


Exploring the influence of postnatal depression on neonatal care practices among mothers in Western Kenya: A qualitative study

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Abstract

Background: Postnatal depression (PND) is associated with adverse infant neurodevelopmental outcomes. Evidence is limited on how PND influences neonatal (<28 days old) outcomes in low- and middle-income countries, such as Kenya, which bear the global burden of neonatal morbidity and mortality.

Objectives: To explore how PND influences neonatal feeding and care practices among women in the early postnatal period in rural Western Kenya.

Design: A cross-sectional study.

Methods: Semi-structured interviews were conducted at 2-weeks postpartum among mothers of newborn infants identified <72 h old from the postnatal wards and clinics across five health facilities in Kisumu County of Western Kenya. They were all screened for features suggestive of postnatal depression using the Edinburgh Postnatal Depression Scale.

Results: Twenty-four mothers were interviewed, 13 of whom had features suggestive of PND. All mothers experienced health or socio-economic adversities in the perinatal period, including traumatic deliveries, financial constraints, and challenging relationships with partners/other family members. Feeding difficulties due to perceived insufficient breastmilk were a particular challenge for mothers with features of PND, who were more likely to introduce complementary feeds. Maternal health-seeking decisions were influenced by high financial cost, long waiting times and poor interactions with health care providers that induced stress and fear among mothers. Maternal caregiving capacity was influenced by her ability to juggle other household duties, which was difficult for mothers with features suggestive of PND. Support from friends and relatives positively impacted maternal mood and caregiving ability.

Conclusion: Mothers experienced many stress-inducing events in the perinatal period which potentially exacerbated features of PND in the immediate postnatal period. Women with features of PND were particularly vulnerable to these stressors that influenced infant caregiving practices. Addressing the socio-economic challenges and health system gaps that include scale up of compassionate and respectful care for women during pregnancy and childbirth, as well as early screening and intervention of PND, through enhanced referral pathways between health facilities and community support structures, could mitigate against the impact of PND on neonatal caregiving.

Keywords

care practices, feeding, Kenya, neonates, postnatal depression

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Introduction

Postnatal depression (PND) is the most common complication of childbearing occurring in up to 20% of mothers worldwide.¹ The prevalence is twice as high in low- and middle-income countries (LMICs) (20%) compared to high-income countries (HICs) (10%).² It is a significant contributor to maternal morbidity and mortality in LMICs, such as Kenya and is associated with adverse health and growth outcomes in infants.^{3–9} While psychological interventions, such as cognitive behavioural therapy, have been shown to be effective in managing PND in HICs, these are rarely prioritized in LMICs, due to the focus on addressing acute physical causes of maternal mortality in the postnatal period, such as postpartum haemorrhage.¹⁰ Therefore, healthcare services in LMICs are often ill-equipped to identify and manage mothers with PND.

While the prevalence of PND is estimated at 18% in Nairobi,³ where the majority of research is focused, recent observational research from Kenya suggests that the prevalence of PND may be higher among adolescent mothers (58%)¹¹ or those with acutely malnourished (64%)⁴ and preterm infants (44%).^{12,13} Previous quantitative studies in Kenya have shown that PND may negatively impact infant growth, nutrition and development,^{3,4,12,14} but none of the studies use qualitative methods to explore in-depth how PND influences maternal infant care practices, particularly in the neonatal (<28 days of life) period where the infant is most vulnerable and essential feeding and care practices are established.¹⁵ Two weeks is a critical time for assessing infant progress post-discharge, since low birth weight (LBW, <2500g) infants are expected to have regained weight at this point, which coincides with recommended postnatal follow-up visits and maternal well-being checks.¹⁶ Identifying the key caregiving challenges from the mother's perspective is crucial in the design and implementation of targeted interventions. In addition, the majority of previous studies in Kenya were conducted in urban settings,^{3,4,12,14} whereas there is a need to explore the impact of PND in rural communities where mothers face different socio-economic pressures and healthcare quality and access is often poorer.¹⁷

Aim

This study aimed to explore how PND influences neonatal care and feeding practices among mothers and their infants in urban and rural communities in Kisumu County of Western Kenya.

Objectives

1. To identify key caregiving challenges for mothers with and without features of PND in the neonatal period.
2. To understand mitigating factors against the effects of PND on maternal caregiving in the neonatal period.

