and 2500 grams	755	83
Method of childbirth	Cesarean section	270	29.7
	Natural	640	70.3
Age of mother during pregnancy	Under 20 years old	142	15.6
	Between 20 and 35 years old	568	62.5
	Over 36 years old	200	22
Relativity between parents	Relative	192	21.1
	Not relative	718	78.9
Height of mother during pregnancy	Less than 150 cm	261	28.7
	Between 151 and 170 cm	646	71
	171 cm and more	3	0.3
Weight of mother before pregnancy*	Less than 50 kg	210	23.1
	Between 51 to 70 kg	658	72.3
	71 kg and more	42	4.7
Mother's mental readiness for pregnancy**	Very low	270	29.7
	Low	289	31.8
	Normal	212	23.3
	High	139	15.3
Psychiatrically sick parents***	Yes	123	13.5
	No	787	86.5
Season of birth	Spring	228	25.1
	Summer	228	25.1
	Autumn	227	24.9
	Winter	227	24.9
Place of birth	Hospital and maternity hospitals	885	97.3
	House	25	2.7
Family income	Up to 3,500,000 rials	457	50.2
	From 3,510,000 rials to 5,000,000 rials	210	23.1
	5,010,000 rials and more	243	26.7
Mother's knowledge about pregnancy cares***	Low knowledge	698	76.7
	Medium knowledge	180	19.8
	High knowledge	31	3.4
Father's knowledge from pregnancy cares***	Low knowledge	462	50.8
	Medium knowledge	410	45.1
	High knowledge	38	4.2
Mother's education	Illiterate or low	249	27.3
	Under diploma	262	28.8
	Diploma to bachelor degree	392	43.1
	Master degree and PhD	7	0.8

Contd...

Table 1: Contd...

Variables	Variables classification	Number	%
Mother's weight gain during pregnancy	5.5 kg and less	126	13.8
	6 to 10 kg	595	65.4
	11 kg and more	186	20.4
Time passed from previous pregnancy	The first infant (no previous childbirth)	397	43.6
	1 to 1.11 years	124	13.6
	2 to 4.11 years	205	21.5
	5 years and more	184	20.3
Mother's job	Employed	210	23.1
	Unemployed	700	76.9
Parents' living place	Urban	575	63.2
	Rural	335	36.8
Mother's attitude towards her body changes during pregnancy	Extremely negative attitude	283	31.1
	Negative attitude	341	37.5
	Indifferent	153	16.8
	Positive attitude	133	14.6
Father's education	Illiterate or low	258	28.4
	Under diploma	314	34.5
	Diploma to bachelor degree	328	36
	Master degree and PhD	10	1.1
The rank or place of infant in family	First infant	325	35.7
	Second infant	220	24.2
	Third infant	179	19.7
	Fourth infant	125	13.7
	Fifth infant or higher	61	6.7

*Mothers' weight before pregnancy was obtained through the records kept by Mother-Child Health Clinics, **Pregnant women were asked whether they wanted to have a baby or not, ***Through the records kept by Mother-Child Health Clinics

The results show that there is a meaningful relationship between the cognitive features of parents (level of education, cognitive abilities, and knowledge about cares during gestation) and low birth weight of neonatal infants, this relationship is significant for knowledge about mother about cares during pregnancy.

In this research, no meaningful relationship was observed between natural-environmental features of mothers' living place (kind of weather, air pollution, sound pollution, kind of drinking water and presence of bases) and birth weight; however, findings suggest that the marital satisfaction between parents during gestation influences the weight of neonatal infant.

DISCUSSION

The finding of present study shows that the frequency of lbw infants in Isfahan is 9.5%, these findings correspond with the findings investigated by Falah[5] who mentioned a 9.35% lbw infants' distribution in Yazd province, but it is in contrast by findings of Eghbalian who reported a 19.1% lbw infants distributions in Hamadan province. These findings

