Prevalence of Maternal Depression in Mothers of Children Below 5 Years, and Associated Factors in Nairobi County, Kenya

Molline Timbwa[1,3*], Lucy Njiru[1], and Peninah Masibo[1,2]

[1]Amref International University, Kenya; [2]Global Programs for Research and Training, Affiliate of the University of California San Francisco, and [3]KEMRI/Wellcome Trust Research Programme, Nairobi, Kenya

***Corresponding author:** Molline Timbwa: Email address: timbwa.molline276@gmail.com

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Abstract

BACKGROUND

Maternal depression significantly contributes to global mental disorders and disease-related disability in women of reproductive age, predominantly in developing nations, causing detrimental effects on families. We sought to determine the prevalence of maternal depression in women with children younger than 5 years and its contributing factors.

METHODOLOGY

We conducted a cross-sectional study from 24th April to 5th May 2023, among 354 women who had children below 5 years in Kianda village, Kibra informal settlements in Nairobi County. We used the Patient Health Questionnaire-9 to measure maternal depression. Using the Household Food Insecurity Access Scale and structured questionnaires we gathered the participants' food security status and sociodemographic information, respectively. We measured the participants' weight and height to determine their nutritional status. We used descriptive and inferential statistics to calculate the prevalence of depression and identify associated factors.

RESULTS

The prevalence of maternal depression was 30.7%. Underweight mothers were 11 times more likely to suffer depression than those with normal weight (p=0.004). Lower education predisposed mothers to depression by 58% more than higher education (p = 0.043). Fulltime housewives were twice as likely to have depression than those with an occupation (p=0.038). Households with moderate food insecurity were 23% more likely to have depressed mothers compared to households with food security (p < 0.001).

CONCLUSION

Maternal depression was prevalent in Kianda village, Kibra informal settlement. Maternal depression was linked to underweight, low educational attainment, full-time housewifery, and food insecurity. Maternal depression screening in the community, along with referrals as needed, can benefit women's mental health. Furthermore, focused interventions to improve undernutrition, socioeconomic disparities, and household food security could significantly reduce maternal depression.

Keywords: *Maternal Depression, Associated Factors, Disease-Related Disability.*

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Introduction

According to the World Health Organization (WHO), depression is among the main reasons for disability globally and affects more females than males (1). The term maternal depression (MD) refers to a wide range of depressive symptoms that often affect females during their childbearing period (2). Recent data shows that depression may persist beyond a year after childbirth, despite being known to affect women during pregnancy and up to a year post-delivery (3-5).

Earlier studies on maternal depression reveal a global prevalence of 10–20% in the first year following childbirth (6-7). The prevalence of MD varies significantly across regions, nations, and localities, influenced by factors such as socioeconomic status, population studied, and screening tools used (5). A review of 191 studies across forty-two nations showed varying prevalences of MD: 1.9–82.1% in low and middle-income countries (LMICs), and 5.2–74.0% in high-income countries (HICs) (8).

Mothers of infants below 12 months had a 57.1% prevalence of depression, in a multi-center study conducted in South Africa (SA) (9). On the contrary, in KwaZulu-Natal, ZA, the MD prevalence was 8.8% in postpartum adolescents (10). In Ghana, MD prevalence was 7% in women aged 18–51 years (11), while in cross-sectional studies in Southeast Nigeria and Southwest Ethiopia, the rates were 33.3% and 33.8%, respectively (12–13). In two public hospitals in Nairobi, MD prevalence was 18.7% at 6–10 weeks post-delivery (14). Moreover, a survey in Kariobangi North Health Center reported MD rates of 13.0% at 6–14 weeks post-delivery (15). Most recently, a cross-sectional survey in two informal settlements in Nairobi showed an MD prevalence of 27.1% (16).

Past research shows that women who experienced financial hardship and stressful situations were predisposed to MD (5, 14, 17). Additionally, a study in Nairobi informal settlements found that low education, younger age, and negative body image were strongly associated with MD (16).

Most LMICs lack data on MD beyond 12 months of childbirth, leading to a lack of priority for maternal mental health (18-19). We investigated the prevalence of MD among mothers of children under five years in Kianda village, in Kibra informal settlement, Nairobi County. We additionally explored the socio-economic factors associated with MD.

