



Can Mother's Depression Affect Infant's Development?

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Abstract

Background: The mental state of the mother is one of the factors influencing the development of infants. Besides, the quality of the child's relationship with her/his parent is very important in childhood development.

Objectives: This study aimed at investigating the relationship between the mother's depression and developmental disorders in infants.

Methods: This cross-sectional study utilized a sample size of 311 subjects. The study population included all infants and their mothers who were referred to health centers of the city of Hamadan, Iran, to receive the usual one-year care. Mothers' depression was assessed with the second edition of the Beck Depression Inventory, and children's developmental disabilities were assessed with one-year Ages and Stages Questionnaire.

Results: The mean age of mothers in this study was 29.7 ± 5.6 . The prevalence of developmental disorders in infants was 3.5%. This study showed that mothers' depression had no significant relationship with any of the developmental domains in infants. None of the developmental domains in infants were related to the mother's occupation and education. However, the gross motor skills (P-value: 0.007) and problem-solving skills (P-value: 0.031) were significantly related to the socioeconomic level, and communication (P-value: 0.034), and personal-social skills (P-value: 0.026) of the infant were directly related to the mother's age.

Conclusions: Mother's depression is not related to the infant's developmental disorders. There is a relationship between the socioeconomic level of the family and gross motor and problem-solving skills of the infant. The mother's age is directly related to communication and personal-social skills of the infant.

Keywords: Infant, Developmental Disability, Mother's Depression

1. Background

The development includes the abilities that human beings acquire in physical, mental, linguistic, and social aspects during their lifetime. These factors are influenced by heredity, environment, nutrition, and social stimuli (1), and the term developmental delay is used for children who do not have the necessary abilities and skills compared to healthy children of the same age (2). Overall, an estimated 200 million children under the age of five suffer from developmental disabilities worldwide (3). On average, about 15 to 18% of children in different communities suffer from speech, learning, and emotional-behavioral disabilities, and 15% of children have serious psychosocial problems (4). The prevalence of developmental disabilities in several cities of Iran is reported between 18.7 and 19.8% (5). However, the root cause of developmental delay is unclear, and no specific cause can be identified as the main cause of this problem (6). Nevertheless, since human de-

velopment is the result of a dynamic and continuous interaction of biological and acquired factors, numerous hereditary and environmental factors are involved (7).

In this situation, the family and its health status have an important impact on the development of the child in the first years of life, so any physical or mental problems, violence, depression, and chronic diseases in the mother can harm the child (8). Mother's depression can theoretically be considered a before-birth factor because studies have shown the effect of a mother's depression and anxiety during pregnancy on fetal neuromotor development (9). It can also be an after-birth factor because the optimal and healthy growth of children in all dimensions depends on the effective and desirable relationship between parents and children, and the quality of the parent-child relationship is very important for the growth and development during childhood (10).

2. Objectives

In this study, we investigated one of the dimensions of the mother-child relationship, ie, the mother's depression, and its effect on developmental disabilities in one-year-old children (infants).

3. Methods

The study population of this cross-sectional study included all infants and their mothers who were referred to the health centers of the city of Hamadan, Iran, to receive the usual one-year care. A two-stage cluster sampling method was utilized. To eliminate the socioeconomic status of the family as a confounding variable, the first clusters were selected from the health centers in three different socioeconomic areas of the city of Hamadan, and in the next step, a convenience sample was taken from each cluster. To calculate the sample size, we used the "r" value of 0.29, according to the Black study (11), and considered $\alpha = 0.01$ and $\beta = 0.01$; thus, about 300 subjects entered the study.

Inclusion criteria included each infant who was referred to health centers in Hamadan for health care, and exclusion criteria were physical or mental problems that could affect the child's developmental process, such as cerebral palsy and metabolic disorders like phenylketonuria.

For those who entered our study after obtaining oral informed consent, the mothers filled out the Ages & Stages Questionnaire (ASQ) themselves in health centers and gave it back to our colleagues. The second edition of the Beck Depression Inventory (BDI-) was filled out by our colleague as a questionnaire to examine the mother's depression in the health center. Also, the questioner obtained mothers' demographic information. All the questionnaires were anonymous. Mothers' demographic data were collected using a researcher-made questionnaire, and the place of residence was used as the socioeconomic level index.

