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Oxytocin Levels on Mental Health of Postpartum Mothers

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Abstract

Background: Postpartum depression is a significant mental health concern, especially for women in vulnerable populations. Mothers with mood or anxiety disorders exhibit less optimal interactive behavior. Oxytocin, a hormone essential for a variety of maternal tasks, including labor, lactation, and infant bonding, has also been hypothesized to have a role in postpartum depression. The neuropeptide oxytocin has been linked to more optimal interactive behaviors in mothers without mental illness, and it may play a particularly beneficial role in mothers with mood or anxiety disorders given its antidepressant and anxiolytic functions. **Purpose:** This study aims to determine the levels of the hormone oxytocin in postpartum mothers on day 1 and on day 3 postpartum and to analyze the mental health of the postpartum mother. **Methods:** The method in this study was a correlation study, namely to determine the correlation between the level of the hormone oxytocin on day 1 and day 3 of the puerperium on the mental health of postpartum mothers. The variable in this study was the oxytocin hormone in postpartum women which was measured on day 1 and day 3 of the puerperium. Measurements were made using the ELIZA method. While the dependent variable in this study was the mental health of postpartum mothers as measured using the Edinburgh postnatal Depression scale (EPDS) in the form of a questionnaire. Respondents in this study were postpartum mothers who had delivered by caesarean section on day 3 and had no health complications during the puerperium.

Results: The results showed that there were differences in the levels of the hormone oxytocin on day 1 and day 3 with a significance value of 0.005. whereas for the mental health of the mother on days 1 and 3 there was no significant difference with a significance value of 0.775.

Conclusion: there were differences in the results of measuring oxytocin levels in postpartum mothers on day 1 and day 3, while the EPDS score did not show a significant difference on day 1 and day 3. The results of the analysis showed a significant relationship between oxytocin levels and EPDS score on day 1, and there was no significant relationship between oxytocin levels and the EPDS score on day 3

Keywords: Post-Partum; Mother; Mental Health; Oxytocin; EPDS

1. Introduction

Maternal mental health disorders are associated with adverse maternal and neonatal outcomes. Screening women in pregnancy and post-partum for mental health disorders is key to early identification and treatment of anxiety and depression in the perinatal population. Although universal screening is now recommended by numerous professional organizations, rates of screening are low and often not performed with a validated screening instrument. Although clinical assessment is important, it is insufficient to identify maternal mental health disorders.(1)

Prenatal and postnatal mental disorders induce disturbances in the physical activity, nutrition, and sleep of pregnant and postpartum women; these disturbances subsequently affect the mood of pregnant and postpartum women and the development of fetuses and children.(2) Timely interventions are helpful in mitigating mental disorders.

During the postnatal period, parents often seek health related services and programs for their infants. These visits can be opportunistic for health-care professionals, including Nursing Practitioners, to connect with new fathers and assess their health and well-being. In addition, by incorporating Nursing Practitioners into postpartum programs, opportunities for screening, diagnosing, managing, and referring fathers, especially those at risk for serious mental health issues, can occur.(3) Postpartum depression occurs during the puerperium up to the first 1 month with an incidence rate of around 10% and this event has a major impact on the health of mothers and children. At the hormonal level, levels of the hormone oxytocin can have an influence on the incidence of postpartum depression. (5)

2. Materials and methods

2.1 Materials

This research method uses a cross-sectional approach. The independent variable in this study was the oxytocin level of postpartum women which was measured on day 1 and day 3 of the puerperium. while the dependent variable in this study was the mental health of postpartum mothers which was measured on day 1 and day 3. Respondents in this study were postpartum mothers on day 1 and day 3 as many as 30 respondents. The inclusion criteria in this study were postpartum women who did not experience health complications during the postpartum period.

2.2 Data collection procedures

The data collection process in this study was carried out in clinics and hospitals and carried out by health workers. Postpartum mothers on day 1 and day 3 are generally identified for health. If the mother does not experience health problems/complications during the puerperium then she can be used as a respondent in the study. Furthermore, venous blood sampling was carried out in postpartum women to measure the independent variable, namely oxytocin levels. The blood that has been collected from both the 1st and 3rd day of the respondent will then be subjected to laboratory tests using the ELIZA method to determine the level of oxytocin in the blood.

The blood of post-Partum mothers will be collected then centrifuge to obtain the plasma. Oxytocin levels are measured using commercial Elisa Kit (Enzo Life Sciences Inc.). The procedure following the manufacturer's protocols, the sample were diluted 1:2 or 1:4.(4) The minimum detection limit for oxytocin was 15.6 pg/mL and inter and intra assay coefficients of variability were less than 8.7% (4)

In collecting data on the dependent variable, namely the mental health of postpartum mothers using the Edinburgh Postnatal Depression Scale (EPDS) score. The EPDS questionnaire was given to postpartum women on day 1 and day 3 to be filled in before the respondent took blood. After that, an analysis process will be carried out from the results of filling out the questionnaire by the researcher.

