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Postpartum Depression, Child Caring Behavior of Mothers and Developmental Milestones of Their Children: A Correlational Mother-Child Dyad Study

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Abstract

Background: Most of the studies conducted about cognitive side effect of mental disorders during pregnancy and the puerperum, have done in developed countries, mainly attended to psychological rather than somatic side effects. The recent studies showed that depression depend on its, severity can cause various degree of dysfunction in childbearing and house holding domain of mentally ill women's lives.

Objective: This study was aimed to determine the relation of maternal depression during post-partum period with childbearing behavior and somatic health milestones of their children.

Method: A cross sectional woman-child dyad study was conducted among 6628 women with a 2-12 months-old child in rural area of Isfahan province. Data gathered *via* demographic questionnaire, Persian version of Beck depressive scale and growth indexes of studied children; measured with related instruments in primary health care units. Collected data analyzed via SPSS software version 22 and descriptive and analytic tests especially correlation tests.

Results: Multivariable analysis indicated that none of the weight-for-length, head circumference of child and breastfeeding behavior of mother had significantly affected by the maternal depression score ($p>0.05$) but maternal health behavior, and depression score had inversely correlated ($r=-0.065$, $p<0.001$). There was also not significant correlation between maternal depression grade and child's age, before 12 months.

Conclusions: Postpartum depression (PPD) impairs child caring behaviors of the afflicted mothers. Preventive approach of early detection and treatment of PPD will help achieve best practice for preserving of their children's normal development and prevention of adverse health outcomes in them.

Keywords: Growth and development; Children; Depression; Postpartum; Child care

Introduction

Postpartum depression (PPD) has been defined in DSM-V as a period of depression which commences within the first six weeks after delivery with simultaneous existence of at least five symptoms of depression characteristic, at least one of them is depressed mood or diminished ability to experience pleasure [1].

Based on thirty years investigation by World Health Organization (W.H.O) depression will have been the second cause of disability around the world, by 2020 [2]. PPD is one of the most prevalent psychiatric disorders after delivery, which affecting approximately 13% of women [3]. It may not only interfere with women's health and wellbeing but also with the infant's intra and extra-uterine development [4,5]. Recent studies in University of Michigan highlighted the association between depression symptoms of mothers and neuro-hormonal changes with problems in infant's adaptation in different aspects of sleep, nutrition, temperament and dependence [6]. Annually, roughly 44 million pounds in England are expended on curing and treating relevant to mothers who suffer from mood disorders and PPD [7].

Albeit studies signify the considerable increase of depression emergence in postnatal period especially in the first trimester after delivery, women still have a special potential to be affected by depression during 2 yrs after delivery [8]. PPD with different prevalence rates ranging from 5-40% allocates over 12.5% of women's acceptance due to psychological problems and while the mothers expect joyous experiences after giving birth, PPD challenges them with unknown and unpleasant feelings as anxiety, diminished abilities, low self-esteem and stress [9]. Depression prevalence, particularly PPD is in correlation with cultural and social factors, hence its prevalence varies in different countries and races; different pieces of research in other countries have reported PPD prevalence in the range of 10-20% [10,11], 10-15% , 20-28% [12] and 53% in some research studies on young mothers [13]. Iranian studies reported PPD prevalence ranging from 16-31% [14,15].

The primary observational studies by Widdowson signified the fact that the emotions quality of child's caregivers impacts his/her developmental process [16]. Kerr et al. presented some pieces of evidence on the basis of weak social-psychological performance of mothers of malnourished children [17]. This investigation included mothers with the history of chaotic life, unsupportive spouse and social isolation in a way that they described these mothers apathetic and dependent [17].

Using McCarthy test from early pregnancy until children were four years old to evaluate perceptual, motor and verbal ability of depressed and no depressed mothers' children, Hay et al. showed in a longitudinal

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study that Children whose mothers were depressed in the first year post-partum have lower cognitive ability than control group whose mothers were not depressed at that time. It was also observed that low birth-weight and lower maternal education exerted independent main effects on the children's cognitive scores [18].