Methodology

Study design

We used a cross-sectional analytical design, which, due to its observational nature, enabled us to measure outcome and exposure variables at a single point in time (20). We then used the obtained data to extrapolate factors related to maternal depression, providing essential information to support further research on this topic.

Study settings

We conducted the study in Kianda village, located in the Kibra informal settlement of Nairobi County. With an estimated 283,024 residents as of 2020, Kibra is Africa's largest informal urban settlement situated in Kenya's Capital, Nairobi (21-22).

Kibra consists of 13 geographic sub-locations that vary widely in socioeconomic aspects such as population density, infrastructure, income, and ethnic composition (21, 23–25). However, past surveys indicate that Kianda and Soweto West, two of these sublocations, share similar rates of poverty and population density (22). Kianda village, located on Kibra’s far west side, is home to approximately 15,219 multi-ethnic residents (26).

Study participants

We included women aged between15 and 49 with children younger than five years residing in Kianda village, in Kibra Nairobi. We excluded pregnant women due to potential physiological changes that could independently impact mental health (27) and mothers with known psychotic illnesses and hearing problems.

Sample size determination

Using Cochran’s formula, n=z (pq)/d (28), we calculated a sample size of 354, based on a similar study conducted in Nairobi, Kenya, that reported a 27.1% maternal depression prevalence rate(16). In this case, n was the intended sample size, z was the standard deviation, normally set at 1.96, p was the predicted prevalence of MD

(27.1%), d was the 95% CI margin of precision of 0.05, and q was 1-p.

Using the formula n = 1.96 x 1.96 (0.271 x 0.730) / 0.05x0.05, we got a total of 302, and 354 when adjusted for attrition.

Sampling technique

We employed the multistage sampling technique. In stage one, we purposively chose Nairobi County, focusing on the Kibra informal area in Kenya. Recognizing socioeconomic diversity across Kibra's 13 villages, we selected similar sublocations in stage two, including the most populous and impoverished areas, Kianda and Soweto West (22). In stage three, we flipped a coin, which landed on Kianda Village. Community health promoters provided a list of 3,200 mothers from Kianda (ages 15–49) with children under five, which formed the sample frame. We used the systemic sampling method with a sampling interval of 9 (3,200/354=9) (29). Using the lottery technique, we randomly selected a starting point and then chose every 9th woman until we achieved the required sample.

Study instruments

We used a structured socio-demographic questionnaire to gather information on age, marital status, education, occupation, and household earnings per month. To measure household food security we used the HFIAS. Developed by the Food and Nutrition Technical Assistance II project (FANTA) in 2006, the HFIAS uses experience-based pointers to measure the occurrence and frequency-of-occurrence of food insecurity indicators (30). The nine-item questionnaire comprised a scale of 0 to 3, where 3 indicated the most frequent occurrence of unstable food situations in households. Higher overall scores (ranging from 0 to 27) indicated greater levels of household food insecurity (30). The HFIAS has shown reliability and validity in numerous studies (30-32).

To measure maternal depression, we used the PHQ-9, developed by Drs. Kroenke, Spitzer, and Williams in 1999 to detect and gauge depression severity (33). The tool has demonstrated strong test-retest dependability, and excellent internal stability in various studies (33-34). The PHQ-9 uses a 4-point Likert scale to score depressive symptoms in the preceding 14 days. Zero,1,2 and 3 represent "no symptoms," "several days," "more than half the days," and "nearly every day," respectively. The total scores range from 0 to 27, with higher scores indicating more severe depression. A score of ≥10 signifies 88% sensitivity and specificity (35).

Using a calibrated digital scale and portable stadiometer, we measured weight and height to the nearest 0.1 kg and 0.1 cm, respectively (36). We calculated Body Mass Index (BMI) from height and weight, then classified participants as underweight, normal, overweight, or obese according to WHO nutritional status categories (37).

Data collection

We collected data from 24th April to 5th May 2023. Following their consent, we conducted in-person interviews at their households. We filled out the sociodemographic questionnaire, followed by the HFIAS. We categorised participants into 4 groups: food secure, mild, moderate, and severe food insecurity, based on their total scores. Mothers then completed the PHQ-9 in either Kiswahili or English, based on their preferred language. We clarified any challenging statements when needed. With scores of 0–4, 5–9, 10–14, and 20–27, we classified participants into four groups: minimal, mild, moderate, and severe depression**,** respectively**.** A PHQ-9 score above 9 indicated depression. Finally, we took anthropometric measurements and calculated BMI using each participant's weight and height.