Methods

Study design

This was a mixed-methods study in which we collected both qualitative and quantitative data (baseline and 2-week postnatal questionnaire). In this article, we present the findings of the qualitative component of the study in which we conducted semi-structured interviews at 2-week postpartum, among mothers of newborn infants who were identified <72 h after the birth of their infants. This enabled us to gain an in-depth understanding of the challenges that mothers with features of PND experience with neonatal care and feeding practices in the immediate postnatal period and post-discharge from hospital. At baseline, the mothers were screened for features suggestive of PND using the Edinburgh Postnatal Depression Scale (EPDS).¹⁸ This is a 10-item self-reporting questionnaire assessing recent emotional experiences using a numerical scale that has been validated for use in Kenya and has been translated to the national language Kiswahili.^{19,20} An EPDS score ≥ 12 suggests that the woman has features of PND that is not diagnostic but enables women to be referred to clinical teams for further assessment. Mothers who scored ≤ 11 were considered 'healthy' for the purposes of this study.

Study setting

The study was conducted in hospitals in Kisumu County in Western Kenya and their catchment areas. These included four level 3 or 4 County hospitals (Chulaimbo, Ahero, Rabuor and Kombewa) and one level 5 hospital (Kisumu County Referral Hospital). These hospitals were part of an existing collaborative research platform for maternal health between the Kisumu County Government, the Kenya Medical Research Institute – Centre for Global Health Research (KEMRI-CGHR) and the Liverpool School of Tropical Medicine (LSTM). The lake-region residents are predominantly of the Luo ethnic group, whose common livelihoods include agriculture, fishing and microenterprise with both rural and urban communities.²¹ Over 60% of the households in Kisumu are estimated to live below the poverty line. Both infant and maternal mortality rates are significantly higher in Kisumu (54 per 1000 live births and 495 per 100,000 live births, respectively)²² than Kenyan national averages (31 per 1000 live births and 342 per 100,000 live births, respectively)²³ and Kisumu has the highest rate of teenage pregnancies in Kenya at 22%.²⁴

We developed the Conceptual Framework in Figure 1 to guide our data collection and analysis on how maternal PND could influence neonatal care and feeding practices.

Study population, sampling and sample size

Baseline screening. We used convenience sampling²⁵ to identify mothers from postnatal wards and clinics in the

