

Breastfeeding Practices and Infant Nutrition (6-23 Weeks) of Post-Partum Depressed Mothers in Nairobi City Hospitals

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ABSTRACT

Background: Mothers suffering from post-partum depression have been reported to have poor breastfeeding habits, and their infants experience high rates of malnutrition. Due to the country's increased rate of malnutrition and its association with breastfeeding practices among children under the age of five, it is important to determine whether these rates are contributed by women suffering from postpartum depression. Therefore, the purpose of this study was to determine the breastfeeding practices and nutrition status of infants 6-23 weeks of postpartum depressed mothers.

Method: The study adopted analytical cross-sectional design on a sample of 202 study participants. Proportionate distribution was used to determine the number of participants per hospital and consecutive sampling used for selecting the respondents. Data was collected using anthropometric tools and interviewer-administered questionnaire. Anthropometric data and quantitative data from the questionnaire was analyzed using ENA for SMART software and SPSS version 25 respectively

Results: 76.3% of the mothers practiced exclusive breastfeeding while 83.2% of the mothers-initiated breastfeeding within the first hour after delivery. Prevalence of underweight, stunting, wasting and overweight was 21.1%, 20.0%, 14.2% and 3.2% respectively. The study found no significant association between breastfeeding practices and nutrition status of the infants. Exclusive breastfeeding practice had a strong negative correlation with the age of the infant $r = -.341$, $p < 0.01$

Conclusion: The rates of wasting, stunting and underweight were higher than the national rates and the study recommend the intervention to include screening of postpartum depression in the post-natal and child welfare clinics.

Keywords: breastfeeding practices, infant nutrition, post-partum depression

INTRODUCTION

Childbirth is a joyous moment for many moms, but for others, it is a time of emotional pain and a lack of self-care (Post & Leuner, 2019). This is due to negative hormonal alterations, which eventually lead to mood disorders (Upadhyay et al., 2017). Post-partum emotional disturbances and alterations range from mild post-partum blues to severe cases of post-partum psychosis.

Post-partum depression is a mood illness with no psychotic characteristics that is associated with childbirth. It is characterized by an episode of major or minor depressive disorder that occurs during the postpartum period (O'Hara & McCabe, 2013). Severe grief or emptiness, isolation from friends, emotional numbness, continual exhaustion, acute anxiety and fear about the infant, or absolute lack of interest in the baby are all symptoms of postpartum depression (Pendergast et al., 2014). Most of the time

this condition usually goes unnoticed because it is underdiagnosed and undertreated. Because it is underdiagnosed and undertreated, this illness frequently remains unrecognized. This is a big problem because many mothers may be unaware that they have the condition, necessitating early and regular screening, particularly at the MCH clinic (van der Zee-van den Berg et al., 2017). Post-partum depression (PPD) necessitates medical attention, however psychological assistance is sometimes sufficient (Anokye et al., 2018). In accordance to studies, mothers with these conditions usually exhibit low confidence in their ability to breastfeed and, as a consequence, they may not practice exclusive breastfeeding. If the health problem persists and fails to be managed, an individual may develop post-partum psychosis.

After giving birth, 13% of women worldwide experience mental disorders, predominantly depression, and 19.8% of women in underdeveloped countries experience post-partum depression (WHO, 2018). A meta-analysis assessment on the prevalence of postpartum depression in Africa indicated a range of 16%-22.5% (Gelaye, Rondon, Araya & Williams, 2016). In a research study carried out in Kenya, the prevalence rate of post-partum depression was 13.0%, which is high given that this mental health condition often goes undetected. In a research study carried out in Kenya, the prevalence rate of post-partum depression was 13.0%, which is high given that this mental health condition often goes undetected (Madeghe et al., 2016).

Breastfeeding exclusively for the first six months of life is recommended by the World Health Organization (WHO) and the United Nations International Children's Emergency Fund (UNICEF). In comparison to other preventative measures, breast milk has the greatest impact on infant mortality by providing irreplaceable essential nutrients that promote healthy growth and development. Breast milk also serves as the first infant vaccine and protects against

infections of the respiratory system, diarrheal diseases obesity prevention and other noncommunicable diseases later in life (Bernado, 2013; Horta et al., 2015).