This study has been designed and conducted targeted at the examination of PPD prevalence rate, risk factors and association with developmental milestones of children and health behaviors of afflicted mothers in a large sample of Iranian women.

Methods

Participants

The population under study constituted of women-child dyads lived in rural districts of Isfahan province and were enrolled in Isfahan basic health units (Isfahan University of medical sciences district-Isfahan-Iran) during 2-12 months after delivery. The children under 12 months age were selected because of the higher prevalence of postpartum depression and exclusively breast feeding and being cared by mother in this phase. Permission was obtained from the Ethical committee of Isfahan University of Medical sciences to conduct the research (Code:83136).

The main aim of this study was to provide essential information and data pool to examine the necessity of designing a comprehensive plan for preventing PPD in Isfahan province. To ascertain the generalizability of the results at the time of reporting the findings to the district's health custodians, there was no sampling and the entire available population was examined during data collection. This study was carried out in July-November 2005 in rural areas of Isfahan province. Demographic data of mothers and their performance conditions in child care behavior was gathered after obtaining verbal informed consent through a researcher-made questionnaire completed by the mother herself and direct supervision of rural health care units' staff. The questionnaire assessed mothers' health related behaviors(physical activity, smoking, diet pattern) and delivering on time routine cares (vaccination and physical milestones assessment) based on Iranian protocol of integrated healthy child care program developed by Iranian Ministry of Health and Medical Education (MOHM) (Table 1).

Instruments

Data related to the condition of mothers' depression was gathered through "Beck depression inventory". The appropriate application and psychometric properties of this questionnaire were confirmed by numerous comprehensive studies; despite opposite viewpoints on the application of this inventory, it is being used as a depression scale widely in a majority of countries [19]. This inventory is consisted of 21 groups of depression symptoms that each group includes 4-5 items. Beck inventory is appropriate to individuals exceeding than 13 yrs and are at sixth grade of school, at least. This scale which is categorized as a self-assessment and rating scale of an observer was primarily used as an interview scale, That is, the interviewer read each item to the subjects and they would select the item which was in accordance with their condition. Nowadays, this scale is used as a self-assessment scale; the test taker is supposed to scrutinize all statements and circle the statement's number which is highly expressive of her/his current feeling [19]. These statements respectively assess the most minimal to the most severe disorder on that aspect. The test taker can get the score of 0-3 on each aspect (ranging from 0=lack of depression symptoms to 3=the severity of the condition on that aspect). The total raw score of the questionnaire may vary from 0 to 63. For determining the severity of depression in this scale, 0-9 score represents being normal, and 10-16 is a sign of minimal depression, 17-29 shows moderate depression and a score exceeding 30 proves severe depression. Its cutoff point in screen studies to diagnose clinical depression in society level is 21 [19]. The reliability and validity of Farsi version of this test has been confirmed [20].

Child Age	Assessment
3-5, 14-15, 30-35 days	Height, weight, head circumference, visual ability, development
2, 4, 6, 7, 9, 12, 15, 18, 24 months	Height, weight, head circumference, visual ability, development
3-7 years	Height, weight

Table1. Iranian integrated healthy child care program.

Data on children growth and developmental condition assessment (height, weight and head circumference) has been gathered by rural health care units' staff.

Statistical analysis

The data were analyzed using SPSS version 22. A logistic regression model was used to detect the variables related to PPD in this study. A multiple logistic regression analysis was conducted also to detect the correlation between PPD and Child caring behavior of mothers and developmental milestones of their children based on the ORs with 95% CIs. The chi-square test was conducted to analyze the correlation between postpartum depression grade and differences in proportions between groups based on the child's age.

Results

Data were obtained from 6628 women with the age of 26.06 ± 5.18 yrs and their 2-12 months children; 4.5% of women were employee and the rest were housewives, 76.1% had wanted pregnancy and the rest had unwanted pregnancy, 62.9% were not affected by depression and others were clinically depressed. The average of children's age who participated was 7.03 ± 3.2 months.

Discussion

Results regarding PPD risk factors that presented in Table 2 have been discussed in another article extracted from this study [21].

