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Assessment of the Role of Maternal Characteristics, Mental Health and Maternal Marital Satisfaction in Prediction of Neonatal Birth Weight

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Abstract

Background

Neonatal mortality comprises a large part of infant mortality, and it depends largely on neonatal birth weight. Besides maternal diseases, it seems that other important factors such as maternal demographic characteristics, mental health and marital satisfaction, affects their infants birth weight. This study conducted aiming to evaluate these affecting factors on neonatal birth weight.

Materials and Methods

This study was descriptive – correlative, and conducted on all of the mothers and their neonates who were 200 mothers and neonates born during the summer 2015, in Urmia Kosar hospital that lasted 6 months. We used the GHQ (General Health Questionnaire), to evaluate the mental status of mothers and ENRICH for the evaluation of marital satisfaction. Demographic characteristics of mothers collected to special forms.

Results

In this study, 200 mothers, and 200 neonates born in Kosar Hospital were studied. The mean age of the mothers was 28.06 ± 6.34 years and the duration of pregnancy was 39.14 ± 1.21 months. The amount of obtained was significant for pregnancy duration in predicting neonatal birth weight. In marital status parameters, beta amounts for economic, family and communication was significant in predicting neonatal birth weight. Among parameters of maternal mental health, correlation of depression was significant in predicting neonatal birth weight.

Conclusion

According to results, in white race low maternal age was a risk factor for bearing low birth weight baby. Marital satisfaction and bearing no stress from husband lets the fetus grow well and reaches normal birth weight.

Key Words: Birth weight, Mental Health, Mother, Neonate.

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1- INTRODUCTION

The mortality rate of infants aged less than one year and maternal mortality rate have always been considered as an important health development index of countries by the World Health Organization (WHO) and other health communities. Given that neonatal mortality is about two-thirds of the mortality of infants aged less than one year, the importance of this period of life, from birth to 28-day age and its role in under one-year mortality is well known (1). Birth weight is one of the most important, simplest, the most common, most critical, and most reliable health indictors for assessing the status of neonates and an important individual and community health index in each country (2). About 20 million neonates, representing about 15.5% of all births around the world, are born with low birth weight each year, and the share of developing countries is about 95.6%. According to the information, the incidence of underweight in developing countries is 16.5%, which is more than twice as high as in advanced countries (7%) (3). Many factors are associated with low birth weight. These factors are categorized in different ways:

1. Biological characteristics of parents, especially mother, such as age, height, weight, multiple births, number of previous children, nutrition, pre-term labor, maternal diseases such as cardiovascular, pulmonary, gastrointestinal, renal, endocrine, autoimmunity diseases, and addiction. 2. Parents' cognitive characteristics such as level of education, cognitive abilities, awareness of prenatal care. 3-Parents' mental and emotional factors such as parental intercourse, mother's attitude towards pregnancy, parental mental readiness, unwanted or wanted child, and marital satisfaction of the mother. 4. Economic, social and cultural factors, such as parental employment, family income, place of residence, residence status and parents' social status. 5. Biological and environmental factors and living place of mother during pregnancy such as weather, air pollution and noise pollution (4). Considering that the mental health of the mother and her satisfaction with marital life can affect pregnancy care, prevention of risk factors during pregnancy and promotion of pregnant mother's health can directly affect the rate of growth and development and health of the fetus and ultimately influence the neonatal birth weight (5). The objective of this study was to evaluate the role of mothers' demographic characteristics, mental health, and marital satisfaction in predicting neonatal birth weight in 2015.

2- MATERIALS AND METHODS

2-1. Study Design and Population

The present study was descriptive-analytic. The statistical population included all new mothers and neonates in Urmia during the second quarter of 2015 and were selected using convenience method. The population of the study consisted of 200 mothers and neonates in Urmia Kosar Hospital. Convenient and random sampling method was used in this study.

2-2. Methods

To prevent any error in this research,at first performance questionnaires were distributed and then other questions were distributed. Finally, after data collection, the Kolmogorov Smirov was done indicating the normal distribution of the data. In order to describe the data, descriptive statistics, and for analytical statistics Pearson and Spearman were used using SPSS software version 17. The level of significance was considered less than 0.05.