Globally, the overall rate of exclusive breastfeeding for children under six months of age is 41% (global-bf-scorecard-2017). The rates of exclusive breastfeeding are 56% in Eastern and Southern Africa and 33% in the remainder of the African UNICEF region. In Kenya, 61% of mothers exclusively breastfeed their children (KDHS, 2022).

Malnutrition continues to be one of the biggest contributors of death and morbidity in developing countries among children under the age of five. The global stunting rate is 21.9%, where as it is 33% in Africa. The global wasting rate is 7.3%, while Africa has a rate of 4.2%. Overweight rates are 5.9% globally and 4.2% in Africa (UNICEF, 2019).

According to WHO, the first 1000 days of a child's life are critical for his or her growth and development. As a result, more strategies have been put in place to safeguard a child's optimal growth and development. A mother's mental health has been found to be crucial to a child's growth and development (Bennett et al., 2019).

A study conducted in Uganda found that 42% of children of depressed mothers were malnourished compared to 12% of children whose mothers were not depressed (Ashaba et al., 2015). Similarly in Ethiopia, infants born to depressive mothers were shown to be three times more likely to be stunted than those born to mothers without post-partum depression (Girma, Fikadu & Abdisa, 2019). Studies undertaken in Bangladesh, Vietnam, and Ethiopia discovered that maternal mental health was associated with undernutrition and diarrhea but not with wasting (Nguyen et al, 2018).

In Kenya, where malnutrition is a common problem, a research conducted at Kenyatta National Hospital showed that 64.1% of mothers with moderate to severe depression had undernourished children, compared to 5.1% of mothers who did not have

depression (Haithar et al.,2018). Similarly, a study conducted in a low-income urban settlement in Nairobi discovered that infants of women with post-partum depression were 5.43 times more likely to be underweight than those of mothers without the disease (Madeghe et al., 2016).

Poor breastfeeding combined with sickness is the leading cause of death in young children and it is estimated that 11.6% of fatalities among children under the age of five are due to poor breastfeeding (Hajeebhoy et al., 2014). Kenya has an exclusive breastfeeding rate of 61%, which, despite being substantially higher than in many other African countries, falls short of the WHO proposed targets of 90%.

Post-partum depression is only recognized when a mother's conduct is clearly odd, despite the fact that it can be checked for and identified early enough to guarantee that both the mother and the child receive suitable care. Many studies have been conducted on exclusive breastfeeding, post-natal care for women, and the factors associated with non-exclusive breastfeeding; however, just a few studies have been conducted to establish the breastfeeding practices and nutrition status of infants of mothers suffering from post-partum depression. As a result, carrying out this study will give light on the breastfeeding practices and nutritional status of infants of mothers who have post-partum depression.

The objectives of the study were:

- To establish the socio-demographic factors of households of post-partum depressed mothers in selected Nairobi City County hospitals.
- To determine the breastfeeding practices of post-partum depressed mothers in selected hospitals in Nairobi City County hospitals.
- To assess the nutrition status of infants aged 6-23 weeks born to women suffering from PPD at selected Nairobi City County hospitals.
- To evaluate the relationship between breastfeeding practices, infant nutrition

status and socio-demographic factors in the households of post-partum depressed mothers.

MATERIALS & METHODS

Research design: The breastfeeding practices and nutrition status of infants born to post-partum depressed mothers were examined using a cross-sectional analytical and descriptive study design. This study design is recommended because it allows for the simultaneous assessment of causal and outcome-related relationships.

Study area: Nairobi County is Kenya's capital city, and as such, it has one of the greatest populations in the country. Mbagathi Hospital and Mama Lucy Kibaki Hospital were chosen due to the large number of mothers who frequent their MCH clinics, as well as the fact that they both serve people of the same socio-economic status in Nairobi County.

Target population: Post-partum depressed mothers and their infants were targeted in the selected hospitals in Nairobi County.

Inclusion criteria: Post-partum depressive mothers with children aged 6 to 23 weeks in the selected hospitals who consented to participate.

Exclusion criteria: Mothers who did not initiate breastfeeding after delivery, mothers who are too weak to speak, mothers taking medication for any mental health problems, mothers suffering from chronic diseases and finally sick infants.

