The Effect of Virtual Patient Visits in the Intensive Care Unit on Postpartum Depression

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Abstract

Background: Maternal postpartum depression negatively affects the baby's emotional, behavioral, and cognitive development and attachment pattern. We aimed to examine the effect of virtual patient visits ̶ in neonatal intensive care unit on postpartum depression in mothers.

Methods: Research data were obtained from mothers whose preterm infants were hospitalized in the neonatal intensive care unit between April and December 2022. A total of 100 mothers of preterm infants (50 in the virtual patient visit and 50 in the control group) treated in the neonatal intensive care unit of a hospital constituted the sample of the study. Using the Zoom application, virtual patient visits were made for 5 minutes, seven days a week, between mother and the preterm infants, with no nursing intervention implemented for at least 30 minutes. Mothers in the control group saw their babies face to face two days a week. In standard hospital procedure, mothers saw their babies twice a week. Edinburgh postpartum depression scale (EPDS) was administered online to the all mothers before and after the study.

Results : The research resulted with statistically significant decreased EPDS scores of the mothers in virtual patient visit group with the pre-study scores. A statistically significant decrease was found compared to the control group ($P<0.001$).

Conclusion: Virtual patient visits between preterm infants in neonatal intensive care unit and their mothers could be effective in preventing or reducing postpartum depression of the mother.

Keywords: Virtual patient visits; postpartum depression; Infant; Nursing

Introduction

Preterm infants are children born before the completion of the thirty-seventh week of gestation. Approximately fifteen million babies are born prematurely each year (1). Preterm births are the leading cause of death for children under the age of five worldwide, with roughly one million children dying annually owing to problems related to prematurity (1,2). Most preterm infants carry a high morbidity and mortality risk and therefore must be hospitalized and treated in neonatal intensive care unit NICU (3, 4).

Preterm birth has traumatic consequences for both the family and the infant. While infants are affected bio-physiologically, preterm birth causes

stress for families, particularly women, due to the baby's physical condition and medical difficulties, uncertainty, fear of losing the baby, and separation from the infant in the early postpartum period (5). Mothers are emotionally sensitive during the postpartum period and are at a higher risk of having mental illnesses, transitory depressive symptoms (postpartum blues), postpartum depression, postpartum psychosis, and generalized anxiety disorders (6, 7).

Hospitalization of the preterm baby in the NICU also leads to stress of inability to care for the baby, which negatively affects the mother-baby bond. Inadequate mother-infant contact causes a vicious cycle, increasing the mother's risk of depression (8, 9). Maternal postpartum depression also negatively affects the baby's emotional, behavioral, and cognitive development and attachment pattern (8). Anxiety and stress of having a baby in NICU can lead to anxiety and stress in the whole family, triggering feelings of dread, panic, and guilt. Furthermore, the admission of a baby to the NICU disrupts their inter-family communication, which may lead to unpleasant emotions in families (10-12). The researches have reported that various factors such as premature birth, low birth weight, medical problems of the baby and hospitalization in NICU, history of miscarriage, stillbirth of the mother and inability to touch, see and breastfeed the baby increase the risk of postpartum depression (13,14).

Mothers of babies treated in the NICU consider that they cannot fulfill their motherhood roles as they cannot hold and feed their babies. Therefore, they have stress, anxiety, and distress, which may result in postpartum depression (15). In a study involving 106 mothers whose babies were hospitalized in the NICU, 66% of mothers had postpartum depression, and 85% of those with postpartum depression had preterm infants (16). In another study with 25 mothers of premature babies treated in the NICU, 78% of mothers had postpartum depression. Virtual patient visits offer a unique experience for families with preterm infants in the NICU (17). Various technological programs are used to facilitate virtual patient visits, and studies report that seeing their babies in

the NICU through virtual visits positively affects parents, reducing stress and anxiety especially in mothers (18-21).

Preterm babies stay in NICU in long periods and restricted parental visitations may lead to difficulties for parents seeing their babies. Different factors such as infection risk in the NICU, family residence in another city, financial issues, the presence and care of siblings in the family may prevent maternal visits to NICU (19). To prevent or reduce stress, anxiety, and postpartum depression in the mother, it is crucial to ensure continuous interaction between the mother and the preterm infant in the NICU, to allow families to visit their infants whenever they desire, and to improve communication between the family and NICU staff. As a result of technology advancements over the past several decades and through the use of internet applications and smart devices, it is now possible to establish a real-time link between the mother, baby and family (22- 24).