The Beck Depression Inventory (BDI-) contains 21 items and is one of the most appropriate tools for reflecting depression, which examines three groups of emotional, cognitive, and physical symptoms of depression. The inventory has different levels: Scores 0 to 13 show no or least depression, scores 14 to 19 show mild depression, scores 20 to 28 indicate moderate depression, and scores 29 to 63 show severe depression. In this study, people who received severe and very severe depression scores based on the BDI-II were regarded as depressed. The validity and reliability of

the BDI-II in the Iranian population were assessed. Its Cronbach's alpha was 78%, and the validity of the retest was 73% after two weeks (12).

The prevalence of developmental disabilities in this study was assessed using the ASQ. The ASQ is a relatively simple questionnaire that allows people with primary education to answer correctly. This test has clear and simple language; next to a large number of questions, simple images have been placed that increase the clarity of the questions; thus, it makes the ASQ applicable and easy to use (13). Pediatric residents have reported that the ASQ is the preferred screening instrument for developmental delay (14). This questionnaire contains 30 questions about the child's development and screens five domains: Communication, gross motor, fine motor, problem-solving, and personal-social skills. The cut-off point of the ASQ is considered to be two standard deviations lower than the average of each domain in Iranian children. Therefore, the cut-off point is 20.4 in the domain of communication skills, 21.5 in gross motor skills, 34.6 in fine motor skills, 33.7 in problem-solving skills, and 18.3 in personal-social skills (15).

Maternal depression and her employment were considered two-state nominal variables, and the independent *t*-test was used to test their relationships with different domains of developmental disorder. The socioeconomic status and maternal education were considered ordinal variables, and due to the existence of outlier data, based on the nature of the ASQ scores, the Kruskal-Wallis test was used to measure their relationship with different domains of developmental disorder. We used the Pearson correlation test to assess the relationship between mothers' age and developmental disorder. All calculations were done using SPSS 16 software.

4. Results

The mean age of mothers participating in this study was 29.7 ± 5.6 years. Besides, 33.8% of them had high school education, 32.2% high school diploma, and 34% university education from technical diploma to Ph.D. Also, 13% were working mothers and the rest of them were homemakers. According to the BDI-, the prevalence of severe and very severe depression in mothers was 20.2% (12.2% severe and 8% very severe).

We counted the cases that had problems in more than one area only once. Thus, the overall prevalence of developmental disorders was 3.5%. The prevalence of developmental disorders in infants was 0.3% in the communication domain, 2.3% in gross motor skills, 0.6% in fine motor skills,

0.3% in problem-solving skills, and 0.6% in personal-social skills.

As shown in [Table 1](#), maternal depression was not related to any of the developmental domains in infants. Besides, the mother's depression was not related to the family socioeconomic status (P-value: 0.179), her employment status (P-value: 0.359), and her education level (P-value: 0.129). None of the domains of development were related to the mother's employment and education. However, gross motor skills (P-value: 0.007) and problem-solving skills (P-value: 0.031) were directly related to the socioeconomic status. Communication (P-value: 0.034) and personal-social skills (P-value: 0.026) were directly related to the mother's age.

5. Discussion

This study aimed at evaluating the relationship between the mother's depression and developmental disabilities in infants. The prevalence of moderate and severe depression was 20.2 and 8% among mothers of infants, respectively. The prevalence of depression varies greatly in different studies and depends on the measurement tool. Among the studies that used the BDI-II, Kaviyani's study estimated that the prevalence of depression in Tehran (the capital city of Iran) is 6.8% (16), and Modabarnia reported that the prevalence of minor and major depression in Rasht, Guilan province, was 5 and 1% respectively (17). Also, the results of a meta-analysis in Iran indicated that the point prevalence of major depression in Iran is 4.1% (4.8% in women and 2.3% in men), which is lower than the WHO global estimation for 2015 (4.4%) (18). This rate is lower than in countries such as Qatar, UAE, Lebanon, and India, and is higher than in Indonesia, North Korea, Maldives, and Nepal (19). The overall prevalence of developmental disorders, considering people with problems in more than one area as one person, was 3.5%. The prevalence of developmental delay was 13.4% in infants in Gonabad, Iran (20) and 2.5% in under two-year-old children in India (21).