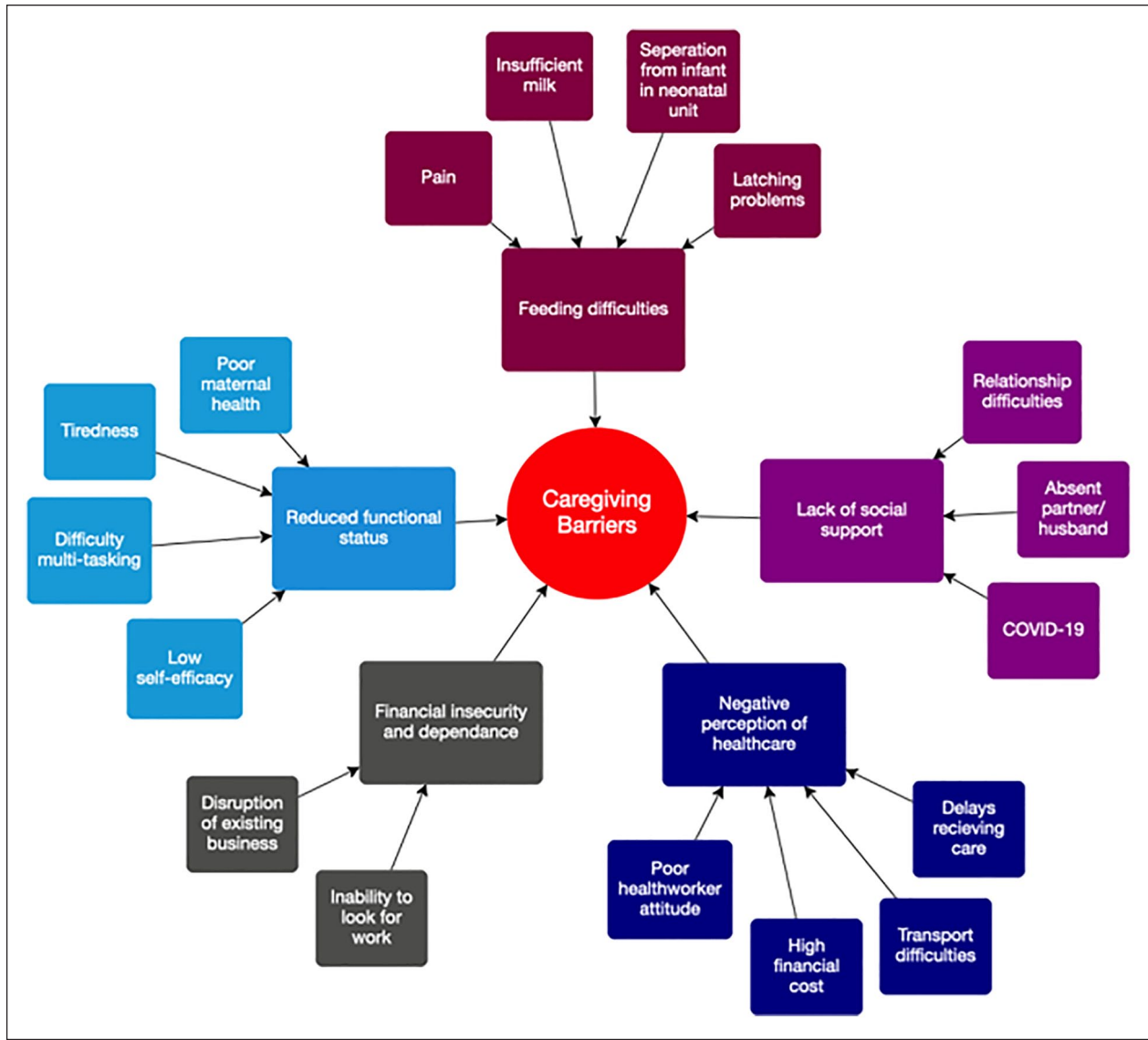


Figure 1. Conceptual framework of caregiving barriers.

relevant health facilities, ensuring home deliveries were captured, so that, the experiences of mothers in rural areas could be understood. All mothers with a live birth within 72 h who gave informed consent were recruited by trained study staff. Mothers who had a still birth, refused follow-up interviews or resided outside of Kisumu County were excluded. Study enrolment was voluntary, and participants were reimbursed for travel expenses according to the KEMRI-CGHR procedures. The screening of 150 mothers was based on the estimated prevalence of PND in Kenya of 18%³ and the combined number of deliveries across study sites. There was no formal sample size calculation since this was an exploratory study to generate a sampling framework for the qualitative data collection and provide preliminary data to explore the burden of PND rather than testing a specific hypothesis.

Semi-structured interviews. We used purposive sampling²⁶ to recruit mothers with characteristics of interest, including mothers with and without features of PND, those having breastfeeding difficulties, poor infant weight gain or infant illness. Including 'healthy' mothers, with and without characteristics of interest allowed us to explore similarities and differences in neonatal care and feeding between the two groups while highlighting potential mitigating and exacerbating factors related to PND and its influence on caregiving. Sample size was based on achieving 'data saturation' where no new themes were emerging during the interviews.²⁷ The sample comprised 13 mothers with features suggestive of PND (EPDS ≥ 12) and 11 'healthy' mothers (EPDS ≤ 11) as four mothers were lost to follow-up due to incomplete contact details.

Data collection and management

Baseline Screening. At baseline, the EPDS was used to screen 150 mothers from postnatal wards and clinics over 2 weeks between May to June 2021, to identify those with features of PND (EPDS \geq 12). For this study, it was verbally translated and was read aloud to the mothers by a trained member of the study team in the local language, either Kiswahili or Dholuo. Mothers scoring \geq 12 (total score 30) were classified as having features suggestive of PND and were referred to existing psychological services in their nearest County hospital. None of the mothers declined follow-up.

Semi-structured interviews. Semi-structured interviews lasting approximately 1 h were conducted by three research assistants (FA, AN and MAJ), who were Kenyan, mothers themselves, resided in Kisumu County and were all fluent in the local dialects – Dholuo and Kiswahili. Each mother was interviewed at home in the community by an individual interviewer, all of whom were female, with over 10 years of experience in conducting qualitative interviews in maternal and child health research. All research assistants were trained by the study principal investigator (PI) on data collection and ethical considerations. Topic guides used to structure the interviews comprised open-ended questions addressing the following topics: feeding practices, maternal–infant interaction and attachment, infant illness episodes, support networks and maternal health that frequently appeared in the literature surrounding PND and its impact on infant outcomes (supplementary material). Interviewers documented field notes and recorded the interviews before transcribing them on the same day and translating them into English. Transcripts were reviewed by two interviewers to improve translation accuracy and were compared to the original audio recordings and revised appropriately following discussion where discrepancies arose. Regular participant checking helped to reduce the meaning lost through misinterpretation and enhance trustworthiness by prioritizing the participants' perspective.