For these reasons, this study's primary objective was to explore the impact of virtual patient visits between preterm newborns in the NICU and their mothers on postpartum depression in mothers.

Research Questions

1. Does the virtual patient visit conducted in NICU have an impact on postpartum depression?
2. Do preterm infant and mother characteristics have an impact on postpartum depression?

Materials and Methods

Population and sample of the study

This research is a comparative to included two groups. The data of the study were collected between April 2022 and December 2022 in the Neonatal Intensive Care Unit at Balıkesir Atatürk City Hospital. A power analysis was conducted to determine the sample size of the study (G*Power, 3.1.9.2). In the power analysis based on a reference study (25), based on 95% power (1-β), an alpha value of 0.05, and with Cohen's

effect size calculated as d=0.80, it was determined that each group should include at least 42 mother, constituting 84 mother in total. Considering the possibility of data losses during data collection in the study, these numbers were increased by 20%, and it was decided to include 100 mother in the sample, including 50 in each group. The study included 100 mothers, 50 virtual patient visit and 50 control group, whose preterm babies were hospitalized and receiving special medical care in the NICU between the specific dates. Preterm infants and their mothers included in the study were determined by the simple randomization method on the website www.randomizer.org. In accordance with standard hospital protocol, mothers visited their infants in the NICU only twice per week and were informed of their condition.

Inclusion criteria: The mothers of preterm babies with gestational ages between 30 and 36+6 weeks with a stable clinic, not receiving oxygen support and no congenital anomalies and who had been treated in the NICU for at least one week were included in the study. It was also mandatory for mothers to speak Turkish and able to use a smart device with internet access.

Exclusion criteria: The mothers of preterm babies with gestational ages under the between 30 weeks with a unstable clinic, receiving oxygen support were excluded in the study. It was also excluded for mothers not to speak Turkish and not able to use a smart device with internet access.

Study Design

Before beginning the virtual patient visit, the mothers who agreed to participate in the study were informed of the purpose of the research and provided their written consent. Researchers explained the study aim to mother by the phone.

The experimental group (Virtual patient visit)

This group was comprised of mother whose preterm infants in the NICU were contacted online by smartphone and virtual patient visit using the Zoom application. This group's mothers communicated with their infants in whichever man-

ner they wished. Virtual patient visits were conducted via online video calls between a preterm infant with no nursing intervention for at least 30 minutes and his mother, for 5 minutes, at as close to the same time each day of the week as possible. During the virtual patient visit, no instructions were given to the mothers, and they were free to interact as they chose. A 5-minute time limit was imposed for the visit, and if the mother continued to communicate with her child after the time limit elapsed, she was asked to discontinue the virtual patient visit.

The mother was given the descriptive information form and the Edinburgh Postpartum Depression Scale (EPDS) one day before to the first virtual patient visit. The EPDS was administered to the mother again after seven days, and the scores were recorded. All forms were prepared online using the Google forms application, sent to the mother online via the WhatsApp program, and completed by the mother. Mothers visited their infants in the NICU only twice per week, on days when mothers visited the NICU to see their baby, there were no virtual patient visits between mother and baby. All moms in the experimental groups visited their baby two times per week.

Control group

The standard NICU hospital approach was applied with this group of mothers. In accordance with standard hospital protocol, mothers visited their infants in the NICU twice per week. They were informed of their condition. All moms in control groups visited their baby two times per week. Before and after the study, the mother information form and EPDS were administered to the mothers of preterm babies in this group. All forms were prepared online using the Google forms application, sent to the mother online via the WhatsApp program, and completed by the mother.

Data collection tools

Information Form for the Mother: This form, consists of 7 questions in total, included questions about the age, education, employment, income status of the mother, mode of delivery,

touching the preterm baby (touching baby hand e.g.) in the NICU, and the gender of the baby.