2-3. Measuring tests

The following tools were used to collect data:

2-3-1. Demographic characteristics questionnaire

This questionnaire has three main sections: in the first section, the neonates' characteristics are questioned. These include: name, gender, age, date of birth, place of birth, type of disorder of the neonate, birth order, living place and residence, neonatal birth weight, and history of neonate disorder to various diseases. In the second section of the questionnaire, the biological characteristics of parents are questioned. These questions are: maternal age, maternal age at marriage, maternal age at birth, mother's birth, history of mother's disease before pregnancy, history of mother's addiction, duration of mother's pregnancy, father's age, father's age at the time of marriage, the father's age at the birth, the father's place of birth, and father's addiction.

In the third part of the questionnaire, the cognitive and psychosocial and social status of parents is questioned. These questions are: kinship marriage, the presence of another disabled person among the relatives of the neonate, the level of education, the emotional and mental status of the mother before the pregnancy, the desire for parental childhood, the history of disorder and mental disorder of the parents before the pregnancy, the relationship of parents before the neonate birth, and the time of knowing that the neonate is exceptional. Using re-implementation (5), reported the reliability of the questionnaire in various questions between 92% and 95%. On the other hand, the revised questionnaire was approved by the supervisors and consultants who are experts in this area and hence it has content validity.

2-3-2. General Health Questionnaire (6, 7)

The general health questionnaire can be considered as a set of questions consisting of the lowest levels of common symptoms of the disease in various mental disorders, and thus can differentiate mentally ill patients as a general category from those who consider themselves healthy. Therefore, the objective of this questionnaire is not to achieve a specific diagnosis in the hierarchy of mental illnesses, but its main objective is to make distinction between mental illness and health (3). The questionnaire has four sub-scales: Physical symptoms, anxiety and insomnia, social dysfunction, and depression. A total score is obtained from the sum of scores. Presence of four sub-scales has been proven based on statistical analysis of the responses (factor analysis). The first sub-scale includes items about people's feelings about their health and their fatigue, and it includes physical symptoms. This subscale evaluates body sensory perceptions that are often associated with emotional excitements. The seven items of this subscale are marked with the letter A in the questionnaire. The second subscale contains items that are associated with anxiety and insomnia. Seven items related to this subscale are marked with the letter B in the questionnaire.

The third subscale measures the ability of individuals to cope with professional demands and daily life issues, and reveals their feelings about how to cope with common life situations. Seven items related to this subsection are marked with the letter C in the questionnaire. Finally, the fourth subscale contains substances that are associated with severe depression and a particular tendency toward suicide, and seven distinct ones are identified in the D questionnaire. The total score of each person is obtained from the sum of scores of four sub-scales. Finally, the fourth subscale contains items that are associated with severe depression and a tendency

toward suicide, and seven distinct items of it are marked with letter C in the questionnaire. The total score of each person is obtained from the sum of scores of four subscales. The method of scoring this questionnaire is that each answer receives the score zero, one, two, and three. The subjects' scores are determined in each of the subscales separately and are written under the sheet. Then, scores of the four sub-scales are summed up and total score is obtained. Scores from 14 to 21 in each subscale represent the severity of subject's condition in that factor (8). In the research conducted by Kramer et al. (9), the reliability coefficient of this questionnaire was obtained 0.72 for the total questionnaire, and it was obtained 0.66, 0.68, 0.57, and 0.58 for the subtest of physical symptoms, anxiety and insomnia, social dysfunction, and depression, respectively. Internal consistency of the Mental Health Questionnaire was 0.89, and it was 0.67, 0.82, 0.72 and 0.79 for its subscales, respectively. The minimum score was zero and the maximum was 84 (5).

2-3-3. Marital Satisfaction Questionnaire (ENRICH)

The ENRICH questionnaire was used to assess marital satisfaction. This questionnaire has been used as a valid research tool in previous studies on marital satisfaction (3, 8). The main version of the test has 115 questions that include dimensions and topics on personality, communication, conflict resolution, financial issues, leisure time, sexual relations, child rearing, communication with the original family and friends, spouse roles and religious orientation. Due to the lengthy questions of the scale, several forms have been extracted from it. For the first time, Quirk and Bowes developed its 15-item form of it, and finally, 25-item form of it was developed (10).

2-4. Inclusion Criteria

Inclusion criteria included mothers who were delivered and their neonates in Urmia during the second quarter of 2015 who were healthy and had satisfaction to participate in the study.

2-5. Exclusion Criteria

Exclusion criteria included failure to fulfill the questionnaire correctly and completely.