All study tools were piloted before use among mothers in Kisumu County Referral Hospital to ensure the feasibility of data collection.

Data analysis

We used the framework approach to explore emerging themes from the interviews and investigate possible mechanisms of how PND impacts neonatal care and outcomes.²⁸ This method provided a structured yet holistic overview of the data and was suitable given the similar topics discussed in each interview.²⁸ Qualitative data analysis ran concurrently with data collection and was conducted by CG and FA. This involved familiarizing ourselves with the data by re-reading the transcripts to identify recurring ideas, issues

and inconsistencies; creating a coding framework using a mixture of deductive codes from our topic guide and inductive codes emerging from the data and then applying these codes to all transcripts in an iterative process using NVivo software (March 2020).²⁹ Similar codes were grouped, summarized and compared using a 'charting' technique,²⁸ retaining the original data, summarizing it in a table and examining the similarities and differences across cases and themes. Peer review of transcripts and codes increased reliability and reduce inconsistencies. Relevant quotes are presented under key themes using matrices that ensure data are presented in its original form in an easily accessible format.³⁰

Results

At baseline, 56 (37.3%; 95% confidence interval (CI): 29.9–45.4) of the mothers had an EPDS score \geq 12 (indicating features of PND). The majority of the women had delivered their newborn infants in a health facility ($n=149$), 10.6% were admitted to the neonatal unit ($n=16$) and 4% infants were LBW ($n=6$). Most mothers were married, and their mean age was 24 ($SD=6.7$) years. Trading was the most common source of income among participants although a larger proportion of 'healthy' mothers reported that their monthly income was guaranteed compared to mothers with depressive symptoms (63.6% ($n=7$) versus 46.2% ($n=6$)). Similarly, 36.4% ($n=4$) of 'healthy' mothers had attained post-secondary school education levels compared to only 7.7% ($n=1$) of mothers with symptoms suggestive of PND (Table 1).

All the 24 mothers interviewed had experienced health or socio-economic adversities in the intrapartum and postnatal period; be it traumatic delivery, financial constraints or relationship difficulties. However, it remains unclear why some of these mothers developed features suggestive of PND in the immediate postnatal period while others did not. Interestingly, rather than depression or low mood, the mothers we interviewed were more likely to mention 'overthinking', often linked to the aforementioned adverse circumstances:

I just think that its overthinking that is what makes us tired . . . I have too much to think about. . . Thinking about how you want to look for money to help yourself that is the main thing that is making me think a lot. (RH-MO25)

PND hinders optimal neonatal feeding practices

All mothers were aware of newborn infant hunger and satiety cues, such as their infant 'wanting to suck the fingers' or 'pulling out the tongue'. Mothers placed huge emphasis on infant satiety given its nutritional benefits. Both mothers with features suggestive of PND and 'healthy' mothers

Table 1. Participant characteristics.

	Depressed (EPDS \geq 12)	Healthy (EPDS \leq 11)
Marital status		
Never married	3	2
Currently married	10	9
Maternal age (years)		
< 20	4	2
21–30	9	9
Source of income		
Farming	1	0
Trading	8	4
Salary	2	3
Remuneration from family member	1	2
Other (odd jobs)	1	2
Income guaranteed every month		
Yes	6	7
Education level		
No schooling or did not complete primary school	5	3
Primary school completed or secondary school started but not completed	5	3
Secondary school completed	2	1
Tertiary or post-secondary school education	1	4
Infant gender		
Male	7	7
Female	6	4

EPDS: Edinburgh Postnatal Depression Scale.

described similar feeding difficulties, including problems with infants latching, pain due to breast engorgement, and the practical and emotional challenges associated with feeding an infant requiring care in a neonatal unit (Figure 1, Table 2: Q1–3). The perception of insufficient breastmilk was common, particularly among mothers with features suggestive of PND and was also given as a justification for introducing complementary feeds. Mother's opinions differed on whether poor breastmilk production was due to the infant taking too much milk or a result of poor maternal diet (Table 2: Q5–6).