Sample size determination: Using the Cochran method as described in Israel (1992), a sample size of 202 women with PPD was obtained.

$$No = \frac{Z^2 pq}{e^2}$$

No (the desired sample size) = $Z^2 pq / e^2$.
Z = the standard normal deviation at 95% confidence level (1.96)
(1-p) = the desired confidence level.
e = required precision level

The estimated prevalence of post-partum depression is $P=13.9\%$.

$N_0 = (1.96)^2 (0.139) (1-0.139) / (0.05)$ at 95% confidence level. $N_0=184$

10% was added to account for non-respondents = 10% of 184 = 18

The total sample size is 202 (184+18).

Sampling technique: Nairobi County was purposefully chosen since it is highly populated with people from different socioeconomic backgrounds. Purposive sampling was also used to choose both Mbagathi and Mama Lucy Kibaki hospitals since they serve low, middle, and upper-middle-class people, are both public hospitals, and have a high number of women who frequent the MCH clinic. Consecutive sampling, a form of sampling strategy in which everyone who fits the inclusion criteria is chosen until the sample size is reached, was then used to pick the individuals who participated in the research. This is due to the small number of mothers with post-partum depression who visit both hospitals on a daily basis.

Data collection tools: Data on breastfeeding practices, infant nutrition status, and maternal socio-demographic characteristics were collected using a researcher-administered questionnaire. To acquire data on infant nutrition status, anthropometric measures were taken using a weighing scale and a height board.

After delivering Edinburgh's post-partum depression scale and screening positive, Key Informant Information was used to fully diagnose women who had post-partum depression. The data was obtained from a clinician who performed additional diagnosis on the responders.

Data collection procedure: A pre-tested questionnaire and anthropometric measurement tools were used to collect data. Every day, mothers with children aged 6-23 weeks were identified and assessed for post-partum depression using the EPDS questionnaire, and the results were verified

by a clinical officer assessment. Mothers who tested positive for post-partum depression were selected and included in the study. The infants' ages were verified again in the child-mother booklet to ensure that they met the inclusion criteria. The mothers present were informed about the study's objectives and purpose, and those who agreed to participate were interviewed.

The researcher provided a questionnaire that collected demographic information as well as breastfeeding patterns. The weight of infants without clothing was measured using a calibrated weighing scale. The weight measurements were taken with a 0.1kg precision. The length was measured with a stadiometer, and the scale readings were taken with a precision of 0.5cm.

To ensure reliability and accuracy the anthropometric measurements were collected twice, and the average result used as the final measurement. The study was conducted in both hospitals until a sample size of 202 was obtained for analysis.

Data analysis: Data was cleaned and coded before being entered into SPSS, where it was further cleaned to remove outliers. Statistical Packages for Social Sciences (SPSS) version 25 was used to analyze the data.

Using WHO cut-offs, weight-for-length and weight-for-age z-scores, as well as length-for-age, were used to determine the nutrition status of the infants. ENA for SMART was used for the analysis. Data on nutrition status, breastfeeding practices, and socioeconomic characteristics of post-partum depressive mothers were described using descriptive statistics.

Breastfeeding practices were defined by whether or not the child is exclusively breastfeeding and whether or not complementary foods had been introduced. The Chi-square test was utilized to determine the relationship between categorical variables such as breastfeeding practices and infant nutrition status. Pearson correlations and logistical regression were used to investigate the relationship between

nutrition status, breastfeeding practices, and socioeconomic characteristics. Finally, was displayed in the form of tables and graphs

RESULT

Response rate: This section presents the study findings which are in line with the study objectives. A total of 202 mothers with post-partum depression aged between 17 to 44 were identified and interviewed. Out of those mothers 7 did not finish answering the questionnaire while 5 refused to participate. Therefore 190 mothers participated fully in the study. This accounted for 94% of the total sample size. Therefore the response rate was 94%.

