

Original Paper

A Comparative Study on Psychosocial Factors Between Mothers of Infants With and Without Physical Abnormalities



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ABSTRACT

Introduction: Congenital anomalies are one of the most important causes of disability and mortality in childhood seen in developing and developed countries. Mothers with physically abnormal newborns have unfavorable lifestyle compared to mothers with healthy infants.

Objective: The aim of this study was to determine the difference between mothers of infants with and without physical abnormalities in terms of psychosocial factors.

Materials and Methods: This is a case-control study with two study groups; the case group (n=133) consists of mothers who had babies with birth defects referred to health centers in Amol city, Iran for postnatal care in 2018. The control group (n=133) included mothers with healthy infants in this city. They were selected using a convenience sampling method. Measurement tools included a Socio-demographic form, Health-Promoting Lifestyle Profile (HPLP), Multidimensional Perceived Social Support Scale (MPSSS), Coping Strategies Scale - Short Form (CSS-SF), Prenatal Distress Questionnaire (PDQ), and General Health Questionnaire - Short Form (GHQ-SF). Data were analyzed using descriptive statistics, chi-square test, and t-test.

Results: A total of 266 mothers with a mean age of 31.9±5.6 years were examined. There was a significant difference between the two groups of mothers in terms of overall HPLP score (P=0.01), and its dimensions of spiritual growth (P<0.05), physical activity, nutrition (P=0.01), and stress management (P<0.05). Moreover, a significant difference was reported between them in terms of MPSSS and its dimensions of social support from friends, family, and significant others (P=0.01). Furthermore, There was a significant difference between them with respect to GHQ dimensions of anxiety/insomnia, and depression (P<0.01); CSS dimensions of escape avoidance and emotion-focused coping strategies (P=0.01); and PDQ and its dimensions of concerns about the delivery and the health of the baby, and about the body weight/image (P=0.01).

Conclusion: Mothers of infants with and without birth defects are significantly different from each other in terms of psychosocial factors. It seems that poor psychosocial variables in mothers during pregnancy can act as a risk factor for congenital anomalies.

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Highlights

- Mothers with physically-abnormal newborns have unfavorable lifestyle than mothers with healthy infants.
- Mothers with physically-abnormal newborns are at a higher risk of general health problems during pregnancy (e.g. physical symptoms, anxiety/insomnia, social dysfunction, and depression symptoms) compared to mothers with healthy infants.
- Mothers with physically-abnormal infants are more likely to use unsuitable coping strategies against stressful situations, such as escape avoidance and emotion-focused coping strategies, during pregnancy compared to mothers with healthy infants.
- Mothers with physically-abnormal newborns experience more distress during pregnancy than mothers with healthy infants.

Plain Language Summary

Congenital anomalies can be defined as structural or functional anomalies (e.g. metabolic disorders) that occur during intrauterine life and can be identified prenatally, at birth or later in life. They can be caused by single gene defects, chromosomal disorders, multifactorial inheritance, environmental teratogens and micronutrient deficiencies. Children with these anomalies face many problems, including multiple surgical interventions, long neonatal hospitalization, and often uncertainty about future quality of life. The aim of this study is to determine the difference between mothers with physically-abnormal infants and mothers with healthy infants in terms of psychosocial factors. There was a significant difference between the two groups of mothers in terms of health-promoting behaviors, perceived social support, general health, coping strategies, and distress during pregnancy. Mothers of newborns with birth defects are more likely to have unfavorable lifestyle, lower perceived social support, poor general health, increased use of escape avoidance and emotion-focused coping strategies, and higher distress during pregnancy compared to mothers with healthy infants.

Introduction

Congenital anomalies are one of the most important causes of disability and mortality in childhood whose hospitalization costs and therapeutic interventions put heavy burden on the health system and families [1]. They are a diverse group of disorders with prenatal origin that can be caused by single gene defects, chromosomal abnormalities, maternal infections and maternal diseases during pregnancy, such as diabetes mellitus, iodine and folic acid deficiency, abuse of alcohol, medications or recreational drugs (e.g. cigarette), exposure to certain environmental chemicals and radiation [2].