2-6. Ethical Considerations

This study was approved by the Ethics Committee of Urmia University of Medical Science and extracted from master thesis with code No. 1393-04-32-1445 and the objectives of the study were explained to all participants and all of them accepted to participate and were assured of the confidentiality of their individual information as well as the voluntary nature of participating in the study.

2-7. Data Analyses

Statistical analysis was carried out using SPSS version 17.0, Chi square, descriptive statistics, Pearson correlation, and simultaneous regression. P-value less than 0.05 were considered. Dependent variables were described as mean ± standard deviation (SD) and independent variables were expressed as number of individuals and percentages.

3- RESULTS

In this study, 200 mothers and neonates born in Kosar Hospital were studied. According to **Table.1**, 64% of mothers had lower than high school education level, and 21.5% were illiterate. In addition, 15%, 4.5% and 0.5% of mothers had a history of 1, 2, and 3 abortions, respectively. According to **Table.2**, there was a negative statistical correlation among birth weight and anxiety and depression in mothers, which means that

the mother's mental status affects the growth rate of the fetus, thus increasing the rate of depression and anxiety in mothers cause low birth weight. According to **Table.3** the mean age of mothers was 28.06 ± 6.34 years and the duration of pregnancy was 39.14 ± 1.21 months. The mean weight of neonates was 3,325.32 ± 444.71 grams. The mean score of general satisfaction in terms of components of marital satisfaction was 30.07 ± 4.98, and the highest score among the components of marital satisfaction related to the religious component (17.02 ± 2.28) and the lowest score is related to the conflict component (12.89 ± 2.89). Additionally, in terms of the components of general health of mothers, the highest score was related to the anxiety component (8.16 ± 4.71) and the lowest score was related to the depression component (2.5±4.51).

As **Table.3** shows, beta values related to the duration of pregnancy are significant in the prediction of neonate weight (P = 0.005). As **Table.4** shows, the beta values for financial components (p = 0.032), family (p = 0.007) and communication (p = 0.046) were significant in predicting neonate weight. As **Table.3** shows, the beta values for depression components (p = 0.034) were significant in predicting neonate weight (*Please see the tables at the end of paper*).

4- DISCUSSION

The objective of this study was to investigate the role of demographic characteristics, mental health and marital satisfaction of mothers in predicting neonatal birth weight. Hypothesis 1: The demographic characteristics of maternal age and duration of pregnancy can predict the neonatal weight. Based on the results obtained from the analysis of data related to the first hypothesis, it can be concluded that this hypothesis is confirmed. This result is consistent with studies conducted by Whitney et al, and Dennis & Mallborn. Whitney et al. (11, 12) showed that components such as maternal age and mental health are the factors affecting the neonate weight. Additionally, Dennis & Mallborn (11) found that in the white race, low maternal age is considered a risk factor for low neonate birth weight .The results obtained from the analysis of the data related to the first hypothesis confirm this hypothesis. The results of this study are consistent with the results of research conducted by Falah et al, Talebian et al, and Mosayebi et al. (1, 3, 5). In the study of Falah et al. (5) conducted to examine the factors affecting the neonates birth weight in Yazd province in 2007, the association of factors such as marital satisfaction with neonates birth weight was investigated. In this study, the frequency of neonates with birth weight of less than 2500 grams was 9.35%. In addition, 4.46% of couples had severe marital dissatisfaction, 26.04% had no marital satisfaction, 66.5% had a relative and moderate satisfaction, and 3.93% had high and very high satisfaction.In this study, severe marital dissatisfaction beside factors such as abnormal maternal hypertension, having job, and pregnancy under 19 years of age have been shown to increase the probability of low birth weight. Domestic violence involving physical, emotional, and sexual misbehavior are found highly in marital dissatisfaction.

In addition, in the study of Talebian et al (3) entitled the effect of the biological and mental risk factors of mothers on low birth weight in Isfahan province in 2009, the frequency of low birth weight in neonates was 9.5%. In this study, the effect of marital satisfaction on neonatal birth weight in Isfahan province was studied. Marital dissatisfaction, abnormal maternal hypertension, employment during pregnancy, weight gain less than 5 kg, maternal height, pregnancy under the age 20, poisoning and bleeding during the

pregnancy period had a significant relationship with low birth weight of neonates. Marital satisfaction is the result of the satisfaction and compatibility of husband and wife in various aspects of common life and ensures the strength of family and parental health (13). Parental marital satisfaction has a critical role in preserving the balance of family life and emotional state of the family. According to other studies (14, 15) it is an effective factor in coping with mental stress and having a proper life function. Nonetheless, existing evidence suggests that couples in the present age are faced with multiple problems in establishing intimate relationships and have a satisfactory marital life.(16) Presenting a model of the optimal family process, Tootoonchi (1986) (17) state that marital interactions among the desirable functions of the family are the foundation of other affairs.