Socio-economic and health system factors influencing maternal health-seeking behaviour for neonatal care

Mothers also raised the high financial cost and practical challenges associated with travelling long distances to the nearest health facility (Figure 1, Table 3: Q7, Q8 and Q9), often to be met with long waiting times and supply shortages resulting in delays receiving care (Table 3: Q10). When mothers did access healthcare, they reported a lack of information from healthcare professionals regarding their own treatment for example during delivery, or the healthcare needs of their child, which contributed to severe maternal worry and distress (Table 3: Q11). One mother with depressive features described the nurses shouting and

harassing mothers on the ward while another expressed that she could not go back to hospital following the maltreatment she had received. (Table 3: Q11 and Q12). Both participants highlighted the anxiety encountered by mothers experiencing childbirth alone (Table 3: Q13).

Experiences of mother-newborn infant interactions

Both groups of mothers recognized the importance of interacting with their infants and noted the positive effect of this on their mood. In general, this involved a combination of talking to, singing to and touching their infant (Figure 1, Table 4: Q14 and Q15). However, some mothers expressed their frustration at the lack of infant response. This was particularly noticeable among 'healthy' mothers, many of whom believed that their infants were too young to hear anything (Table 4: Q16, Q17 and Q18). No participants reported they had been separated from their infants in the first 2 weeks, although one mother with depressive features explained the difficulty of 'finding a good time' to spend with her infant, given her burden of household tasks and other caregiving duties (Table 4: Q19). Nevertheless, mothers prioritized infant needs; perhaps, most evident in their response to infant crying where mothers described the urgency in which they would comfort their child by carrying or breastfeeding them (Table 4: Q20 and Q21).

Table 2. Feeding challenges.

Sub-themes		
Latching problems	Q1	'Whenever (I) am breastfeeding her she feels like she wants to hold but she cannot hold it with the mouth because it is slippery . . . that is something I find hard' (CH-MO14)
Pain	Q2	'The only problem I have is my painful breast, it worries me whenever I want to breastfeed, and it was very painful that I had to shed tears while breastfeeding but I just persevered' (RH-MO25)
Separation from infant in neonatal unit	Q3	'Walking up and down is not easy because I had to go upstairs to breastfeed my baby in the nursery and I had just had an operation' (KC-MO26)
	Q4	'The challenge I had was going to the nursery to breastfeed my child and at the same time I had a lot of pains' (AC-MO07)
Insufficient milk	Q5	'When breastfeeding him I realized that the milk was not enough and that is the reason why I introduced milk' (RH-MO20)
	Q6	'with breastfeeding you need to eat well to get enough milk to feed the baby but sometimes I do not get enough food to eat. Like at times there is no proper food to eat and at times you just cook porridge and drink which is not enough' (RH-MO04)

Table 3. Health-seeking challenges.

Sub-themes		
Financial cost	Q7	' . . . at times you want to go to the hospital, but you don't have the money, so I walk' (AC-MO02)
	Q8	' . . . when I got there, they told me that they did not have the equipment's to help me deliver that I should go and buy' (RH-MO25)
Transport difficulties	Q9	'I did not go to the hospital because my husband was very busy, and he has to take me to the hospital. I am also not able to walk by myself because of my disability' (RH-MO20)
Delays receiving care	Q10	'sometimes they don't help the baby can end up dying when they delay with the treatment . . . it can even take three hours before you are attended to' (KC-MO04)
Poor health worker attitude	Q11	'The doctors did not attend to me well, and they made me feel so bad . . . she just took the baby and rushed with her to the nursery . . . I asked if the baby was going to be okay, but they just looked at me but did not answer' (KC-MO07)
	Q12	'they should at least tell us what to do instead of them rushing us we don't need those nurses/trainees, we need those with experience, because they shout at us and harass us, it makes us depressed, like with my case the way the sisters handled me, they had an attitude towards me, but to men, they are just okay' (CH-MO14)
	Q13	'there was a scenario where young girl came with the mother, she was only 13 years, the mother was not allowed to the delivery room, so they shouted at her until the mother came to ask what was going on, the nurses just looked at her, so she told the nurse that that was not the only hospital she can take her elsewhere, that is when they changed, this acts makes us depressed so they should allow any female person to come with us in the delivery room' (CH-MO14)

Maternal self-efficacy and functional ability for newborn care prioritization in the context of multiple household demands

When asked about conducting every day household tasks, all mothers described reducing their workload (Table 5: Q22 and Q23). Despite this, mothers with features suggestive of depression were more likely to express that they felt unable to care for themselves and their infants compared to 'healthy' mothers often because of poor social support or ill health (Table 5: Q24). Interestingly, some mothers with stronger support networks were advised by relatives not to complete strenuous household jobs, suggesting that in some cases, this lack of self-efficacy may be re-enforced by social support systems. Mothers in both groups also linked their lack of financial independence to poor self-efficacy (Table 5: Q25 and Q26).