The incidence of congenital anomalies may vary based on time and place. It occurs by the complicated interaction of known and unknown genetic and environmental factors, including social, cultural, and ethnic. According to the World Health Organization (WHO), more than 8 million babies worldwide are born each year with a se-

rious birth defect. Birth defects are a leading cause of infant death, and babies who survive may be physically or mentally disabled and put a costly burden on their families and communities [3]. The proportion of global neonatal mortality due to these defects increased from 3% in 2008 to 4.4% in 2013 [4]. In Iran, the incidence of congenital anomalies is 10.1 per 1,000 live births in Gorgan city (northern Iran) and 28 per 1000 live births in Yazd city (southern Iran) [5]. A study by Aramesh et al. reported that, out of 1,620 newborns in Ahwaz city in 2011, 284 died; 79.9% of them were premature babies, 77.1% had weights < 2500 gr, and 78.2% died in the first week after birth. The most common causes of mortality were prematurity, congenital anomalies, birth defects, infections and other causes [6].

Various studies have been conducted in Iran on congenital anomalies and their etiology [7-12], but few studies have examined the relationship between psychosocial factors and birth defects. In a study, Ghavi et al. [13] found a significant relationship between mater-

nal lifestyle during pregnancy and low birth weight after delivery. Alhusen [14] in a study on the maternal-fetal attachment and its effect on the health of infant at birth showed that anxiety causes mother's inappropriate responses to the fetus and reduces maternal-fetal attachment. As a result, mothers who have less attachment to their fetus have more anxiety and depression, which can lead to adverse effects in pregnancy.

Basharpour et al. [15] found that health beliefs and health promoting behaviors, especially physical activity and stress management, are associated with anxiety during pregnancy. However, the role of social-psychological factors has been neglected in these studies. In this regard, the present study aimed to determine the difference between mothers of infants with and without physical abnormalities in terms of psychosocial factors such as lifestyle, social support, mental health, coping strategies, and perceived stress intensity.

Materials and Methods

This is a case-control study. The study population consists of all mothers referred to health centers in Amol, Iran for postnatal care in 2018. Of these, 266 mothers were selected using a convenience sampling method and divided into two groups including mothers of infants with physical abnormalities (case group, $n=133$) and mothers of healthy infants (control group, $n=133$). The sample size for the case group was determined using Cochran's formula, and for the control group by using homogenization method. To assess the birth defects in infants, a pre-test was performed on 60 mothers (30 with and 30 without physically-abnormal infants).

In calculating sample size, since the physical abnormality was a qualitative variable and there was a lack of access to the proportion of mothers having children with birth defects, the estimated proportion of population was set as $P=0.5$, and the confidence interval and the estimation error were considered 0.95% and 5%, respectively. Moreover, the amount of negligible error in estimation was considered 0.06. The inclusion criteria for the case group were: apparent physical defect and abnormal height (<40 cm), weight (<2500 gr), and head circumference (<32 cm) in the infants. The inclusion criteria for control group were normal height, weight, and head circumference, and no apparent physical defect in the infants.

The data were collected by:

A. A demographic form; surveying age, infant gender, education, income, job, place of residence, history of

alcohol use and smoking, history of symptoms during pregnancy such as rubella, toxoplasmosis, cytomegalovirus and chickenpox.

B. Health-Promoting Lifestyle Profile (HPLP) [16] containing 52 items rated on a 4-point Likert scale (never, sometimes, often, and routinely) and measures health promoting behaviors under 6 dimensions: nutrition (having a dietary pattern and food choices, with 8 items), physical activity (following exercise, with 8 items), health responsibility (13 items), stress management (identifying stress resources and stress management measures, with 5 items), interpersonal relations (having intimate relationships to others, with 8 items), and spiritual growth (feeling purposefulness and satisfied with individual progress awareness, with 10 items). This questionnaire was translated to Persian by Mohammadi Zeidi et al. [17].

C. Multidimensional Scale of Perceived Social Support (MSPSS) [18] containing 12 items rated on a 5-point Likert-type scale (from strongly disagree to strongly agree), measures the perceived social support from friends (4 items), family (4 items), and significant others such as teacher or counselor (4 items). The validity of the Persian version of this questionnaire was confirmed using factor analysis by Masoudnia [19].

D. Coping Strategies Scale - Short Form (CSS-SF) [20] consisted of 17 items rated on a 5-point Likert scale (very high, high, moderate, low, and very low), measures the coping strategies in two areas: problem-focused (seeking social support, problem-based coping, and active coping) and emotion-focused (positive reappraisal/adaptation, escape avoidance, emotional-based coping, and self-control). The CSS-SF was translated to Persian by Masoudnia [21] and its satisfactory validity and reliability were reported.