The Edinburgh Postnatal Depression Scale (EPDS) consists of 10 questions given to postpartum mothers to determine their psychological state. Responses are scored 0, 1, 2 and 3 based on the seriousness of the symptom. The scale indicates how the mother felt during the previous week. This questionnaire has been standardized in more than 13 languages in the world(1,5).

2.3 Data analysis

Data analysis was carried out to determine levels of the hormone oxytocin in postpartum mothers on day 1 and day 3. The results of laboratory tests using the ELIZA method on blood samples will be analyzed using statistical tests. Likewise, on the EPDS score of postpartum women on day 1 and day 3, data analysis will also be carried out using statistical tests.

In addition, researchers will also analyze data on the results of laboratory tests regarding levels of the hormone oxytocin on day 1 with the results of the EPDS score on day 1. The same thing will be done to find out the correlation between oxytocin levels and the EPDS score on day 3. This research has been carried out with an ethical test No. 074/KEPK-RSISJS/V/2023

3. Results and discussion

3.1 Results and discussion

In this study, analysis of differences in oxytocin levels in postpartum mothers on day 1 and day 3. Where on day 1 and day 3 of the postpartum period psychological and physiological changes occur in postpartum women. This will affect the levels of the hormone oxytocin produced by the hypothalamus. This will also affect how the mother's physiological and psychological adaptation will be, both in terms of emotions, acceptance of new roles, breastfeeding or others.

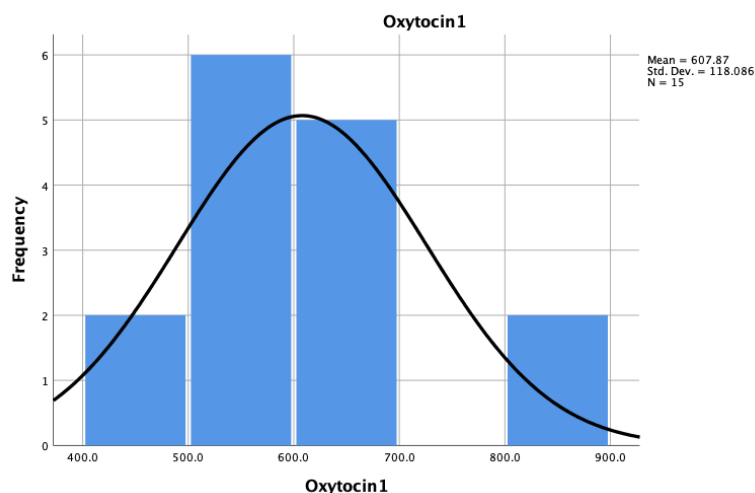


Figure 1. Oxytocin Levels on Day 1 Of The Puerperium

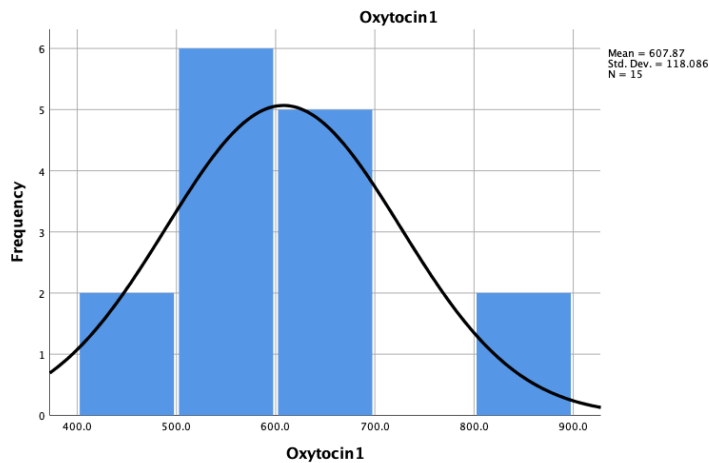


Figure 2. Oxytocin Levels on Day 1 Of The Puerperium

The results of this study indicated that oxytocin levels on day 1 had an average value of 607.87 pg/ml, while on day 3 the average oxytocin level was 820.87. Oxytocin levels on day 1 and day 3 of the puerperium based on the results of statistical analysis showed a significant difference with a significance value of 0.005.