Social support networks and their influence on newborn care practices

In general, husbands and partners were absent for most of the day although they had an important role in providing financially (Table 6: Q27 and Q28). Thus, unless mothers received support from neighbours, friends or relatives, they were alone caring for their infant and completing household tasks which mothers expressed could be difficult. While some mothers received practical support, including help with 'cooking and cleaning', giving them the opportunity to spend time with their infants, other mothers received psychological and emotional support, often in the form of advice (Table 6: Q29, Q30, Q31 and Q32). Mothers mentioned the positive impact of social support on their mood and implied that good social support prevented them from feeling low (Table 6: Q33 and Q34).

Table 4. Mother infant interaction.

Sub-themes		
Maternal response to infant interaction	Q14	'... when (I) am talking, she produces some sound or she laughs, that shows that we are communicating, and this makes me happy' (CH-MO14)
	Q15	'When carrying the baby, you touch the hands, and she smiles back thus it makes me feel good' (KC-MO20)
	Q16	'I feel so bad(laughs) that is because I want him to respond to my touch' (KC-MO04)
	Q17	'It's a must you play with the baby maybe buy just touching his hands because as per now, he doesn't understand anything . . . For now he doesn't even hear things' (AC-MO02)
Challenges	Q18	'It is hard because if you play with him, he does not respond back'
	Q19	'It's not hard and on the other side it's also hard because at the moment you are singing or talking to them, you are also thinking on what to do, or maybe wash for them, so you don't find a good time to spend with them'
Prioritizing infant needs	Q20	'Whenever he needs something, he will cry, so I have to check fast when he cries to know what is wrong' (AC-MO02)
	Q21	'I run while going, because you don't know what is happening to her at times you don't even know that the person you left her with has pinched her or maybe she has injured her now that she is still delicate, or maybe her beddings are suffocating her, so I have to run and see what is going on with her' (CH-MO14)

Table 5. Maternal functional status.

Sub-themes		
Reduced workload	Q22	'I just manage by doing my daily chores in bits and when tired I rest and start doing another thing again' (KC-MO04)
	Q23	'I just do light things even when washing I just do light clothes' (KC-MO24)
Poor maternal health	Q24	'At times you find that you want to do some of the house chores, but you can't because at that time she might be crying and maybe I was cooking, so I find this very hard because I can't multitask . . . at the moment I can't find a way of helping myself because I can't go to work because of my health, I can't stand or along time too with this I can't help take care of myself . . . Now, I can only wash while seated I cannot bend yet, still I can't cook; I can't mop because when I do them, I feel so much pain on my thighs' (CH-MO14)
	Q25	'Apart from that is that you are just sited at home your ways are blocked, there is nothing you can do to sustain yourself because you can't go with her anywhere, so you find that your business is at stand still, those are the difficult things I see' (KC-MO24)
Lack of financial dependence	Q26	'Now that am not going to work it's hard because the baby needs feeding, clothes to wear and soap to wash his clothes . . . I need help because right now there is nowhere going, but before I could go to the market to sell vegetables and from there, I could find how to help myself' (AC-MO02)

One mother commented on how having a network of other new mothers allowed her to normalize and therefore cope with some of the challenges she was facing caring for a newborn (Table 6: Q35). Despite these benefits, anxiety surrounding COVID-19 meant some mothers limited their support networks to prevent virus transmission to their infants (Table 6: Q36 and Q37).

Discussion

Summary of key findings

Our study describes the neonatal caregiving experiences of women in the immediate postnatal period and how having features of PND could influence these. Most of the mothers had experienced adverse financial

circumstances and dysfunctional relationships that had been exacerbated by poor interactions with healthcare providers during the perinatal period, with some reporting traumatic experiences during childbirth. Key caregiving challenges for mothers included newborn infant feeding difficulties that were particularly challenging for mothers who had features of PND in the immediate postnatal period. Although mothers were cognisant of their infant's cues for feeding and other care needs, the multiple demands on their time in the household hindered them from prioritizing the care of the newborn infants and mothers with features of PND found this particularly difficult. However, mothers also described how practical and emotional support from partners, friends and relatives in the immediate postnatal period mitigated these challenges.