E. Prenatal Distress Questionnaire (PDQ) [22], with 12 items rated on a 5-point Likert scale (strongly disagree, disagree, moderate, agree, strongly agree), measures the severity of perceived stress during pregnancy in 3 dimensions: concerns about the delivery and the health of the baby, concerns about the body weight/image, and concerns about emotions and relationships. A higher score indicates higher stress intensity. The Persian version of PDQ has also a good concurrent validity, test-retest stability, and internal consistency [23].

F. Goldberg and Hillier's General Health Questionnaire-Short Form (GHQ-SF) [24], with 12 items rated on a 5-point Likert scale (I agree, I strongly agree, I do not mind, I dis-

agree, I strongly disagree), measures mental problems under 4 dimensions: physical symptoms (3 items), anxiety/insomnia (3 items), social dysfunction (3 items), and severe depression (3 items). Its lower score indicates better general health. The reliability and validity of the Persian version of GHQ-SF have been reported acceptable [25].

Information was given to the mothers about the study objectives and informed written consent was then

obtained from them. Data were analyzed in SPSS v.20 software using descriptive statistics, Chi-square test and Independent t-test.

Results

The mean age of mothers was 31.9 ± 5.6 years. The prevalence of smoking and alcohol consumption in mothers of infants with physical abnormalities was higher than

Table 1. Clinical and sociodemographic characteristics of mothers with and without physically-abnormal infants (n=133)

Variable		No. (%)		Sig.*
		Mothers With Physically-abnormal Infants	Mothers With Healthy Infants	
History of Smallpox	Yes	17 (12.8)	4 (3)	0.005
	No	116 (87.2)	129 (97)	
History of Toxoplasmosis	Yes	4 (3.0)	2 (1.5)	0.684
	No	129 (97)	131 (98.5)	
History of Rubella	Yes	19 (14.3)	4 (3)	0.002
	No	114 (85.7)	129 (97)	
History of Cytomegalovirus	Yes	4 (3)	0 (0)	0.122
	No	129 (97)	133 (100)	
History of Alcohol use	Yes	13 (9.8)	4 (3)	0.042
	No	120 (90.2)	129 (97)	
History of Smoking	Yes	51 (38.3)	33 (24.8)	0.025
	No	82 (61.7)	100 (75.2)	

*Chi-square test

Table 2. Comparison of study groups in terms of Health Promoting Lifestyle Profile and its dimensions

Dimensions	Mean \pm SD		Sig.*
	Mothers With Physically-abnormal Infants	Mothers With Healthy Infants	
Spiritual growth	0.7 \pm 2.7	0.72 \pm 2.9	0.049
Health responsibility	0.67 \pm 2.9	0.63 \pm 3.0	0.468
Interpersonal relations	0.62 \pm 2.7	0.75 \pm 2.7	0.724
Stress management	0.56 \pm 2.9	0.6 \pm 3.0	0.024
Physical activity	0.96 \pm 2.3	0.8 \pm 2.7	0.000
Nutrition	0.67 \pm 3.0	0.5 \pm 3.3	0.000
Total	0.51 \pm 2.8	0.46 \pm 2.9	0.003

*t-test

Table 3. Comparison of study groups in terms of Multidimensional Scale of Perceived Social Support and its dimensions

Dimensions	Mean±SD		Sig.*
	Mothers With Physically-abnormal Infants	Mothers With Healthy Infants	
Social support from friends	0.71±3.9	0.64±1.4	0.001
Social support from family	0.71±3.9	0.58±3.4	0.0001
Social support from significant others	0.74±4.2	0.53±4.5	0.0001
Total	0.6±4.0	0.49±3.4	0.0001

*t-test

Table 4. Comparison of study groups in terms of General Health Questionnaire and its dimensions

Dimensions	Mean±SD		Sig.*
	Mothers With Physically-abnormal Infants	Mothers With Healthy Infants	
Physical symptoms	0.61±2.0	0.41±2.0	0.06
Anxiety/insomnia	0.73±2.6	0.64±2.0	0.0001
Social dysfunction	0.71±2.0	0.53±1.9	0.029
Depression symptoms	0.9±1.7	0.57±1.4	0.008
Total	0.49±1.2	0.36±1.8	0.0001

*t-test

in mothers with healthy infants (Table 1). There was a significant difference between the two groups of mothers in terms of lifestyle ($P=0.003$). The mean HPLP score of mothers without abnormal infants was higher than that of mothers with healthy infants (Table 2). There was a significant difference between the two groups in terms of overall MSPSS score ($P=0.01$), and its dimensions including the support from friends ($P=0.01$), family ($P=0.01$), and significant others ($P=0.01$) (Table 3).