Socio-demographic characteristics: The mean age of mothers was 27.28 (SD= 5.643) and the median was 26.38. The majority of the mothers were between the

ages of 20-29 by 59.6%. 78.9% of the respondents were married and a majority of the mothers (61.6%) were protestants while 53.7% reported having secondary education as their highest level of education. 73.7% of the respondents had an income of below Ksh. 20000 per month while 0.5% had an income of above Ksh.100000.45.8% of the mothers were housewives, 17.9% were employed,18.9% were doing business and 0.5% were students. When it comes to who is the sole provider in the household,71.1% of the mothers reported their partner to be the sole provider,5.3% said it was both her and her partner,13.7% said they were the sole provider while 0.5% and 1.6% responded that a sponsor and sister respectively were the sole provider. The mean number of children birthed by the women was 2.02(SD= 1.016) while mode and median were 1 and 2 respectively

Table1: Demographic characteristics of the mother

		Frequency (190)	Percentage
Age	10-19	13	6.8
	20-29	113	59.6
	30-39	61	32
	40-49	3	1.6
Religion	Catholic	62	32.6
	Protestant	117	61.6
	Muslim	8	4.2
	Others	3	1.6
Level of Education	Primary Education	44	23.2
	High School	91	47.9
	Tertiary Education	55	28.9
Household Level of Income	0 - 10000	58	30.5
	10001 – 20000	82	43.2
	20001 – 30000	30	15.8
	30001 – 40000	12	6.3
	40001 – 50000	7	3.7
	Above 50000	1	0.5
Employment Status	Employed	34	17.9
	Unemployed	32	16.8
	Business	36	18.9
	Housewife	87	45.8
	Others (student)	1	0.5
Sole Provider	Both of us	10	5.3
	Myself	26	13.7
	My parents	15	7.9
	My partner	135	71.1
	My sister	3	1.6
	Sponsors	1	0.5
Number of Children	1	72	37.9
	2	61	32.1
	3	44	23.2
	4	9	4.7
	5	3	1.6
	6	1	>0.5
Marital status	Single	36	18.9
	Married	150	78.9
	Partnered	1	0.5

	Separated	2	1.1
	Widowed	1	0.5

Infants' age and sex: A total of 190 infants were included in the study as illustrated in table 4.2. 45.8% of the infants were male while 54.2% were female. Most (42.1%) of the infants were aged 1-2 months and the

least (20.5%) were aged between 5-<6 months of age. The ratio between girls and boys was 0.8. The mean age was 14.23 weeks (SD=6.114).

Table 2: Distribution of age and sex of the infants.

AGE (mo)	Boys		Girls		Total		Ratio
	no.	%	no.	%	no.	%	Boy: girl
1-2	35	43.8	45	56.3	80	42.1	0.8
3-4	35	49.3	36	50.7	71	37.4	1.0
5- <6	17	43.6	22	56.4	39	20.5	0.8
Total	87	45.8	103	54.2	190	100.0	0.8

Characteristics of post-partum depression

53.2% of the mothers had no one to help them take care of the children and 41.1% felt like the social apathy from the family and partner was not enough. 84.7% of the mothers had not previously experienced any form of gender based violence while 19% of the mothers had experienced some form of

gender based violence with their current intimate partner. 6.3% of the mothers had a known family history of depression while 4.2% of the mothers had undergone some form of treatment for depression whether it's talking to a friend, pastor or a psychologist as demonstrated in figure 3 below.

Table 3: characteristics of post-partum depressed mothers.

		Frequency (190)	Percentage
Social apathy from family and partner enough?	Yes	112	58.9
	No	78	41.1
Assistance at home	House help	15	7.9
	Parents	14	7.4
	Myself	101	53.2
	Partner	34	17.9
	Relatives	7	3.6
	Siblings	19	10.0
History of gender based violence	Yes	11	6
	No	179	94
Gender base violence with current intimate partner	Yes	19	10
	No	171	90
Family history of depression	Yes	12	6.3
	No	178	93.7
Treatment of depression	Yes	12	4.2
	No	182	95.8

Breastfeeding practices of the infants

According to the study, 76.8% of the mothers were practicing exclusive breastfeeding while 23.2% had introduced other things to the infants apart from breast milk since the baby was born while 82.9% of the study participants were shown how to breastfeed when the baby was born while 17.1% were not. When it comes to milk production, 63.2% had the first milk production one day or less after the birth of

the infant, 22.6% after two days, 6.8% after 3 days and 7.4% after more than 4 days since the infant was born. 43.2% of the mothers-initiated breastfeeding less than 30 minutes after delivery, 20% within one hour and between one and two hours each, 7.4% after one day, 6.8% more than two days while 2.6% don't remember when it was but was certainly more than three days. This is illustrated in table 4.

