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Postpartum Mental Health in Rural South Africa: Socioeconomic Stressors and Worsening Mental Health

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Abstract

Objectives This study aimed to characterize patterns of worsening mental health during the postpartum period among women in rural areas of Limpopo Province, South Africa, and to identify correlates with household demographic factors.

Methods We collected data on maternal mental health symptoms shortly after birth and then again 7 months postpartum using the World Health Organization self-reporting questionnaire (SRQ-20) from December 2017 to November 2018. The absolute change in SRQ-20 symptom score was calculated to determine worsening mental health over the postpartum period. Linear regressions were performed to investigate factors associated with mental health symptom scores at varying postpartum time points.

Results We found increased reporting of poor mental health symptoms at 7 months postpartum as compared to shortly after birth (n = 224). Worsening maternal mental health over the postpartum period was associated with higher SRQ-20 symptom score shortly after birth ($p < 0.001$) and reported food insecurity at 7 months ($p < 0.001$). SRQ-20 symptom scores in the postpartum period were not associated with breastfeeding in the past 24 h reported at 7 months postpartum ($p = 0.08$).

Conclusions for Practice Women in rural South Africa, like women in many settings, may be vulnerable to worsening postpartum mental health when they lack sufficient socioeconomic resources and when they have pre-existing depressive/anxiety symptoms.

Keywords Postpartum · Mental health · South Africa · Common mental disorder · SRQ-20

Significance

What is already known on this subject? Postpartum mental health may be categorized into different trajectories according to timing of common mental disorder (CMD) symptoms. South African studies have identified maternal demographic factors associated with certain trajectories. *What this study adds?* In rural South Africa, 49.1% of women reported an increase in CMD symptoms from shortly after birth to 7 months postpartum, compared to only 26.8% with a decrease in CMD symptoms. An increase in CMD symptoms over the postpartum period was associated with food insecurity and having reported more CMD symptoms earlier in the postpartum period.

Introduction

According to a 2017 meta-analysis of 291 studies from 56 countries, 17.7% of women globally experience postpartum depression (PPD) (Hahn-Holbrook et al., 2018). In low- and middle-income countries (LMICs), 19.8% of women experience a CMD during the postpartum period, primarily depression or anxiety (Fisher et al., 2012). In South Africa, multiple studies of women drawn from areas including the

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urban township of Khayelitsha, rural Western Cape, and rural Eastern Cape have found PPD rates ranging from 14.5 to 50% (Christodoulou et al., 2019; Hung et al., 2014; Stellenberg & Abrahams, 2015).

Maternal mental health is a significant public health issue with tangible consequences for women and their children. Studies in rural Malawi and urban South Africa used the WHO self-reporting questionnaire (SRQ-20) as a screening tool to identify CMD symptoms, and demonstrated that worsening maternal mental health peaking at either 6 or 18 months were associated with child wasting and stunting (Garman et al., 2019; Stewart et al., 2008). However, other South African studies have not found an association of postpartum mental health with child health outcomes (Christodoulou et al., 2019). Notably, the SRQ-20 is a screening tool used to categorize respondents, but is not a clinical diagnostic tool (Sartorius & Janca, 1996).

In order to enact targeted prevention and treatment interventions, it is important to understand the heterogeneity of women struggling with their mental health during the postpartum period. South African studies have stratified groups of women based on the trajectories of mental health symptoms over the postpartum period, including one trajectory of women reporting depressive symptoms peaking at 6 months, associated with maternal unemployment, maternal HIV-seropositive status, and stunted child growth (Garman et al., 2019). Another South African study showed that while the majority of women had stable mild-to-moderate depressive symptoms over the postpartum period (83.3%), one group had initially mild depressive symptoms during the immediate postpartum period that subsequently increased in severity over the postpartum period, peaking at 12 months postpartum (Pellowski et al., 2019). Further research is required to explain why women follow different mental health symptom trajectories over the postpartum period, and how we can better prevent and support these different groups.

The goals of this study were to characterize rates and patterns of CMD symptoms over the postpartum period among women in rural areas surrounding Tzaneen, a city located in the Limpopo Province of South Africa, and to identify associated risk factors. In doing so, we hope to inform the timing and form of interventions aimed at preventing and addressing postpartum mental health.

Methods

Setting

This study took place in the city of Tzaneen in Mopani District, Limpopo Province, South Africa. Tzaneen is located 180 km from the Zimbabwe border, 250 km from the Botswana border and 170 km from the Mozambique border. Mopani has a population of 1.1 million people, around 80% of whom live in rural areas (Mopani District Municipal Government, 2014). The two largest ethnolinguistic groups in Tzaneen are speakers of Sepedi (Northern Sotho) and Xitsonga.