Ethical considerations

AMREF Ethics and Scientific Review Committee (ESRC) approved this study, and we obtained research permits from the National Commission for Science, Technology, and Innovation (NACOSTI) and Nairobi County

Health Services. We conducted the study in alignment with the International Committee on Harmonization of Good Clinical Practice (ICH-GCP) principles. we engaged independent witnesses to support illiterate mothers and participants provided thumbprints on the consent forms.

Data management and statistical analyses

We analyzed the data using R software, version 4.3.2 (38). We computed descriptive statistics as frequencies and percentages for categorical variables and used means and standard deviations to describe continuous variables. To identify factors associated with maternal depression, we calculated adjusted odds ratios through logistic regression, applying a 95% confidence interval and a statistical significance level of 0.05.

Results

Socio-demographic and economic characteristics

We excluded two out of 354 respondents because their ages did not match the cutoff. Over half (57.4%) of mothers were aged 20-29 years, 51.1% reported having partial or complete secondary education, and 70.8% were married. Only 4.5% had a monthly income exceeding Kenya Shillings (Kes.) 20,000, while 41.1% had a household income of Kes. 5000 or less.

Table 1:
Socio-Demographic and Economic Characteristics for the Study Respondents (N = 352)

Variable	Category	n	%
Child Age Group	0-12 months	111	31.5
	>12-24 months	91	25.9
	>24-36 months	69	19.6
	>36-48 months	48	13.6
	>48-60 months	33	9.4
Sex	Male	179	50.9
	Female	173	49.1
Maternal Age Category	<20 years	17	4.8
	20-29 years	202	57.4
	30-39 years	119	33.8
	≥40 years	14	4.0
Marital Status	Single	102	29.0
	Married	250	71.0
Mother's Education	None	3	0.9
	Primary	119	33.8
	Secondary	180	51.1
	Tertiary	50	14.2
Mother's Occupation	Full-time housewives	159	45.2
	Domestic/casual labourers	82	23.3
	Business/Trader	90	25.6
	Private/Public employed	21	6.0
HH Income (Kes.)	0-5000	141	40.1
	5001-10000	104	29.6
	10001-15000	64	18.2
	15001-20000	27	7.7
	>20000	16	4.6
HH Food Security	Food secure	10	2.8
	Mild insecurity	13	3.7
	Moderate insecurity	82	23.3
	Severely insecurity	249	70.2
Total N = 352, HH= household, Kes. = Kenya shillings			

More than 45 % were full-time housewives, and two-thirds (70.2%) experienced severe food insecurity. Table 1.

Nutritional status of study participants

Based on the WHO Body Mass Index cut-off points, 39% of the mothers were overweight,18 % obese, and 4% were under-nourished. Figure 1.

Severity of maternal depression

On the severity of maternal depresssion using PH-Q-9 scores, approximately 24% of the mothers had none-minimal depression; 45% experienced mild depression, and 20% exhibited moderate depression. A total of 10.2% of the participants had severe depression. Table 2.

Prevalence of maternal depression

Thirty-one percent of the mothers had depression (PHQ-9 scores of >9), while 69% had no depression, according to the criteria established by Kroenke et al. (2001). Figure 2.

Predictors of maternal depression

Underweight mothers were 11 times more likely to suffer depression than those with normal nutritional status (AOR 11.14, CI 3.13, 46.93, p = 0.004). Additionally, mothers with secondary and tertiary education were 42% less likely to have depression compared to those with primary education and below (AOR 0.58, CI, 0.34, 0.98, p = 0.043). Housewives were twice as likely to have depression than those employed or in business (AOR 1.86, CI 1.04–3.38, p = 0.038). Households with mild and moderate food insecurity were 9% and 23% more likely to have depressed mothers compared to food-secure households (AOR 0.09, CI 0.03–0.23, p < 0.001) and AOR 0.231, CI 0.13-0.43, p < 0.001, respectively. Table 3.