Comparison of mothers in terms of GHQ-SF score showed a significant difference between them ($P=0.0001$) (Table 4). Moreover, there was a significant difference between the two groups of mothers in terms of CSS dimensions of escape avoidance ($P=0.004$) and emotion-focused ($P=0.0001$) strategies (Table 5). In terms of PDQ, the comparison showed significant difference between the two groups in terms of overall PDQ score ($P=0.0001$) (Table 6).

Discussion

The aim of this study was to evaluate the difference between mothers with and without physically-abnormal infants in terms of psychosocial factors. The prevalence

of smoking and alcohol use during pregnancy was higher in mothers of infants with physical abnormalities than in mothers with healthy infants. Some studies have shown that maternal smoking during pregnancy is an established risk factor for miscarriage/perinatal mortality, low birthweight, premature births and small fetuses, and increases the likelihood of fetal abnormality [26, 27]. The frequency of smallpox and rubella in mothers who had newborns with physical abnormalities were higher than in those with healthy baby. This finding is in line with the findings of Joshaghan [28].

Regarding HPLP dimensions, There was a significant difference between mothers with and without physically-abnormal infants in terms of spiritual growth. Mothers with healthy newborns had more hope, satisfaction, and purposefulness in their lives than mothers with physically-abnormal infants. This result is consistent with the results of Avaznejad et al. [29]. Mothers with healthy babies emphasized on the positive aspects of their empowerment in different areas of life, which makes them more resistant to difficult conditions, but such conditions are also observed in mothers of infants with physical abnormalities.

Table 5. Comparison of study groups in terms of Coping Strategies Scale and its dimensions

Dimensions	Mean±SD		Sig.*
	Mothers with physically-abnormal infants	Mothers with healthy infants	
Seeking social support	0.71±3.8	0.88±3.7	0.322
Positive reappraisal/adaptation	0.76±3.8	0.81±3.8	0.787
Escape avoidance	0.98±2.8	0.99±2.4	0.004
Problem-focused coping	0.72±3.3	0.88±3.4	0.241
Emotion-focused coping	0.67±4.0	0.97±3.5	0.0001
Active coping	0.97±3.2	0.98±3.3	0.399
Self-control	1.1±2.9	1.1±2.7	0.122

*T- test

Table 6. Comparison of study groups in

Dimensions	Mean±SD		Sig.*
	Mothers with physically-abnormal infants	Mothers with healthy infants	
Concerns about delivery and health of the baby	0.85±1.4	1.02±3.2	0.0001
Concerns about body weight/image	0.89±3.8	1.03±3.2	0.0001
Concerns about emotions and relationships	1.9±3.1	1.06±3.2	0.22
Total	0.77±3.6	0.87±3.2	0.0001

*T- test

There was no difference between mothers with and without physically-abnormal infants in terms of the health responsibility, as other component of HPLP. However, Jamshidi Manesh [30] reported that mothers who had higher level of health-responsibility had healthier babies. This discrepancy may be due to the use of different measurement instruments. Regarding other dimensions of HPLP, mothers in both groups had satisfying interpersonal relationships and could solve their problems through dialogue. These results are consistent with the results of Ghavi et al.'s study [13].

In terms of stress management dimension, there was also a significant difference between the two groups, where mothers with healthy baby had a greater degree of relaxation. This result is consistent with the results of other studies [31, 32]. Mothers with healthy infants had more physical activity than mothers with physically-abnormal infants. Hajikazemi et al. [33] showed that exercise during pregnancy increases birth weight, shortens the delivery stages and reduces the need for delivery

through cesarean section; it is an important contribution to normal delivery. In terms of the dimension of nutrition, mothers with healthy newborns had better dietary pattern compared to mothers with physically-abnormal infants.