Sampling

This cross-sectional study was nested within a larger, 2-year-long child development intervention trial (SANCTR: reference number 4407/PACTR201710002683810). In this trial, a package of community health workers (CHW) interventions, largely centered on promoting positive mother–child interactions, are being tested to see what effects they may have on children's physical and neurocognitive development during the first 2 years of life. Overall, 1107 caregiver-child dyads have been enrolled in that trial and are being followed for 2 years, approximately half of whom were exposed to the package of community health worker interventions. Caregiver-child dyads enrolled in the larger intervention trial were eligible to participate in this sub-study if the child was born to a mother at least 18 years of age, after 37 weeks gestational age, with a birth weight over 2500 g, and without a known genetic abnormality or neurological disorder. The SRQ-20 CMD symptom screen was administered to caregivers when they agreed to join the study during enrollment shortly after birth (Round 1) conducted in different locations and by different interviewers, and then again when they took their children in for the 7-month postpartum assessment (Round 2) at our study's research office. Of the 1107 enrolled in the trial, 317 caregiver-child dyads qualified and returned for the Round 2 assessment, of whom 268 had already completed the SRQ-20 CMD symptom screen at Round 1. Of those, 236 were the biological mothers of the children enrolled in the study, and attended Round 1 and Round 2 with their children. Of those, 224 women had complete SRQ-20 CMD symptom screen without any blank responses. Our study is based on the cross-sectional analysis of data collected at two time points from this group of 224 women.

Procedures

Data collection forms were used to gather demographic information from the women (e.g. age, education level, household wealth, etc.), as well as the CMD symptom screen data. The survey questions about CMD symptoms were drawn directly from the WHO's SRQ-20 CMD symptom screen (Sartorius & Janca, 1996). The SRQ-20 CMD symptom screen has been validated as a screening tool for assessing postpartum depression (Santos et al., 2007). The survey questions were written in English and then verbally translated into the local languages, Xitsonga and Sepedi,

by local research staff, who administered the survey to the study participants over the study period 12/2017–11/2018. The study team agreed on appropriate wording for the translations during the training and piloting phase. Study data were collected and managed using REDCap electronic data capture tools hosted at the University of the Witwatersrand (Harris et al., 2009, 2019).

Ethical clearance for the main intervention trial, in which this survey was nested, was obtained from the institutional review boards of Boston University (protocol number H 37,065) and the University of Witwatersrand (Human Research Ethics Committee—Medical protocol number M160251), as well as the Limpopo Department of Health, and has therefore been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki and its later amendments. All caregivers gave their written informed consent prior to their inclusion in the study, with consent given in their local languages Sepedi and Xitsonga, with the help of local research staff who served as interpreters. Details that might disclose the identity of subjects under the study were omitted.

Data

The SRQ-20 is a WHO-designed questionnaire measuring self-reported levels of CMDs. The SRQ-20 symptom screen consists of 20 "yes/no" questions to investigate the presence of depression, anxiety, and somatic symptoms of distress among interviewees. Question responses were summed, with each "yes" response being worth one point and each "no" counted as zero points, such that the more CMD symptom screen questions with "yes" responses the higher the CMD symptom screen score. Data with incomplete SRQ-20 symptom screens with missing responses were excluded from this analysis. The SRQ-20 symptom screen score has been validated for use in LMICs, including South Africa (Harpham et al., 2003). Our survey utilized 19 of the 20 SRQ-20 questions, excluding the question "Has the thought of ending your life been on your mind" due to our study's lack of sufficient counseling and support resources available if women did report suicidal ideation. For this reason, we did not analyze the rates of categorical CMDs among our cohort of women using a minimum 7-point score cutoff to create a binary variable, and instead used the SRQ-20 symptom scores as a continuous variable. That being said, we have included data using the 7-point minimum cutoff in our supplementary figures (Supplementary Tables S3, S4). We measured the mean SRQ-20 CMD symptom screen scores at Round 1 (shortly after birth) and Round 2 (7 months postpartum). To create the variable of worsening mental health symptoms over the postpartum period, we calculated the absolute change in CMD symptom score by subtracting a participant's SRQ-20 score at Round 1 (shortly after birth) from their SRQ-20 Score at Round 2 (7 months postpartum).

Included in the Round 2 demographic surveys to assess maternal behaviors, women were asked if they had breastfed their child at all the day before, which we used to represent continuance or cessation of maternal breastfeeding at 7 months postpartum.