Table 4: Breastfeeding practices of infants.

		Frequency (190)	Percentage
Exclusive breastfeeding	Yes	146	76.8
	No	44	23.2
Breastfeeding assistance	Yes	158	82.9
	No	32	17.1
Milk production	1 day or less	120	63.2
	2 days	43	22.6
	3 days	13	6.8
	More than 4 days	14	7.4
Initiation of breastfeeding	Less than 30 minutes	82	43.2
	Within 1hour	38	20
	1-2 hours	38	20
	1 day	14	7.4
	More than 2 days	13	6.8
	Don't remember	5	2.6

24-hour feeding chart: Out of the 190 infants assessed, 97.9% had taken breast milk during the last 24-hour period while none had been given sweet drinks or tea.4.7% had been given formula while 6.3% had baby cereal. 6.8% had cows'

milk,11.6% were given plain water, 2.1 had mushy food,2.6% had fruit juice and sugar water each while 14.7% had been given vitamins or medicine and 1.1% had ORS as illustrated in table 5.

Table 5: 24-hour feeding.

Type of Feed		Frequency (190)	Percentage
Breastmilk		186	97.9
Formula		9	4.7
Cow Milk		13	6.8
Sweet drinks		0	0
Vitamins, Medicine		28	14.7
Plain water		22	11.6
Fruit Juice		5	2.6
Tea or Infusions		0	0
Sugar water		5	2.6
Mushy or solid food		4	2.1
ORS		2	1.1
Baby cereal		12	6.3

Nutrition status of infants 6-23 weeks of age

Prevalence of global malnutrition was 14.2% with 10.3 % being boys and 17.5% being girls. A majority (85.8%) of the infants aged 6-23 weeks old were normal. Prevalence of moderate and severe malnutrition among infants aged 6-23 weeks months old were 7.4% and 6.8 % respectively. This study revealed that the prevalence of underweight among infants was 21.1 % with 21.8 %

being male and 20.4 % being female. The prevalence of moderate underweight and severe underweight was 6.8 % and 14.2 % respectively. The prevalence of stunting in infants was 20.0% with 20.7 % being male and 19.4 % being female. The prevalence of moderate and severe stunting was 6.8 % and 13.2 % respectively. Prevalence of overweight among the infants was 3.2 % with 3.4 % being male and 2.9 % being female while severe overweight was 0.5 %.

Table 6: Nutrition status of the infants

	All	Boys	Girls
	N = 190	N = 87	N = 103
Prevalence of wasting			
<-2 sd	(27) 14.2 %	(9) 10.3 %	(18) 17.5 %
>= -3and<-2 sd	(14) 7.4 %	(6) 6.9 %	(8) 7.8 %
<-3 sd	(13) 6.8 %	(3) 3.4 %	(10) 9.7 %
Prevalence of underweight			

<-2 sd	(40) 21.1 %	(19) 21.8 %	(21) 20.4 %
>= -3 and <-2 sd	(13) 6.8 %	(10) 11.5 %	(3) 2.9 %
<-3 sd	(27) 14.2 %	(9) 10.3 %	(18) 17.5 %
Prevalence of Stunting			
<-2 sd	(38) 20.0 %	(18) 20.7 %	(20) 19.4 %
<-2 sd and >=-3 sd	(13) 6.8 %	(6) 6.9 %	(7) 6.8 %
<-3 sd	(25) 13.2 %	(12) 13.8 %	(13) 12.6 %
Prevalence of overweight			
> 2 sd	(6) 3.2 %	(3) 3.4 %	(3) 2.9 %
> 3 sd	(1) 0.5 %	(1) 1.1 %	(0) 0.0 %

Association between breastfeeding practices, nutrition status of the infants and socio-demographic factors of postpartum depressed mothers.