A fundamental hypothesis of the current study was that maternal postnatal depression and performance disorder due to this depression incur the decline of mothers' performance in the field of behaviors of child health care and as a consequence decline in children physical growth standards (height, weight, and head circumference).

To this end, the assessment and comparison of health behavior of postpartum depresses and non-depressed mothers revealed that firstly the condition of health behavior of non-depressed mothers have been meaningfully better than mothers with PPD. On the other hand, there was a significant inverted correlation between the amount of the observance of taught health instructions and the severity of depression, that is, the higher depression, the less observance of health tips (Table 3).

This topic albeit as a general debate of disorder in a performance of a depressed individual is understandable and predictable but special attention to it is of great importance in that health behavior of mothers for looking after the child in early months of life to pass the growth path and natural development is extremely significant and every kind of postponement for curing depression and continuity of this insufficient care can leave irreversible harm to the child; from this view PPD as an urgent phenomenon in psychiatry will not be far from the real-

PPD		OR	SE.	Z	P>z	CI (95%)
Child's sex	Male	1.00 (reference)				
	Female	1.04	0.06	0.63	0.53	0.93-1.15
Type of Feeding	Breast feeding	1.00 (reference)				
	Bottle feeding	1.35	0.18	2.22	0.03	1.03-1.76
	Breast & bottle	0.71	0.16	-1.5	0.13	0.45-1.11
	Other	1.46	0.71	0.78	0.43	0.56-3.78
Inborn illnesses	No	1.00 (reference)				
	Yes	0.743	0.17	-1.31	0.19	0.47-1.16
Number of mother's children	one	1.00 (reference)				
	two	0.89	0.06	-1.6	0.11	0.77-1.03
	three	0.79	0.09	-2.04	0.04	0.64-0.99
	four	0.72	0.13	-1.82	0.07	0.51-1.02
	Five and more	0.54	0.13	-2.5	0.01	0.33-0.87
Mother's Education	Literacy	1.00 (reference)				
	Primary	0.88	0.06	-1.9	0.06	0.76-1.00
	High School	0.74	0.06	-4.01	0	0.64-0.86
	University	0.47	0.09	-4.1	0	0.33-0.67
Mother's Occupation	Employee	1.00 (reference)				
	House wife	1.27	0.18	1.63	0.1	0.95-1.68
Parental attitude to child's sex	Yes	1.00 (reference)				
	No	1.49	0.14	4.33	0	1.24-1.79
	No difference	0.82	0.05	-3.29	0	0.73-0.92
Attitude to pregnancy	wanted	1.00 (reference)				
	wanted but not that time	1.7	0.14	6.45	0	1.45-2.00
	Unwanted	1.75	0.18	5.45	0	1.43-2.14
Drug history	Yes	1.00 (reference)				
	No	0.41	0.04	-9.79	0	0.34-0.49
	Do not know	1.03	0.19	0.18	0.86	0.72-1.49
Mother's age		0.99	0.01	-1.58	0.11	0.97-1.00
Child's age		1.01	0.01	1.3	0.19	0.99-1.03

Table 2: Logistic regression analysis of variables with postpartum depression (PPD) with 95% confidence intervals *(*N=6628); All reference categories have ORs=1.00, OR=Odds ratio, SE=Standard Error, CI=Confidence Interval.

	Depression Score	Breast Feeding	Child Head Circumference	Mother's Health Related Behaviors	Delay Of Delivering On Time Routine Child Cares	Weight/ Height
Depression score	1	0.02 (0.11)	-0.002 (0.83)	-0.065 (<0.001*)	0.027 (0.02*)	0.004 (0.69)
Breast feeding		1	0.001 (0.97)	-0.047 (<0.001*)	0.026 (0.03*)	-0.01 (0.31)
child head			1	-0.032 (0.002*)	0.109 (<0.001*)	0.54 (<0.001*)
circumference						
Mother's health related behaviors				1	-0.23 (<0.001*)	-0.013 (0.20)
Delay of delivering on time routine child cares					1	0.09 (<0.001*)
weight/height(gram/cm)						1

Table 3: The correlation coefficient of variables with depression score (N=6628); p<0.001 (two-tailed).

ity. These results are partly consistent with the findings of Grote et al. who found that Z-scores for weight-for-length at inclusion of infants of mothers with high Edinburgh postnatal depression scale (EPDS) scores were lower than of those with normal scores [22]. Results of our study showed that potential effects of depressive symptoms might be prolonged through 12 months of child life, this result is inconsistent with results of Wright et al. study who suggested these effects might be transitional and not remains no longer at the first year of child's life [23].