A wealth index was constructed based on principal component analysis of household asset data (Filmer & Pritchett, 2001).

Analysis

First, we summarized the demographics of the study population. Afterward, we fit a linear regression model to estimate associations between demographics and the continuous outcome of maternal mental health scores at Round 1. Next, we fit a linear regression model to estimate associations between demographics and the continuous outcome of worsening maternal mental health over the postpartum period (absolute change in CMD symptom score from Round 1 to Round 2), controlling for maternal mental health score at Round 1. We also fit a pair of logistic regression models with the dichotomous depression outcome as the dependent variable and the same covariates, using the 7-point score cutoff as mentioned above.

We fit logistic regression models to estimate associations between postpartum maternal mental health and dichotomous outcomes of breastfeeding practices. Each model included demographic controls—including time since childbirth, maternal age, education, employment, parity, HIV status, household size, food insecurity in the last 30 days, and wealth index of household. All data were analyzed using R (R Foundation for Statistical Computing, Vienna, Austria).

Results

The final study population included 224 women from unique households who had responded to both SRQ-20 CMD symptom screens at Rounds 1 and 2. Women were on average 59.7 (standard deviation [SD] 36.9) days postpartum at the time of Round 1, and 232 (SD 26.9) days postpartum for Round 2 (Table 1). In characterizing our study population, we found that participant women had a mean age of 28.7 (SD 6.0) years and had completed 10.6 (1.7) years of education. Only 10.8% of women were employed. 8.5% of women reported insufficient food sometime in the past 30 days. Of the respondents, 25.9% of women were HIV-positive, of whom 94.7% were on antiretroviral treatment. Most women (80.1%) were still breastfeeding when asked at Round 2 (7 months postpartum).

Table 1 Demographics of the study population (N = 224), rounds 1 and 2

	Mean (SD) or n (%)
Mother (round 1[a])	
Age (years)	28.7 (6.0)
Education (years)	10.6 (1.7)
Parity	2.5 (1.3)
Time since childbirth, round 1 (days)	59.7 (36.9)
Married or permanent partner, n (%)	94 (43.1)
Employed, n (%)	24 (10.8)
Number of persons living in household	6.5 (2.6)
Mother (round 2[b])	
Time since childbirth, round 2 (days)	232.0 (26.9)
Has mother experienced food insecurity within the past 30 days? n (%)	19 (8.5)
HIV positive, n (%)	57 (25.9)
Breastfed child at all the day before, n (%)	180 (80.4)
Household assets (round 2)	
Water on site (borehole or piped water)	30.4% (68/224)
Flush toilet or pit latrine with ventilation pipe	52.0% (116/223)
Motor vehicle (car, motorcycle, etc.)	22.3% (50/224)
Mean (SD) SRQ-20 CMD symptom score	
Shortly after birth (round 1), mean (SD)	2.1 (3.0)
7 months postpartum (round 2), mean (SD)	3.2 (4.0)

[a]Characteristics based on information provided by mothers during Round 1 survey at time of study enrollment, shortly after birth

[b]Characteristics based on information provided by mothers during Round 2 survey, 7 months postpartum

SD standard deviation

Women reported a mean SRQ-20 CMD symptom score of 2.1 (SD 3.0) out of a possible 19 points at Round 1, whereas the same women reported a mean SRQ-20 score of 3.2 (SD 4.0) at Round 2. Of the women who completed both surveys, 49.1% reported a greater SRQ-20 CMD symptom score at Round 2 relative to their Round 1 SRQ-20 score, whereas only 26.8% reported a lower SRQ-20 CMD score at the later Round 2 date, and 24.1% of women had no change in their SRQ-20 score. Additional detail on SRQ data at each wave are presented in Supplementary Tables S1 and S2.

Using a linear regression model, we found an association between reporting a greater CMD symptom score at Round 1 with maternal unemployment at 7 months ($p = 0.02$) and negative HIV serostatus ($p = 0.02$) (Table 2). Using a linear regression model, we found an association between a larger increase in reported SRQ-20 CMD symptom score with higher SRQ-20 CMD symptom score at Round 1 ($p < 0.001$) and maternal food insecurity in the past 30 days ($p < 0.001$) (Table 3). We found similar results in our analysis of the dichotomous depression outcome at Round 2 (Supplementary Table S4). At Round 1, the dichotomous depression outcome was not associated with unemployment or negative HIV serostatus (Supplementary Table S3).