Table 6. Social support.

Sub-themes	
Role of the father	Q27 'He always makes sure that there is enough water to drink and firewood to cook in the house every day . . . most of the time he is not around because he leaves by 5:00AM and come back very late in the night. He only supports with food and other needs in the house . . . he has never carried the baby since birth' (RH-MO20)
	Q28 '. . . he is someone who is not always home, he is always at work, so I can't really count on him' (KS-MO19)
Practical benefits	Q29 'They show me love, do for me everything I want like washing clothes and they also help in cleaning the house' (KC-MO20)
	Q30 'I have never experienced any [difficulties], because I am the only one taking care of him and that is the only thing I do, the others are being taken care of with the house help' (KC-MO15)
Psychological and emotional benefits	Q31 'Like the way I am with my grandmother and she has told me to let everything go, now I feel I can take care of myself' (CH-MO10)
	Q32 'They are telling me not to worry too much cause all that is in the past' (KC-MO07)
	Q33 'When I am in the house with the baby sometimes, I feel low and if somebody was around it's at least' (KC-MO22)
	Q34 'You know you only get low when you don't find the right support or when you don't have anyone that gives you support' (CH-MO14)
	Q35 'My baby sleeps during the day and wakes up most of the time at night. So, I was also wondering why such a thing was happening because he is my first born but when I asked other mothers who have given birth, they told me that it is normal' (AC-MO14)
Impact of COVID-19	Q36 'For now, and due to covid, I take care of my baby alone because she can be infected and survival chances for her is very thin. We were also advised from the hospital not to allow many people to carry the child' (KC-MO20)
	Q37 '. . . even if he is crying and am not near, I just tell them no . . . because of COVID'

Impact of PND on breastfeeding and growth

While we did not directly assess maternal nutrition, many mothers in our study described having insufficient breastmilk production, which they linked to poor maternal diet, particularly affecting mothers with features suggestive of PND. This was the main reason stated by mothers for non-exclusive breastfeeding (non-EBF), in which previous research in Kenya suggests is more common among mothers with features of PND.¹⁴ While research in HICs suggests that depressed mothers may encounter problems with breastmilk production due to reduced oxytocin and prolactin production,³¹ all breastfeeding data in our study were self-reported, hence, it is difficult to establish whether there is an objective difference in breastmilk production between those with symptoms of depression and 'healthy' mothers or if this is simply a bias from exaggerated pessimistic concern in depressed mothers.³² Instead, these beliefs about insufficient breastmilk may be due to low maternal self-efficacy which is more common among mothers with PND.³³ Rahman et al.³⁴ found no difference in breastmilk production between depressed and 'healthy' mothers in rural Pakistan at 4 months, even though depressed mothers were more likely to report insufficient milk. This would fit with our findings which suggest that mothers with depressive features have less confidence in their ability to care for themselves and their infants despite describing similar degrees of functional disability as 'healthy' mothers. Previous research in Iran has linked

PND to reduced functional status and poor maternal self-efficacy³⁵ and breastfeeding self-efficacy training has been shown to significantly improve depression outcomes among these mothers.³⁶

Maternal well-being

Financial insecurity leading to economic stress, relationship difficulties and a lack of social support were the prominent factors that mothers associated with 'worry' or 'over-thinking'. Therefore, while breastfeeding and infant growth interventions are likely to have a positive impact on maternal mood,^{10,37} interventions that aim to improve social support and financial security are crucial to fully address the sources of maternal anxiety and stress in the postnatal period. In addition, it may be possible to build their resilience to cope with such events through increasing maternal self-efficacy and strengthening maternal support networks. Likewise, mothers described intense labour pain, feelings of powerlessness, negative health worker interactions and inadequate information from health workers in the intrapartum and postnatal period; all of which are potentially modifiable factors contributing to traumatic childbirth experience,³⁸ associated with the development of PND.^{39,40}

The issue of 'over-thinking' seemed to be closely linked to challenges experienced by mothers who may have been reluctant to discuss issues of stress, anxiety and depression due to stigma surrounding maternal mental health in this

context. Among adolescent and young mothers, this statement may depict a state of apathy in accessing support for their stressors and/or triggers of poor mental health.⁴¹ This needs to be explored further in future research.