Edinburgh Postpartum Depression Scale (EPDS): The scale created by Cox and Holden to determine the risk of depression in women during the postpartum period is not intended for depression diagnosis, but rather screening (26). It is a self-report scale consisting of ten items and a four-point Likert scale (0-3). The lowest and highest possible scores for the scale are 0 and 30, respectively. The cutoff point of the EPDS was determined to be 13, and women with a score of 13 or higher on the scale were judged to be at risk for depression. The Turkish EPDS validity and reliability study was conducted by Engindeniz et al, who determined the scale's internal consistency Cronbach Alpha score to be 0.79. (27). As the conclusion of our investigation, we determined that the Cronbach Alpha value of the scale was 0.82.

Data analysis

The data collected were analyzed in computer environment through SPSS 23.0 (IBM Corp., Armonk, NY, USA). Descriptive statistics for the data collected were expressed as mean ± standard deviation and minimum and maximum values. Categorical variables were summarized as number and percentage. Analysis was performed in order to determine the impact powers of the scale. There was a linear relationship between the dependent and independent variable and the continuous variable, and they were almost normally distributed. The dependent variable of this study was the total scores obtained on EPDS. The independent variables of this study are the mother's age, education, mode of delivery, employment, income status, touching the preterm baby and the gender of the baby. Spearman correlation was used to determine the relationship between groups. Comparisons of pre-test and post-test scale scores of the study and control groups were made with Paired samples t test. In the analyses performed, significance level was accepted as $P<0.05$.

Ethical considerations

Ethical approval of the Clinical Studies Ethics Committee of Balikesir University – (Decision No. 2021/206, Date: 22 September 2021) and other necessary permissions were obtained. All mothers were given information on the study. They gave written informed consent. The study was conducted in accordance with the Principles of the Declaration of Helsinki

Results

Table 1 shows the characteristics of the mothers whose babies were hospitalized in the NICU. There was no statistically significant difference between the virtual patient visit and control groups in terms of sociodemographic characteristics ($P>0.05$). The groups were homogeneously distributed (Table 1).

Table 2 shows a comparison of EPDS scores from the virtual patient visit and control groups before and after the study. The mean EPDS scores of the virtual patient visit group before and after the study were 8.80±6.28 and 5.66±5.51, respectively. On the other hand, mean EPDS scores of the control group before and after the study were 12.56±5.45 and 14.24±4.13, respectively. According to the significance value of the paired samples t test; a statistically significant difference was found between the pre- and post-study scores of the virtual patient visit ($P<0.001$) (Table 2).

Table 1: Distribution of descriptive characteristics of mothers between groups

Variables	Virtual Patient Visit Group (n=50)		Control Group (n=50)		Test Statistic	P
Mean of age	28.14+5.45		29.28+8.52			
	n	%	n	%		
Education					0.251[b]	0.882
Middle School	16	32	14	28		
High School	18	36	18	36		
University	16	32	18	36		
Employment					1.330[b]	0.568
Not working	31	62	36	72		
Officer	11	22	8	16		
Selfemployment	8	16	6	12		
Income					0.260[a]	0.806
Good	11	22	10	20		
Middle	39	78	40	80		
Mode of delivery					5.211[a]	0.622
Normal	5	10	14	28		
Cesarean	45	90	36	72		
Touching the preterm baby in the NICU					1.871[a]	0.171
Yes	16	32	10	20		
No	34	74	40	80		
Gender of the baby					1.528[a]	0.216
Famale	22	44	16	32		
Male	28	56	34	68		

[a]Pearson Chi-square test was used.
[b]Fisher-Freeman-Halton test was used

Table 2: Comparison of the Edinburgh Postpartum Depression Scale scores of the virtual patient visit and control group before and after the study

Variable	Virtual Patient Visit Group(n=50)	Control Group (n=50)
Edinburg Postpartum Depresyon Scale		
Pretest mean score	8.80±6.28	12.56±5.45
Posttest mean score	5.66±5.51	14.24±4.13
Test statistic *	4.208	-0.649
P	0.000	0.108

*Paired samples t test was used.

Table 3 displays the correlations of the scores before and after the study for the virtual patient visit and control groups with age, education level, employment status, income level, mode of delivery, touching the preterm baby in the NICU, and the sex of the baby. No statistically significant correlation was found between the sociodemographic characteristics of the virtual patient visit and control group and the scores of EPDS before and after the study ($P>0.005$) (Table 3).