Using a logistic regression model with breastfeeding as a dichotomous outcome, women were not found to be less likely to report breastfeeding at 7 months postpartum if they had reported higher SRQ-20 CMD symptom scores at Round 1 ($p = 0.08$) or if their CMD score had increased by a greater amount from Round 1 to 2 ($p = 0.06$). Women were however less likely to be breastfeeding at 7 months postpartum if they were employed at the time of the survey ($p = 0.007$) or if they were HIV positive ($p < 0.001$) (Table 4).

Discussion

We examined symptoms of maternal mental health at two time points in the postpartum period among women in rural South Africa. Our cross-sectional analysis yielded three main findings. Maternal mental health on average worsened over the postpartum period, with 49.1% of women reporting an increase in common mental disorder (CMD) symptoms from shortly after birth (Round 1) to 7 months postpartum

Table 2 Associations with maternal mental health score at round 1 (N = 224)

Variable	Beta (95% CI)	p value
Round 1 factors		
Time since childbirth, round 1 (days)	0.006 (− 0.0005 to 0.012)	0.28
Maternal age	0.092 (0.045 to 0.140)	0.05
Maternal education (years of schooling)	0.109 (− 0.025 to 0.244)	0.42
Is mother employed?	− 1.740 (− 2.460 to − 0.720)	0.02
Mother parity	0.119 (− 0.102 to 0.340)	0.59
Round 2 factors		
Is mother HIV positive?	− 1.156 (− 1.659 to − 0.653)	0.02
Household size	− 0.049 (− 0.131 to 0.032)	0.54
Has mother experienced food insecurity within the past 30 days?	1.026 (0.250 to 1.803)	0.19
Wealth index of household (z-score)	− 0.002 (− 0.006 to 0.001)	0.51

Table 3 Associations with worsening maternal mental health over the postpartum period from round 1 to round 2 (N = 224)

Variable	Beta (95% CI)	p value
Round 1		
SRQ-20 CMD symptom score, round 1	− 0.488 (− 0.569 to − 0.407)	< 0.001
Time since childbirth, round 1 (days)	− 0.007 (− 0.013 to 0.0002)	0.33
Time since childbirth, round 2 (days)	0.012 (− 0.003 to 0.021)	0.17
Maternal age	0.093 (0.038 to 0.148)	0.09
Maternal education (years of schooling)	− 0.167 (− 0.320 to − 0.013)	0.28
Is mother employed?	− 1.338 (− 2.184 to − 0.493)	0.12
Mother parity	− 0.342 (− 0.609 to − 0.075)	0.20
Round 2		
Is mother HIV positive?	0.255 (− 0.324 to 0.834)	0.66
Household size	0.142 (0.050 to 0.234)	0.12
Has mother experienced food insecurity within the past 30 days?	3.600 (2.714 to 4.485)	< 0.001
Wealth index of household (z-score)	− 0.0003 (− 0.004 to 0.004)	0.95

Table 4 Associations between maternal mental health scores with round 2 outcome of breastfeeding (N = 224) (All models adjust for: timing of measurements, mother age, education, employment, parity, HIV status, household wealth and size, and food insecurity)

Variable	Beta (95% CI)	p value
SRQ-20 CMD symptom score, round 1	− 0.018 (− 0.028 to − 0.008)	0.08
SRQ-20 CMD symptom score change from round 1 to round 2	− 0.015 (− 0.023 to − 0.007)	0.06

(Round 2), compared to only 26.8% of women reporting a decrease in CMD symptoms. An increase in CMD symptoms over the postpartum period was associated with women reporting food insecurity and having reported more CMD symptoms earlier in the postpartum period, suggestive of both poverty and poor early postpartum mental health as possible contributors to a lack of resilience against worsening mental health over the postpartum period. Additionally, postpartum mental health was not associated with the maternal behavior outcome of earlier breastfeeding cessation, as evaluated at 7 months postpartum.

Overall, we found an increase in levels of reported CMD symptoms among women in our study population from shortly after birth to 7 months postpartum. This finding of increasing CMD symptoms later in the postpartum period is consistent with multiple studies demonstrating mid- to late-postpartum peaks in CMD symptoms. A 2014 study of multiple LMICs, including South Africa, reported higher mean CMD symptom scores at 6 months than at 1 month postpartum (Pendergast et al., 2014). Another study demonstrated a bimodal distribution of CMD symptom scores peaking at 0–1 month and then again at 9 months postpartum among women in the US (Gjerdingen et al., 2011). Both studies demonstrated mid- to late-postpartum peaks in CMD symptoms, consistent with our findings.

We identified recent food insecurity as a factor associated with increases in CMD symptoms over the postpartum period, consistent with multiple studies in Khayelitsha, South Africa, which found significant association between food insecurity and postpartum mental health (Dewing et al., 2013; Garman et al., 2019).