Impact of social support

Our findings suggest that social support had a positive effect on maternal mood and self-efficacy consistent with previous research.⁴² Practical assistance including help with housework and financial support allowed mothers to focus their efforts primarily on infant caregiving and enabled mothers to rest and get back to full health following delivery, which was considered important for good functional ability. In contrast, mothers who lacked practical support were worried about economic difficulties and food insecurity, an important and potentially modifiable risk factor for depression.^{43,44} A study of South African mothers found that food insufficiency was more likely to compromise the mental health mothers who lacked social support and practical support was more effective than emotional support at mitigating these adverse effects on mental health.⁴³ Nevertheless, mothers in our study described the benefits of receiving emotional support from relatives which allowed them to re-frame negative thinking patterns, normalize caregiving challenges and boost self-esteem, which is consistent with previous LMICs research.^{44,45}

In our recent research exploring the feasibility of mother-to-mother peer support for the post-discharge care of LBW infants, we found that this strategy promoted resilience among mothers of LBW infants, improved knowledge and practice of breastfeeding and other caregiving practices, and enhanced family relationships.^{46,47} Similarly, a recent meta-analysis suggested community-based peer support, such as one-to-one counselling or group meetings can increase breastfeeding initiation within the first hour and extend the duration of EBF as well as reducing pre-lacteal feeding among new mothers in LMICs.⁴⁸

Limitations

While this study provides useful exploratory data, it was done during the COVID-19 pandemic, therefore, many hospitals in Kenya still had restrictions for visitors and that may have adversely affected the birthing experiences of the mothers in our study. In addition, we did not include the perspectives of male partners or other key decision-makers in the household (e.g. paternal grandmothers) to understand their perspectives on PND, how it influences newborn infant care practices and potential mitigating factors. Finally, the perspectives of the most vulnerable adolescent mothers were not captured in this study. Nevertheless, this study provides some useful insights to inform larger scale evaluations of the association between PND and neonatal outcomes. In addition, longitudinal data

mapping out maternal experiences across the entire perinatal period would be useful to further understand why some mothers develop PND and others do not as well as enabling us to truly isolate the impact of PND on maternal caregiving in the postnatal period by identifying antenatal confounding factors.

Conclusion

The immediate postnatal period was described as a challenging time by mothers who were balancing their usual household tasks with caring for a newborn and recovering from childbirth, often with very limited practical and emotional support. Our findings suggest reduced self-efficacy in mothers with PND who reported insufficient breastmilk production and felt they were unable to care for themselves or their infant. These mothers often lacked social support, which seemed to mitigate against the effects of these caregiving challenges on maternal mood. Strengthening community-based social support networks could build maternal resilience and autonomy to enhance mothers' psychosocial well-being with ultimate benefits for them, their infants and families. In addition, health workers should receive sufficient training and mentorship to enhance their interactions with mothers during the pregnancy, intrapartum and postnatal periods, which may help to prepare mothers better for the challenging postnatal period and minimize trauma associated with childbirth.

Declarations

Ethics approval and consent to participate

Ethical approval for the study was obtained from the Kenya Medical Research Institute's Scientific and Ethics Review Unit (KEMRI/SERU/CCR/334/4089) and the Liverpool School of Tropical Medicine Research and Ethics Committee (20-088). Written informed consent was obtained from all participants prior to data collection. Due to high levels of illiteracy in the study communities, participants incapable of providing written informed consent were verbally guided through the study consent procedures and indicated their consent with a thumbprint.

Consent for publication

All participants gave written informed consent for publication.

Author contribution(s)

Catherine Gribbin: Conceptualization; Formal analysis; Funding acquisition; Methodology; Project administration; Supervision; Writing – original draft.

Florence Achieng: Data curation; Resources; Writing – review & editing.

Alloys K'Oloo: Data curation; Resources; Software.

Hellen C Barsosio: Writing – review & editing.

Edith Kwobah: Writing – review & editing.

Simon Kariuki: Writing – review & editing.

Helen M Nabwera: Conceptualization; Methodology; Supervision; Writing – review & editing.

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Competing interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

Availability of data and materials

Requests for access to data should be addressed to the corresponding author. This is an open access article distributed in accordance with the Creative Commons Attribution 4.0 Unported (CC BY 4.0) licence, which permits others to copy, redistribute, remix, transform and build upon this work for any purpose, provided the original work is properly cited, a link to the licence is given and indication of whether changes were made. See <https://creativecommons.org/licenses/by/4.0/>.

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Supplemental material

Supplemental material for this article is available online.

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