Chi-square was used to determine the association between nutrition status and breastfeeding practices. Nutrition status was categorized into Normal, SAM, MAM, Overweight and Severe overweight while

breastfeeding practices were categorized into either yes to exclusive breastfeeding or no to exclusive breastfeeding. There was no significant relationship between breastfeeding practices and nutrition status. All these applied for weight for height, weight for age and height for age as illustrated in table 6.

Table 6: Association between breastfeeding practices and nutrition status.

Variables	Chi-square test	Cramer's V
Exclusive breastfeeding Vs.		
Weight for Length	$\chi^2(3, n=190) = 20.006^a, p = <0.01$	0.3
Weight for Age	$\chi^2(4, n=190) = 6.632^b, p = 0.157$	0.2
Length for Age	$\chi^2(4, n=190) = 5.794^a, p = 0.215$	0.2

Pearson correlation was further used to measure the strength and direction between different variables as illustrated in table 7. A strong, negative and significant correlation was found between age of the infant and Exclusive breastfeeding, $r = -0.341, n = 190, p < 0.01$. Income had a strong, positive and significant correlation with the level of education, $r = 0.253, n = 190, p < 0.05$.

Gender based violence with a current sexual partner had a strong, negative and significant correlation with the level of education, $r = -0.222, n = 190, p < 0.01$. Being assisted at home to take care of the household had a strong, positive and significant correlation with the level of education, $r = 0.211$ and income $r = 0.313$ at $p < 0.01$.

Table 7: Correlation

Variables	Pearson Correlation	P- value
EBF Vs. Age of infant	-0.341	< 0.01
Gender based violence with partner Vs. Income	-0.222	< 0.01
Income Vs. Education	0.253	< 0.05
Home assistance Vs. Education	0.211	< 0.01
Home assistance Vs. Income	0.313	< 0.01

Logistical regression was further conducted to determine whether social apathy, home assistance and gender-based violence with current partner could predict the likelihood that a mother will practice exclusive breastfeeding. The result is shown in table 8 below.

Table 8: Association between breastfeeding practices and socio-demographic factors

Variables	Standardized beta coefficient	P value
Social apathy and support	-0.040	0.910
Home assistance	-0.204	0.563
Gender based violence with current partner	-1.007	0.045

DISCUSSION

Socio-demographic characteristics

Most of the mothers who participated in the research (59.6%) were aged between 20-29 with a median age of 26.4; this indicates an increase in attending post-natal clinics among young mothers as well as receiving nutrition-related education (Table 1). This apparent positive influence on education is seen as majority of the mothers have at least secondary education. This idea is supported by a study conducted in Ethiopia to determine the knowledge, attitude and nutrition practice in public hospitals that found that mothers who had at least secondary education were 2.5 times more knowledgeable than those who did not while those who had attended college and above were 4.5 times more knowledgeable than those with only secondary education (Gezimu et al., 2022). There was also a significant correlation between the age of the mother and education level $r=1.53$, $p < 0.01$. This show that the higher the level of education then the older the mother is.

As discussed in the literature, socio-economic status may be a factor contributing to post-partum depression with mothers from lower socio-economic status having a high chance of developing post-Partum depression. This assumption was supported by the results which indicated that the majority (73.7%) of the respondents had an income of below Ksh. 20000 per month (Table 2). This assumption is in line with a study conducted in rural South Africa which found that women who lack sufficient socio-economic resources are extremely vulnerable to worsening post-partum mental health (Silverman et al., 2022) as well as a study conducted in Ethiopia that found 72.3% of the respondents who had post-partum depression were from low socio-economic status (Toru et al., 2018).