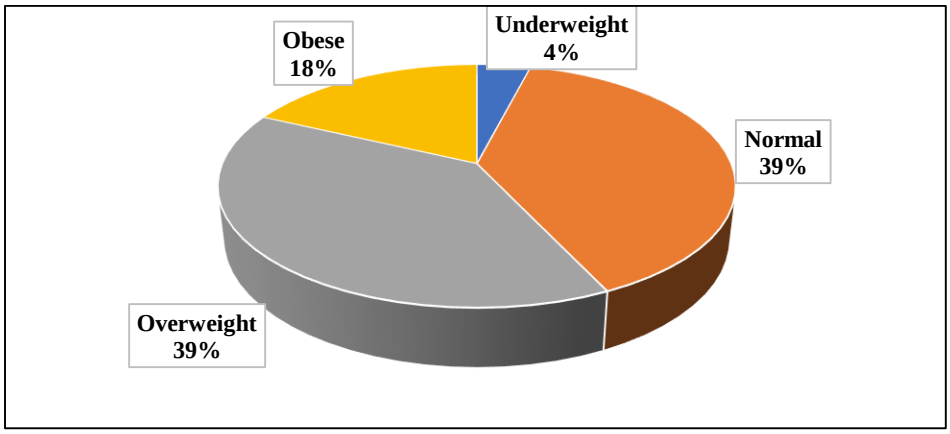

Figure 1:
Nutritional Status of study participants

Table 2:
PHQ-9 Scoring and Maternal Depression Status for the Study Respondents (N=352)

Maternal Depression (MD)	Maternal Depression (PHQ-9 scores)	n	%
	None-minimal (≤ 4)	84	23.9
	Mild (5-9)	160	45.5
	Moderate (10-14)	72	20.5
	Moderately severe (15-19)	32	9.1
	Severe (20-27)	4	1.1
	Total	352	100

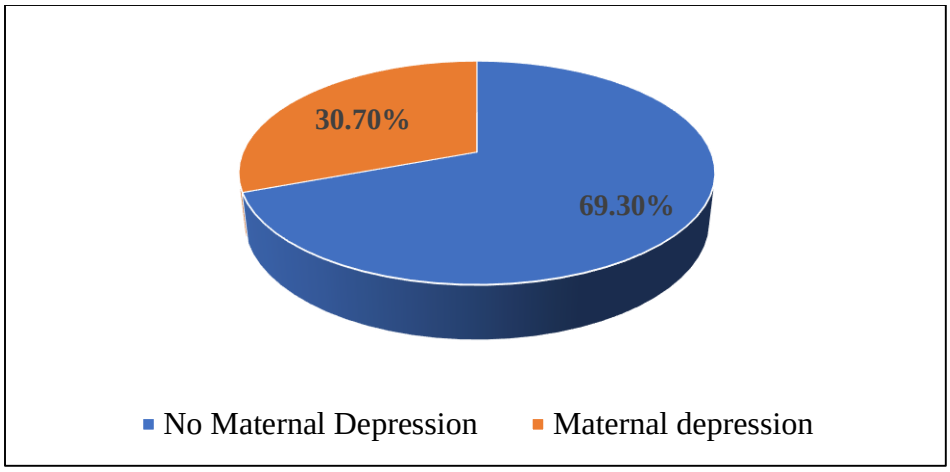

Figure 2:
Prevalence of Maternal Depression among Study Participants

Table 3:
Predictors of Maternal Depression (N =352)

Predictors	Category	AOR (95% CI)	p-value
Child age (months)	0-12 months	Ref.	
	>12-24 months	1.59 (0.83, 3.08)	0.163
	>24-36 months	1.38 (0.83, 3.08)	0.366
	>36-48 months	1.50 (0.68, 3.28)	0.308
	>48-60 months	1.68 (0.67, 4.13)	0.257
Child sex	Female	Ref.	
	Male	1.35 (0.83, 2.21)	0.226
Mother's Age Group	15-29 years	Ref.	
	>30-49 years	1.56(0.92, 2.66)	0.099
Mother's BMI	Normal	Ref.	
	Underweight	11.14 (3.13, 46.93)	*0.004
	Overweight+ obesity	1.25 (0.74, 2.13)	0.404
Marital status	Married	Ref.	
	Single	1.62 (0.90, 2.91)	0.105
Mother's education	No formal education + primary	Ref.	
	Secondary + tertiary	0.58 (0.34, 0.98)	*0.043
Occupation	Business/Employed	Ref.	
	Full-time housewife	1.86 (1.04, 3.38)	*0.038
	Casual labourers	1.00 (0.50, 2.00)	0.993
HH income (in Kes)	>15000	Ref.	
	0-5000	1.13 (0.47, 2.90)	0.789
	5001-15000	1.71 (0.75, 4.22)	0.221
Food security	Food secure	Ref.	
	Mildly insecure	0.088 (0.03, 0.23)	*p=0.000
	Moderately insecure	0.231 (0.13, 0.43)	*p=0.000
	Severely insecure	1	

Note. Ref.=reference, BMI= Body Mass Index, AOR = Adjusted Odds Ratio; 95% CI = Confidence Interval; p <0.05 was significant.