If the marital relationship between the wife and husband is weak, the foundations necessary for the success and desirability of the family function will be weaker. Based on the results obtained from the analysis of data related to the first hypothesis, it can be concluded that this hypothesis is confirmed. This result is consistent with the results of Kingston D et al. Witt et al., Patel and Prince (12,18, 19).

In a study conducted in 2012 by Kingston D et al. (18), mothers with mood disorders such as anxiety and depression, especially during pregnancy, gave birth with medical problems. These neonates had evolutional disorders at age of one compared with neonates whose mothers had complete mental health .In this study, the negative effects of maternal medical problems on the health of the neonate were also studied and emphasized. In addition, in a study conducted by Wikarm Patel et al (19) on 270 mothers in cohort form in India in 2006, the relationship between maternal mental illness and low birth weight was studied. Maternal mental status influenced the growth rate of the fetus, and this relationship was reported significant. Additionally, the effect of maternal mental health, which was assessed by GHQ questionnaire, was significant on the birth weight of the neonates. According to the findings of this research, low maternal age during pregnancy increases the risk of low birth weight. Since the risk of having anemia in women aged 15-19 years is higher, the risk of birth of neonates with growth restrictions in this group is higher (20-23). On the other hand, domestic violence involving physical, emotional and sexual misbehaviors are found highly in severe marital dissatisfactions. Johnson et al. (cited by Williams et al.) showed that pregnant mothers who were misbehaved once were faced with a threefold increase in the risk of pre-natal bleeding and limitation of fetal growth, and an eight-fold increase in the risk of death in child birth (20-23), which several studies in Iran and Iraq have confirmed these facts (19, 24, 25). Marital satisfaction is the state in which a husband and wife are happy due to marry to each other.

Factors such as their attitude towards the role of communication in marital relationship, conflict resolution, the level of satisfaction with family financial management, satisfaction with sexual and emotional relations, agreement on having child and religious beliefs in marital life are involved in this regard (26). Finally, marital satisfaction and lack of bearing stress by spouse lead to a better growth of the fetus and consequently, the birth of a neonate with normal weight. As a result, marital satisfaction can increase the general and mental health of the pregnant mother, and predicts the birth of the neonate with proper weight.

4-1. Limitation

The small sample size of include studies are potential limitation of this study. There is still need to further studies to access

additional information about the low birth issue. Another limitations of the current study, were low of the same study in this field and low of the schools surveyed in Urmia.

5- CONCLUSIONS

This study showed that parameters such as maternal age and her mental health affects neonatal birth weight. Also in white race low maternal age is a risk factor for bearing low birth weight baby. Mental health and marital satisfaction had positive effect on neonatal birth weight. Marital satisfaction and bearing no stress from husband lets the fetus grow well and reaches normal birth weight. This study conducted in a government hospital in Urmia city, where the socioeconomic status of the mothers were low, so for better evaluation of this correlation we suggest to conduct this study in private hospitals too.

6-AUTHORS CONTRIBUTIONS

Study design: KD, SKS.

Data Collection and Analysis: MS.

Manuscript Writing: SKS, MS.

Critical Revision: KD, SKS.

7- CONFLICT OF INTEREST

All the authors declare that they have no conflict of interest.

8- ACKNOWLEDGMENTS

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Table-1: Frequency distribution of demographic variables in participating mothers

Variables	Sub-group	Frequency	Percent
Education	Illiterate	43	21.5
	Under high school	128	64
	High school	22	11
	Associate	1	0.5
	Bachelor	6	3
Job	Housekeeper	195	97.5
	Employed	5	2.5
Husband job	Self-employed	190	95
	State	10	5
Living place	City	100	50
	Village	100	50
Labor	Natural	68	34
	Surgical	132	66
Gender	Female	98	49
	Male	102	51
Birth type	Single	198	99
	Twin	2	1
Abortion	Never	160	80
	1	30	15
	2	9	4.5
	3	1	0.5