The results from this study also indicated that the higher the level of education among the women then the higher the income level. More than half of the mothers (53.2%) had no one to assist them with the baby and household chores while 41.1% felt like

social apathy and support from their partner and family was not enough (Table 2). This could explain why these mothers had postpartum depression because literature suggests that lack of social support from family, previous history of depression and intimate partner violence have a high odds of developing post-partum depression (Dadi et al., 2020). A systematic review on the epidemiology of post-partum depression in Ethiopia showed that marital problems and lack of support with the household chores as well as the new born baby were associated with increased odds of developing post-partum depression (Duko et al., 2020). The study also showed a significant correlation between both previous sexual or physical violence history and sexual or physical violence with a current intimate partner with the level of education (Table 7). This results is in line with the results of a study conducted in rural Ethiopia that found previous physical violence or physical and sexual violence from intimate partner was associated with development of post-partum depression (Azale et al., 2018; Bitew et al., 2019). The more educated the women are the lesser chances of undergoing sexual or physical violence (Loembe, 2020; Bonnes, 2016). The study further revealed that the more educated a mother is the more likely they will have home assistance in taking care of the infant. All these can be explained by the fact that if one is educated, then they are likely to also have a spouse who is educated and literature suggest that level of education reduces the likelihood of engaging in intimate partner violence. When one is educated then she will likely look for work that will increase the level of income. Those who go out for work will need someone to take care of the child while they are at work.

Breastfeeding practices of the infants 6-23 weeks

Results from the study show almost all mothers were breastfeeding their baby. The rate of exclusive breastfeeding was 76.8% which is higher than the national rate of

61% (KDHS, 2022) yet lower than the WHO target of 90% (WHO, 2010). This number may be high because majority of the infants in this study were below 4 months of age with 42% being less than 14 weeks old. This idea is supported by a pooled analysis of population based survey in Ghana from 2003-2017, which found that children 0-3 months were exclusively breastfed while those between 4-5 months breastfeeding pattern included addition of water and puree (Mohammed et al., 2022). This result however, is not in agreement with a study done among Maasai community in Kenya which found that Infants at the age of 2 weeks are given fatty concoction which is laced with ghee (Chege et al., 2015). Another reason for high rate of exclusive breastfeeding might be social desirability bias whereby mothers might know what the correct or preferred answer should be because of attending antenatal and post-natal clinics and that is what they answered. Only 2.1% of the mothers had completely stopped breastfeeding their babies with claims that they didn't have breast milk and had busy daily schedule. This number represented infants who were at least 4 months of age. The cessation of breastfeeding might just be a perception that there is reduced milk or the breast milk is not enough to satisfy the baby and not necessarily reduced breast milk production (Rahman et al., 2016). This result is supported by a study conducted among Maasai women on their perception of breastfeeding and infant nutrition whereby the women perceived that breast milk alone was not sufficient to meet the nutritional needs of the infants (Dietrich Leurer et al., 2019). The majority of the mothers initiated breastfeeding within the first one hour which is recommended by WHO (World Health Organization, 2018.) because it stimulates the production of prolactin, which helps in milk production as well as oxytocin which facilitates ejection of milk (KDHS,2014.). This study is in agreement with a study conducted in Rwanda whereby 87% of the mothers initiated breastfeeding

within the first one hour after giving birth (Ahishakiye et al., 2020). The early initiation of milk might be the reason why 63.2% of the mothers started producing milk less than one day after delivery.

Nutrition status of the infants

Adequate nutrition is required for optimum growth and development of children. Without the proper nutrition, children may experience growth faltering experiences including poor physical and cognitive development. The present study found that the prevalence rate of stunting among infants was high at 20%. This rate is almost equal to the national stunting rate among children under five years of age which stands at 26% (KDHS, 2014.). The high stunting rate may be attributed to maternal nutrition during pregnancy as well as while breastfeeding.

When it comes to weight for length Z-score which is a measure of wasting, the prevalence rate was high at 14.2%. This is considerably lower than the rate of wasting in Africa of 33% as well as a study conducted in Burkina Faso which reviewed data of infants attending child welfare clinic found the wasting rate to be 30% among infants (M. Mwangome et al., 2019).

The prevalence rate of underweight was equally high at 21.1% and this is higher as opposed to the national level of 11%. Both wasting and underweight are of high public health significance while stunting was of medium public health significance according to WHO (World Health Organization, n.d.). The rate of stunting, wasting and underweight were high among these children as opposed to the national rates. This supports the results found in other studies which suggest PPD negatively affects the nutrition status of infants (Dadi et al., 2022; Farías-Antúnez et al., 2018).

Association between breastfeeding practices, nutrition status and socio-demographic factors.