Discussion

The study revealed that 30.7% of participants had maternal depression (MD). However, studies in similar populations in Nairobi informal settlements have reported lower rates. For instance, mothers from two informal settlements visiting Riruta and Langata mother and child health (MCH) clinics had an MD prevalence of 27.1% (16).

Elsewhere, in two public MCH clinics in Nairobi, the rates were 18.7% in postnatal mothers at 6–10 weeks post-delivery (1). Additionally, in postnatal mothers at 6–14 weeks, post-delivery visiting Kariobangi North Health Centre, MD prevalence was 13.0% (2). The higher rates in the present study may partly be explained by the inclusion of mothers who were more than a year postpartum. The current study revealed that mothers of children older than one year accounted for over 70% of the depressed participants.

Globally, higher rates of maternal depression have been reported in rural Bangladesh 51.7% (39), India 52% (3), two South African studies, 57.14% and 38.8% (9, 40), and Nigeria 35.6% (41). Conversely, lower rates have been documented in European nations 8% (6), Italy 9.9% (42) Middle East nations 26% (6), Ethiopia, 22.8% (43), and Ghana, 27.8% (44). This study identified low education levels, maternal undernutrition, full-time housewifery, and severe food insecurity as predictors of MD.

Regarding education levels, the findings from this study support previous research from Kenya and Japan that revealed a link between maternal depression and low education (16, 45). These results could be explained by how low education may lead to reduced socioeconomic opportunities, which can increase stress levels (45). Additionally, limited education may negatively affect one's problem-solving skills leading to reduced life coping mechanisms (46). Nevertheless, a recent study in Sudan showed no correlation between low education and MD (47).

The result from this study are consistent with a meta-analysis of Western studies that found maternal undernutrition was a predictor of MD (48). An underweight woman may experience low self-esteem and depression because of being dissatisfied with her body image (16). However, a meta-analysis of other global studies on MD and an Italian study revealed that maternal overnutrition was a more potent predictor of MD than undernutrition (49-50). In Spain, a prospective cohort study revealed that both obese and underweight women had high rates of depression (51).

Consistent with our study, past studies from Türkiye, Malaysia, and Nigeria, showed a link between MD and being a full-time wife (53-55). A probable explanation for this finding is that stay-at-home mothers may experience burnout and stress due to the frequent household chores they undertake (53). Additionally, fewer social interactions and support may cause a feeling of seclusion (56-57).

Furthermore, there was a link between maternal depression and food insecurity in these study's findings which is consistent with research conducted in America (58), Ethiopia (59), Malawi (60) and Kenya (61). About 70% of the respondents in the present study reported severe food insecurity. A possible explanation for this finding is that food insecurity can cause constant worry and anxiety about supporting the family (61).

Our study indicates that maternal depression can occur up to five years after childbirth, rather than just within the first twelve months (40–44). Targeted interventions, such as community-based screening and risk stratification for MD can improve women's mental health.

Strengths and Limitations

This research was pertinent to global public health due to the rising prevalence of depression and its effects on families. Unlike conventional studies that evaluate maternal

depression during pregnancy and the first year post-delivery, this study was distinctive as it encompasses a 5-year postpartum period. However, the cross-sectional design employed limited the capacity to prove causation. Future prospective cohort studies to determine the actual incidence of MD and to confirm the temporal link between exposures and MD should be carried out.

Conclusion

Maternal depression was prevalent in Kianda village, one of the sublocations within the Kibra informal settlement. Maternal underweight, low education level, full-time housewifery, and food insecurity were associated with maternal depression.

Recommendations

The study supports the creation of community support groups that offer peer assistance with mental health issues. These groups can serve as first-line resources for identifying and referring depressed women, as well as forums for talking about depression coping techniques.

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Author contacts

- MT - timbwa.molline276@gmail.com
- LN - lucynjiru8@gmail.com
- PM - peninahmasibo@gmail.com

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Data availability. The study's data can be made available by the author upon request.

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