In this study, there was no relationship between the mother's depression and developmental disabilities in infants. This finding is somewhat consistent with Turner's study that indicated depression during pregnancy and the first two months after child delivery, regardless of the severity of symptoms, has no relationship with developing insecure attachment in 14-month-old children (13). However, Black's study showed that the mother's depression was associated with developmental motor disabilities (11). Sliwerski, in a systematic review showed that maternal depression affects infant attachment, and stated that this re-

lationship is both complex and dynamic (22). Barnes and Theule meta-analyzed the results of 42 articles on the relationship between mother's depression and insecure attachment in children under one year of age, and revealed that insecure attachment is two times more in children of depressed mothers than in children of healthy mothers (23). Behrendt states that the mother's sensitivity to the needs of the child and her relationship with the child after infancy, which can be affected by the mother's clinical depression, can negatively affect the early socioemotional development of children of 12 to 16 months (24).

In this study, the mother's age was significantly related to communication and personal-social skills in infants. However, in Ghana, researchers did not find a significant relationship between the mother's age and any of the developmental areas of the child (25). Chittleborough related only 3% of child developmental disabilities to the young age of mothers (26), and Turley, by controlling for the family support factor in young mothers, showed that mother's age had no significant relationship with developmental disabilities in children (27). However, a study in the United States, which assessed the impact of social and demographic risk factors on the incidence of mental retardation, stated that a mother's age is one of the factors associated with child mental retardation (28).

While our study did not show any relationship between mother's education and the incidence of developmental disabilities in children, a study in the United States considered mother's low education at birth (less than 12 years of education) as the strongest factor in the development of mental retardation at 10 years of age (29). Also, in the studies by Guo (30) and Rhum (31), mother's education was considered one of the influential factors on the incidence of developmental disabilities, and a study in Ghana associated mother's low education with the incidence of developmental disabilities in children in the domain of gross motor skills (25).

In the current study, no relationship was found between maternal employment outside the home and developmental disorders in infants. Rhum's study showed that a mother's employment in the first three years has little effect on the child's verbal abilities but can cause a significant decline in reading and math skills in children aged 5 - 6 years (31). The present study showed a significant correlation between the unfavorable economic situation and the occurrence of developmental disabilities in gross motor and problem-solving skills. This was also confirmed in Sameroff et al.'s study in which children who were at a socioeconomic risk were 24 times more likely to have an IQ below 85 compared to children in the low-risk group (32).

Table 1. Relationship Between Mother's Depression, Age, Education, Employment, and Family Socioeconomic Status and Child's Development^a

Variables	Communication	Gross Motor Skills	Fine Motor Skills	Personal-Social Skills	Problem-Solving Skills	Statistical Test
Mother's depression	0.18	0.65	0.23	0.22	0.09	Independent t-test
Mother's age	0.034*	0.94	0.078	0.026*	0.43	Pearson correlation
Mother's education	0.64	0.17	0.81	0.44	0.33	Kruskal-Wallis
Socioeconomic status	0.79	0.012*	0.89	0.40	0.031*	Kruskal-Wallis
Mother's employment	0.75	0.57	0.83	0.52	0.93	Independent t-test

^a Significant items are determined by (*).

However, Carolyn in the United States, while stating the relationship between economic status and mental retardation, revealed that this correlation is not strong after controlling for mother's education (28).

5.1. Conclusions

The mother's depression is not related to the infant's developmental disorder. There is a significant relationship between the socioeconomic level of the family and gross motor and problem-solving skills of the infant, and the mother's age is directly related to communication and personal-social skills of the infant.

Footnotes

Authors' Contribution: Study concept and design, N.M.P.; Analysis and interpretation of data, F.E.; Drafting of the manuscript, N.M.P.; Critical revision of the manuscript for important intellectual content, N.M.P.; Statistical analysis, A.M.

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