The results from the study show that 76.8% of the mothers were exclusively

breastfeeding and because all mothers in this study had post-partum depression, this number would be way less if maternal mental health had a negative impact on exclusive breastfeeding. The number is way higher than the breastfeeding rate in the country. This refutes the report from (Alimi et al., 2022), and (Jalal et al., 2017) that found an association between breastfeeding practices and maternal mental health. The study is also in agreement with other studies whose results show no association between exclusive breastfeeding practices and mothers mental health to children below 6 months of age (Wemakor & Iddrisu, 2018; Woldeyohannes et al., 2021).

A strong, negative and significant correlation was found between the age of the infant and exclusive breastfeeding, $r = -0.341$, $p < 0.01$. This shows that as the age of the infant increases the less likely the mother practices exclusive breastfeeding. This can explain why some mothers started introducing other feeds including cow's milk, solid feeds and fruit juice. This shows early cessation of exclusive breastfeeding which is in agreement with other studies that suggest the same among postpartum depressed mothers (Sha et al., 2019; Dagla et al., 2021).

The study also found that there was no significant relationship between breastfeeding practices and the nutrition status of the infants. This applied to weight for height, weight for age and height for age of the infants as illustrated in table 6. This result may be because the majority of the infants were below 14 weeks old and also the fact that they were attending post-natal clinics where they receive regular nutrition education. Another reason might be that the indicators for measuring nutrition status are more pronounced in children above 6 months of age. For those below 6 months of age, the trend of weight gain is more likely to be used because infants are expected to at least double their birth weight by the time they reach 6 months of age. The study also found an association between weight for age and education level.

Social apathy and having home assistance had a beta coefficient of -0.040 and -0.214 respectively indicating a small negative relationship with whether a mother will practice exclusive breastfeeding. However, p value of 0.910 and 0.563 for both respectively were not statistically significant. This shows that they are not significant predictors of whether a mother will practice exclusive breastfeeding. The results from this study contradict with other studies conducted in Bangladesh and Turkey that found a significant association between exclusive breastfeeding with social apathy and home assistance (M. J. Islam et al., 2021; Mercan & Tari Selcuk, 2021). This result can be because majority of the infants were below 14 weeks of age and also majority of the mothers were not breadwinners of the family. Another reason could be because of the increased education on the importance of exclusive breastfeeding in hospitals where almost all the mothers were taught after delivering and during their antenatal and post-natal clinic visits.

The study further shows that an increase in gender-based violence by one unit is associated with decrease in exclusive breastfeeding practices. P value of 0.045 indicates that it is statistically significant. This means that the association is unlikely due to chance. Therefore, mothers who experience gender-based violence with their current partner are less likely to practice exclusive breastfeeding. This result is in agreement a systematic review conducted by (Mohammed et al., 2023) and (Normann et al., 2020) that showed that women who experience gender based violence with their intimate partner did not practice exclusive. This results contradicts that of a study done in Sweden that that women who reported gender base violence exclusively breastfed their infant to a higher extent than those who did not report on violence history (Finnbogadóttir & Thies-Lagergren, 2017).

CONCLUSION

The study concludes that post-partum depression is high among mothers of ages 20-29, those who are married and from low socio-economic background.

The rate of exclusive breastfeeding was high and the more the age of the infant the less likely the mother will practice exclusive breastfeeding.

The rate of stunting, wasting and underweight were high among the infants.

The study found no association between exclusive breastfeeding and nutrition status of the infants.

The study found no association between post-partum depression and breastfeeding practice of the infant as all the mothers had post-partum depression.

Declaration by Authors

Ethical Approval: Approved by Kenyatta University Ethical Review Committee approval number PKU/2221/1165. Research permit was obtained from National Council of Science, Technology and Innovation (NACOSTI) Reference number NACOSTI/P/21/9470 as well as permission from the heads of the mother and child clinics at each of the hospitals. Informed written, signed, or thumb-printed consent was obtained, and data confidentiality was ensured by employing codes rather than names. Respondents volunteered to take part in the study. Infants with poor nutritional status were referred to the nutrition clinic, while mothers suffering from postpartum depression were referred to the psychology clinic for a psychological assessment, care, and treatment.

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