We found that higher reported CMD symptoms shortly after birth were also associated with maternal unemployment (p = 0.02) and with maternal HIV-negative status (p = 0.02). In contrast to our findings, other recent studies have shown there to be no association between maternal HIV status and likelihood of PPD (Chibanda et al., 2010; Christodoulou et al., 2019; Mokhele et al., 2019). One possible explanation of our findings is that HIV-positive women in the Limpopo province may receive greater support from government and health agencies, thus contributing to relatively lower levels of postpartum CMD symptoms. Understanding this finding would require further investigation into medical care and social supports provided to HIV-positive women in South Africa. A 2015 study in rural South Africa also found an association between maternal unemployment and PPD (Stellenberg & Abrahams, 2015).

We did not find earlier cessation of breastfeeding as an outcome to be associated with higher CMD symptom scores shortly after birth nor with worsening CMD symptom scores over the postpartum period. However, earlier cessation of breastfeeding as an outcome was associated with maternal employment and maternal HIV positive status. Since 2008, the South African government has

encouraged all women to follow the WHO's recommendation for exclusive breastfeeding for at least 6 months and continued breastfeeding supplemented with other foods up to 2 years postpartum, regardless of their HIV status (Nieuwoudt et al., 2019). Meta-analyses demonstrate that longer duration of breastfeeding has protective effects for children, including decreased mortality rates, decreased morbidity with protection against diarrheal episodes and respiratory infections, and improved child growth (Victora et al., 2016). A 2008 study of Nigerian infant immunization clinics did find PPD was associated with earlier cessation of breastfeeding (Adewuya et al., 2008). Studies in South Africa have demonstrated decreased rates of exclusive breastfeeding at 6 weeks postpartum among women reporting prenatal depression, although those same studies did not find associations with postpartum mental health (Jones et al., 2018; Tuthill et al., 2016). Further investigation is needed elucidate the association between postpartum mental health and early breastfeeding cessation.

Our study has several limitations. Surveyed caregivers were part of a larger child development study, and thus may not be representative of the greater Limpopo Province or all of South Africa, with approximately half of the women in the study sample having been exposed to the home visit intervention of the larger child development study for 7 months at the time of Round 2 of data collection. Exposure to the intervention did not significantly impact caregiver SRQ-20 score (data not shown). Additionally, we excluded caregivers who were not the mothers of child study participants (n = 32) and who did not respond to both postpartum SRQ-20 surveys (n = 49), and who had at least 1 missing SRQ-20 response (n = 12) which may not be representative of the larger child development study population (1107 caregivers). Another limitation is that the enrollment and 7 month postpartum SRQ-20 surveys were conducted in different locations and by different interviewers, allowing for variance in caregiver comfort or likelihood of reporting CMD symptoms between the different settings. Outcome measures such as breastfeeding relied on respondent self-report, which allows for response bias in possibly falsely elevated reporting of breastfeeding. We do not have information regarding stresses or medical complications during childbirth, which may impact reporting of CMD symptoms. An additional limitation is exclusion of the question "Has the thought of ending your life been on your mind," from all SRQ-20 surveys, which restricted our analysis to relative mental health levels within our study population, instead of using WHO minimum symptom cutoffs to analyze common mental disorders as a binary variable. We chose to exclude this question as we did not have sufficient counseling and support services available to women if they did report thoughts of suicidality. Lastly, our study results are formed from cross-sectional analysis of survey responses from our study participants, from which we can conclude associations but not causal relationships.

Overall, we found that 49.1% of women in our rural South African study population reported worsening mental health symptoms over the postpartum period, and were more likely to do so if they experienced associated factors of food insecurity and prior CMD symptoms earlier in the postpartum period. Women in rural South Africa, like women in many settings, may be vulnerable to worsening postpartum mental health when they lack sufficient socioeconomic resources, and when they have preexisting depressive/anxiety symptoms. In South Africa, there is a major gap in human resources for mental health, with insufficient health workers to adequately serve the needs of the population. The South African Health Department's *National Mental Health Policy Framework and Strategic Plan for 2013–2020* aims to integrate mental health services into primary healthcare, with support for community-based services and a shift away from centralized institutions (Rensburg, 2013). We recommend continued support for interventions designed to prevent and treat postpartum mental health South Africa and other LMICs, as well as further research into the time course and risk factors associated with worsening mental health over the postpartum period.

Supplementary Information The online version contains supplementary material available at https://doi.org/10.1007/s10995-021-03268-3.

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Declarations

Conflict of interest The authors declare that they have no conflict of interest.

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