Table 3: Correlations of mothers' descriptive characteristics and pre- and post-study Edinburgh Postpartum Depression Scale test scores

Variables	*Edinburg Postpartum Depresyon Scale*							
	Virtual Patient Visit Group (n=50)				Control Group (n=50)			
	Pre test		Post test		Pre test		Post test	
	R*	*P*	R*	*P*	R*	*P*	R*	*P*
Age	0.024	0.868	0.044	0.759	0.081	0.578	0.197	0.169
Education	0.277	0.051	0.330	0.069	-0.169	0.241	-0.153	0.288
Employment	0.027	0.851	0.093	0.520	-0.071	0.626	0.375	0.107
Income	-0.351	0.112	-0.298	0.135	0.311	0.228	0.274	0.054
Mode of delivery	-0.059	0.638	0.074	0.553	0.102	0.501	0.094	0.534
Touching the preterm baby in the NICU	-0.052	0.679	-0.138	0.268	0.056	0.712	0.141	0.349
Gender of the baby	0.371	0.062	0.431	0.167	0.785	0.122	-0.258	0.165

* Spearman correlation test was used.

Discussion

The aim of this study was to investigate the effect of virtual patient visits between preterm infants in the NICU and their mothers, on postpartum depression. In this section, the findings of the research are discussed in line with the literature. A virtual patient visit group and a control group was incorporated in this experimentally planned study.

When the distribution of sociodemographic characteristics of the mothers participating in the study by group was analyzed, there was no statistically significant difference between these variables and the groups; the groups were uniformly distributed. The sociodemographic features of the mother were not considered because this was a randomized, controlled study and homogeneity between the groups was established. In order to eliminate the confounding impact between mothers' characteristics and the EPDS scores, the homogeneous distribution of the groups is essential.

Comparing the EPDS scores of the virtual patient visit and control groups before and after the study revealed that the EPDS scores of the mothers in the virtual patient visit group were significantly lower than those of the mothers in the control group, and the scores decreased significantly when compared to their pre-study lev-

els. Our research indicates that virtual patient visits between a mother and her preterm infant in the NICU are effective in lowering postpartum depression in women.

Previous studies have explored the effect of virtual patient visits on mother's postpartum depression. Fifteen women and their preterm infants participated in a video chat study that investigated the impact of the Facetime application on maternal postpartum depression. The conclusion of the study revealed that there was no correlation between video calls and postpartum depression; however mothers indicated that seeing their newborns was beneficial (24). In a different virtual patient visit study examining the effect of web camera usage on postpartum depression in 12 mothers and preterm infants, it was revealed that the mother's postpartum depression level could not be assessed due to the extremely low level of postpartum depression (15). In a randomized, controlled virtual patient visit trial including 75 preterm children and their mothers, the interview group's depression scores were lower than those of the control group, although this difference was not statistically significant (5). Our research indicates that virtual patient visit between a mother and her preterm infant in the NICU reduces postpartum depression in women.

The findings of our study indicate that virtual patient visit has a positive effect on postpartum depression. Similar to previous research, our

findings indicate that virtual patient visit between a mother and her preterm infant in the NICU are beneficial for the mother. The fact that our research differed from the literature in that virtual patient visit had a statistically positive effect on the postpartum depression scale score can be attributed to the different cultural characteristics of the mothers, the different NICU visit procedures, the different durations of the virtual patient visits, and the fact that this was the first national study of its kind.

Conclusion

Mothers in the virtual patient visit group, compared to mothers in the control group, had a significant decrease in postpartum depression scores after the study. Mothers in the virtual patient visit group saw and communicated with their babies seven days a week and much more frequently when compared to the mothers in control group. This had positive effects on the mothers and their EPDS scores. Sociodemographic characteristics of mothers were not found to be associated with postpartum depression. Postpartum depression is inevitable in mothers who are separated from their babies in the early postnatal period. In mothers that cannot fully interact with their babies when separated from them in the early postnatal period, we have demonstrated that virtual patient visits between mothers and their babies is useful in preventing or reducing postpartum depression. The results of this study are limited to 100 mothers who had preterm babies, so they cannot be generalized. Conducting such studies on mothers who have preterm babies will contribute to the improvement of maternal and child health.

Journalism Ethics considerations

Ethical issues (Including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc.) have been completely observed by the authors.

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Conflict of interest

The authors declare no conflict of interest.

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