Table 2: Multiples of regression model and standard deviation and the chance ratio of risk factors of lbw infants						
Variables	B multiples	Standard deviation	EXP (B) chance ratio	The number of *P*, level of meaningfulness	Wald	Degree of freedom, df
Mothers resting and activities during gestation	−0.823	0.236	0.439	0.000	12.169	1
Mothers height	0.032	0.011	1.033	0.004	8.096	1
Apgar score	0.501	0.196	1.650	0.003	6.564	1
Abnormal sibling in family	0.825	0.367	2.281	0.025	5.052	1
Mothers knowledge about cares during gestation	0.134	0.061	1.144	0.028	4.822	1
Mothers bleeding during gestation	−0.426	0.188	0.653	0.024	5.118	1
Mothers poisoning during gestation	0. 746	0.367	2.110	0.042	4.132	1

are considerable in comparison to the data reported by WHO in which the rate of lbw was reported 15% in African desert countries, 11% in north African countries, 10% in the east Asian countries, 33% in South Asia, 9% in Latin America, 6% in industrial countries, 18% in developing countries and 17% in the whole world and 10% in Iran.[15]

In 2000, the rate of lbw infants was reported 7.6% in the United States, 5.7% in Spain, 2.8% in England and 3.53% in Switzerland,[16] which is lower in comparison to the present research. The reason of the increase in the rate of lbw infants in this research in comparison to researches conducted in America and Europe is due to different factors such as financial-social, nutrition, cares during pregnancy, age of gestation, intervals between gestations and diseases during gestation. The rate of under 5 and 2 years old infants' mortality in Iran is 32 and 26 per 1000, among them, 18 per 1000 of them die during the first month of their lives and most of them are lbw infants.[7]

In a research, conducted in India in 2004, the rate of lbw infants was reported 39.1% which had a relationship with weight, age, number of gestations and mothers' height. There was found no meaningful relationship in the gender of lbw infants, though WHO, reports that the female gender is at higher risk of being low birth weight.[17] The results of the analysis showed that mother's height, bleeding, toxicity, lack of knowledge about cares during pregnancy, marriage dissatisfaction, unnatural blood pressure, employment, and gaining weight less than 5 kg during pregnancy for mothers under 20 years, can meaningfully increase the probability of having an lbw infant. In different researches, various factors such as smoking, using alcohol, financial-social level and using chlorinated water, are potential factors in creating gestational disorders such as lbw, infants small for gestational age and premature infants.[18] According to studies of some researchers, mother's age, weight, job, number of gestations, smoking, rank of birth and having previous lbw infant, have direct relationship with the weight of neonatal infant.[19]

Other researchers mentioned some other reasons of low birth weight such as social-financial condition, bad nutrition, high blood pressure, multiple births, low level of hemoglobin and hematocrit of blood, mother's illiteracy, chronic diseases and use of alcohol.[20,21] From 1981 to 2000, there was an increase in the rate of lbw infants in the united states from 6.6% to 7.6% and some other factors such as mother's age, number of birth, mother's diseases, insufficient cares during gestation, infant's gender and the race have role in low birth weight.[22] Low birth weight is the most prevalent reason of infant mortality, in the way that mortality among infants less than 2500 g is 40 times more than normal infants. The results of this research is not expandable to the whole country considering the limitations of the research such as studying only 910 cases, 9 cities of Isfahan province, and lack of accurate information due to some mothers' illiteracy, their lack of collaboration in completing questionnaires, lack of up-to-date and accurate data bank, lack of knowledge about other province's statistics and even lack of knowledge about lbw rates in Isfahan in 2 last years.

CONCLUSION

The results of the study shows that lowering the rate of lbw infants and its damages need a multi-lateral program and its application, which needs comprehensive programs for prevention. This prevention must be in four phases which are before gestation, while gestation, while giving birth and after birth. Servicing pregnant mothers, and increasing the quality of cares during pregnancy by hygienic-medical bases in cities and villages, performing educating and intervening programs for groups at risk especially mother under 20 years old, mothers who are pregnant for the first time, over 35 years old mothers and low educated mothers and those who do not pay attention to intervals between pregnancies, can have significantly prevent the birth of lbw infants. The results of this study can be beneficial for hygiene ministry, psychology administration system of country, increasing public knowledge, increasing the level of mental health in families and lowering the birth rate of abnormal infants. It can also help the preventing department of social welfare organization in Isfahan in expanding the applicable knowledge for preventing the birth of handicapped newborns.

ACKNOWLEDGMENTS

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