The influence of maternal depression on the condition of physical growth standards (height, weight and head circumference) were among the examined factors in this study. Multivariable analyses indicated that none of the weight-for-length and head circumference of child had significantly affected by the maternal depression score (Table 4).

As for the history of these studies, numerous studies have been repeatedly published on harmful effects of adverse social-psychological conditions of mothers on children cognitive-emotional development [24-26], but relatively few studies are conducted on the effect of mothers' depression on physical condition of their children [5].

			Depression Grade				Total
			Non-depression	Mild	Moderate	Sever	
Child age	1-6 months	Count	1341$_a$	602$_a$	542$_a$	572$_a$	3057
		% of Total	20.7%	9.3%	8.4%	8.8%	47.1%
	>6 months	Count	1447$_a$	687$_a$	649$_a$	651$_a$	3434
		% of Total	22.3%	10.6%	10.0%	10.0%	52.9%
Total		Count	2788	1289	1191	1223	6491
		% of Total	43.0%	19.9%	18.3%	18.8%	100.0%
Symmetric Measures							
				Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Interval by Interval		Pearson's R		.015	.012	1.174	.240[c]
Ordinal by Ordinal		Spearman Correlation		.016	.012	1.262	.207[c]
N of Valid Cases				6491			

a. Not assuming the null hypothesis; b. Using the asymptotic standard error assuming the null hypothesis; c. Based on normal approximation; Std. Error=Standard Error

Table 4: Maternal depression grade based on child's age (N=6628)

It is assumed that, by the evaluation of previous studies, totally prolonged and continued depressions are predictors of disorder emergence in children's growth process.

In a study on 171 children, Patel et al. argued that mothers' depression is an independent and sound anticipating factor for low weight and height in children [26].

To sum up the relevant information in regards to this topic, it is stated that mothers' depression leaves negative impact on growth and development process of children in different cognitive-emotional dimensions and physical growth. With respect to the uniqueness of this growth period in respect of growth and development speed and the necessity of child's access to the least growth and development processes in this period and lack of compensation possibility of probable deficiencies in future years this problem underlines again the urgent aspect of attending mothers' PPD and its punctual cure actions. Our study results are partly in accordance with Grote et al. study, who found that high rates of postnatal depression, as measured by the Scale of Edinburgh, had no significant effect on the growth of children in developed countries [22].

The obtained results in the present study highlight that PPD effects are not significant regarding breastfeeding. Our results are not consistent with the view of Ip et al. [27] who believed that PPD can lead to not initiating or early cessation of breast feeding [27], but the adaptability, the sensitivity, the mother's ability to cope with stressful facts and to buffer the depression effects on the relationship with the baby and breastfeeding behavior of mother [28]. Although not studied in our study, the correlation which observed between maternal depression score and mother's health related behaviors and delay in delivering on time routine child care in our study can demonstrate the role of a latent factor- impairment of bonding with the newborn- which may lead to impairment of maternal capacity of caring in the postpartum period [29,30].

Finally, a number of important limitations need to be considered here. First, Being a cross sectional study, causality cannot be assumed. In our study just anthropometric measures of children were studied and the correlation between maternal depression and attachment styles and children emotional development which also important are not examined in our study. Second, our study was a cross sectional study, so did not study the longitudinal correlation between postpartum depression and anthropometric measures of children through a long period.

Our study results regard the correlation between maternal depression and afflicted mothers, health behaviors about children routine care, have led to the need for new public policies in the field of maternal-child health and development of preventive approaches for early diagnosis and treatment of PPD aiming to preserving of their children's normal development.

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Conflict of Interest

The author(s) report no conflicts of interest.

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