The hormone oxytocin is a hormone that has an important role in a woman, starting from the process of childbirth, lactation, the bond between mother and baby and can also affect the incidence of postpartum depression. The type of delivery also affects the levels of the hormone oxytocin in the mother's blood serum. Delivery with additional oxytocin infusion can increase 2-3 times the level of oxytocin in the mother's blood but is not related to neonatal plasma.(6)

Endogenous oxytocin is a major component in the transition period in a mother. In addition, oxytocin also influences molecular pathways in resisting stress reactivity, as well as affecting the mood and behavior of the mother during the puerperium. (7)

3.2 Mental Health In Postpartum Mothers Based On The Edinburg Depression Scale

Mental health disorders in postpartum mothers affect the condition between mother and baby. Perinatal depression, which includes both major and minor depressive episodes that occur during pregnancy or within the first 12 months after delivery, is one of the most common medical complications during pregnancy and the postpartum period, affecting one in seven women. It is important to identify pregnant and postpartum women with depression because untreated perinatal depression and other mood disorders can have devastating effects.

Table 1. Frequency Distribution of Postpartum Maternal Mental Health on Day 1 And Day 3

Mental health	Day 1		Day 2	
	Frequency	Percentage (%)	Frequency	Percentage (%)
Depressi not likely	9	60	6	40
Depression possible	2	13	6	40
Fairly high possible	3	20	1	7
Probable depression	1	7	2	13

Based on the results of filling out the EPDS questionnaire by respondents on day 1 and day 3, it was found that most of the respondents on day 1 were included in the depression

not likely category, while on day 3 most of the respondents were in the depression and depression possible categories. This shows that on the 3rd day postpartum mothers have started to adapt to their new roles which may be on the first day. Some of them are still focused on themselves. The results of the statistical analysis showed that there was no significant difference between the results of the EPDS score on day 1 and day 3, which was 0.775, which was > 0.05 .

Mothers who are depressed compared to mothers who are not depressed, show data that there is a higher difference in externalizing behavior. Financial, instrumental, and emotional support from partners were independently and inversely associated with behavioral problems ($p < 0.05$). However, this external support was not proven to be associated with behavioral problems.(8)

The results of other studies show that there are significant differences in the severity of postpartum depression symptoms in respondents who were measured at the beginning of the Covid-19 endemic and before the outbreak of the Covid-19 epidemic.(9) These data indicate that demographic environmental conditions affect mental health conditions in postpartum mother.

The process of screening and treatment of mothers with mental health disorders or postpartum depression is very necessary, because it has an impact on the mother herself and the development and growth of the child. Health workers, especially the midwifery department, must be able to carry out mental health screening using validated instruments. Yearn There is a lot of evidence showing that the process of screening and treatment as early as possible can have a positive impact on the mental health of the mother.(10)

3.3 Levels of The Hormone Oxytocin on The Mental Health Of Postpartum Mothers

			Oxytocin1	EPDS1
Spearman's rho	Oxytocin1	Correlation Coefficient	1.000	.591*
		Sig. (2-tailed)	.	.020
		N	15	15
	EPDS1	Correlation Coefficient	.591*	1.000
		Sig. (2-tailed)	.020	.
		N	15	15

			OxytocinD3	EPDSD3
Spearman's rho	OxytocinD3	Correlation Coefficient	1.000	.084
		Sig. (2-tailed)	.	.767
		N	15	15
	EPDSD3	Correlation Coefficient	.084	1.000
		Sig. (2-tailed)	.767	.
		N	15	15

Based on the results of data analysis, there is a significant relationship between levels of the hormone oxytocin and the mental health of postpartum mothers on the first day with a significance value of 0.02. While the results of the analysis on day 3 oxytocin levels with the mental health of postpartum mothers based on the results of completing the EPDS

showed that there was no significant relationship. The results of data analysis showed a significance value of $0.767 > 0.5$

Another study with a systematic review method showed that there was no relationship between intravenous synthetic oxytocin and postpartum depression. This is due to heterogeneity and limited research data.(11) In addition, other studies have shown that oxytocin is a viable treatment option for postpartum depression. However, the role is still controversial. The results of a systematic review that was conducted showed that one trial showed that oxytocin relieved depressed mood; two trials showed that oxytocin had no effect (but reduced negative thoughts in healthy mothers, or decreased narcissism); another trial showed that oxytocin exacerbated depression.(12)

Intravenous administration of oxytocin can affect the thymus in postpartum mothers. so that the administration of oxytocin in the delivery process will also affect the postpartum period in postpartum women. This theory suggests that oxytocin given during labor is associated with the onset or worsening of postpartum depression regardless of whether it is a cause or an effect.(13) This data is in line with other studies showing that higher oxytocin predicts greater severity of postpartum depression symptoms in women with previous mental health disorders with a significance value of ($p = 0.019$), but not in women without a history of mental health disorders with a significance value of ($p = 0.216$)(14)

4. Conclusion

There are differences in the results of measuring oxytocin levels in postpartum mothers on day 1 and day 3. On the EPDS score did not show a significant difference on day 1 and day 3. The results of the analysis showed that there was a significant relationship between oxytocin levels and the EPDS score on day 1, and there was no significant relationship between oxytocin levels and the EPDS score on day 3.

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Conflict of interest

The authors declare no conflicts of interest

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