Table-2: The correlation between predictor and criterion variables in participating mothers

Weight	depression	social	anxiety	physical	relation	religious	family	children	sexual	free time	financial	conflict	character	satisfaction	pregnancy duration	mother's age	weight
Weight																	1
Mother's Age																1	0.02
Pregnancy Duration															1	-0.14	0.29
Satisfaction														1	0.02	-0.19	0.03
Character													1	0.56	0.57	0.05	0.05
Conflict												1	0.68	0.67	0.68	0.02	0.03
Financial											1	0.54	0.54	0.39	0.66	-0.06	0.09
Free Time										1	0.61	0.61	0.51	0.34	0.49	-0.13	0.07
Sexual									1	0.49	0.49	0.51	0.41	0.56	0.51	-0.11	0.09
Children								1	0.37	0.37	0.42	0.39	0.45	0.47	0.53	-0.07	0.17
Family							1	0.36	0.33	0.35	0.53	0.48	0.48	0.43	0.52	-0.04	0.13
Religious						1	0.36	0.35	0.48	0.34	0.25	0.19	0.41	0.51	0.28	-0.04	0.09
Relation					1	0.49	0.49	0.55	0.56	0.57	0.48	0.51	0.75	0.77	0.66	-0.06	0.11
Physical				1	-0.09	-0.09	-0.17	-0.21	-0.12	-0.24	-0.27	-0.36	-0.12	-0.05	-0.32	0.12	0.09
Anxiety			1	0.62	0.61	-0.18	-0.11	-0.26	-0.11	-0.21	-0.19	-0.35	-0.27	-0.03	-0.38	0.19	-0.12
Social		1	0.16	0.17	0.21	-0.17	-0.02	-.07	-0.15	-0.17	-0.17	-0.15	-0.16	-0.09	-0.26	0.03	0.02
Depression	1	0.27	0.27	0.61	0.51	-0.22	-0.09	-0.16	-0.22	-0.26	-0.28	-0.39	-0.29	-0.04	-0.44	-0.03	-0.14

Table-3: Predictive and criterion variables in participating mothers

Variables			Number	Mean	SD
Criterion variable	Neonate weight (gr)		200	3325.32	444.71
	Maternal age (year)		200	28.06	6.43
	Pregnancy duration (week)		200	39.14	1.21
Predictive variables	Components of Marital satisfaction	General satisfaction	200	30.07	4.98
		Personality	200	14.16	4.08
		Conflict	200	12.89	2.98
		Financial	200	14.26	3.24
		Free Time	200	15.62	2.31
		Sexual	200	16.21	2.15
		Children	200	15.01	2.88
		Family	200	14.51	3.01
		Religious	200	17.02	2.28
		Communication	200	14.38	3.61
	General health components	Physical	200	6.69	3.14
		Anxiety	200	8.16	4.71
		Social	200	7.71	2.21
		Depression	200	2.50	4.51

SD: Standard deviation.

Table-4: Multiple regression analysis of neonate weight based on maternal age and duration of pregnancy, general health components and marital satisfaction components

Variables		Beta	S.E	T-test	P- value	Tolerance index	Inflation of Variance
Maternal age		0.04	5.97	0.52	0.599	0.77	1.29
Duration of pregnancy		0.24	9.91	2.88	0.005	0.87	1.14
General health components	Physical	-0.01	4.91	0.08	0.935	0.52	1.92
	Anxiety	-0.02	1.42	0.11	0.917	0.43	2.31
	Social	-0.02	3.44	0.13	0.892	0.87	1.14
	Depression	-0.19	2.59	1.49	0.034	0.46	2.17
Marital satisfaction components	General satisfaction	0.12	2.73	0.81	0.423	0.28	3.53
	personality	0.09	5.81	0.62	0.539	0.27	3.64
	Conflict	0.16	1.97	1.21	0.236	0.29	3.42
	Financial	0.26	6.38	2.15	0.032	0.41	2.47
	Free Time	0.05	2.31	0.42	0.671	0.42	2.34
	Sexual	0.03	2.39	0.21	0.835	0.45	2.22
	Children	0.14	3.16	1.24	0.218	0.52	1.91
	Family	0.29	5.68	2.73	0.007	0.51	1.78
	Religious	0.06	3.79	0.53	0.591	0.56	1.92
	Communication	0.32	3.36	1.94	0.046	0.23	4.26

SE: Standard error.