Poor nutrition during pregnancy is associated with irreversible damage to the infant brain and central nervous system, leading to poor brain development and intelligence. This finding is similar to that of Kaiserl and Allen [34]. It seems that economic, social and cultural factors make it difficult for many women in developing countries, including Iran, to have proper nutrition and health care. Health may be an important determinant of opportunities in life and this process termed “selection by health”, and suggest that health selects people in different social strata [35].

The present study revealed the relationship between inadequate perceived social support of mothers during pregnancy and the incidence of physical abnormalities in newborns. The overall MSPSS score of mothers with

healthy baby was lower than that of mothers with physically-abnormal infants. Bradley and Cartwright [36] showed that mothers who had received support from friends during pregnancy and had less interpersonal conflicts reported better coping strategies. This result of our study is consistent with the results of Abdollahpour et al. [37]. The level of perceived social support from significant others in mothers with physically-abnormal infants was lower than that of mothers with healthy infants. Social support from relatives during pregnancy and after birth is important for women [38]. Social support theories show that social support contributes to the control of maternal stress and distress during pregnancy. It helps moderate the neurological effects and acute/chronic stress in mothers during pregnancy, and regulate the stressful conditions of pregnancy [39].

There was a significant difference between mothers with and without physically-abnormal infants in all GHQ components except in physical symptoms. This result is consistent with the results of Foruzandeh et al. [40]. The symptoms of anxiety and insomnia in mothers with physically-abnormal infants were higher than in mothers with healthy infants. This result is consistent with the results of Green et al. [41]. Mothers with physically-abnormal newborns also showed more symptoms of social dysfunction during pregnancy. According to studies, the feeling of isolation and reduced social activity in mothers, weaken their social function and cause psychological problems during pregnancy [42]. There was also a significant difference between the two groups of mothers in terms of depression symptoms during pregnancy. This result is consistent with the findings of some studies [43, 44]. In general, it seems that women with low general health have higher tendency to use alcohol and drugs during pregnancy, and lower willingness to receive proper care during pregnancy.

Another variable whose relationship with birth defects was investigated was coping strategy. Coping strategies in this study were categorized into two general categories of problem-focused and emotional-focused strategies based on Lazarus and Folkman's theory of coping [45]. The results showed that, although the mean score of problem-focused coping strategies in mothers with healthy infants was higher than in mothers with physically-abnormal infants, the difference between them was not statistically significant. Regarding emotional-focused coping strategies, mothers with physically-abnormal infants avoided confronting stressful conditions, resolved them during pregnancy, and tended to use an emotion-focused coping strategy more than mothers with healthy infants. They expressed their feelings such

as fear, anger, and discomfort during pregnancy more than mothers with healthy infants. According to Lazarus and Folkman [45], when a mother adopts an emotion-focused strategy, she tries to control stressors by methods such as telling a trusted friend or a family member about her feelings. This strategy makes it possible to ignore stressors rather than solving problems.

Our study showed that mothers with physically-abnormal infants had more concerns about their body weight and image during pregnancy than mothers with healthy babies. Negahban et al. [46] showed that the most common cause of concern during pregnancy is the fear of pain and fetal harm. In addition, the risk of low birth weight in distressed mothers is higher than in other mothers [47]. Body dissatisfaction can have direct or indirect effects on maternal and fetal health such as depression, the use of unhealthy ways to lose weight, low birth weight, premature birth, and developmental delay.

There were some limitations in conducting this study. We used a self-report tool and, hence, it is possible that the mothers' perceptions have not been correctly reported. Therefore, future studies are recommended to use other measurement methods along the tool that indirectly measure variables. The second limitation was related to the culture. Since the behavior and interaction of mothers are shaped by cultural patterns and the behavioral and cultural patterns of mothers living in northern Iran are different compared to those living in other parts, the results can not be generalized to other parts of the country. Therefore, it is recommended that more studies be conducted in other cities in order to obtain more accurate results on the effect of psychosocial factors on birth defects.

Ethical Considerations

Compliance with ethical guidelines

This study was extracted from a master thesis. All ethical principles were met in this study. Prior to study, the participants were informed about the study objectives and then a written informed consent was obtained from them.

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Authors contributions

Conceptualization, editing & review: All authors; initial draft preparation, investigation, and data analysis: Ebrahim Masoudnia, Mahtab Ranjbar.

Conflict of interest

The authors declared no conflicts of interest.

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