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Risk of psychological distress following severe obstetric complications in Benin: the role of economics, physical health and spousal abuse

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Background
Little is known about the impact of life-threatening obstetric complications ('near miss') on women's mental health in low- and middle-income countries.

Aims
To examine the relationships between near miss and postpartum psychological distress in the Republic of Benin.

Method
One-year prospective cohort using epidemiological and ethnographic techniques in a population of women delivering at health facilities.

Results
In total 694 women contributed to the study. Except when associated with perinatal death, near-miss events were not associated with greater risk of psychological distress in the 12 months postpartum compared with uncomplicated childbirth. Much of the direct effect of near miss with perinatal death on increased risk of psychological distress was shown to be mediated through wider consequences of traumatic childbirth.

Conclusions
A live baby protects near-miss women from increased vulnerability by giving a positive element in their lives that helps them cope and reduces their risk of psychological distress. Near-miss women with perinatal death should be targeted early postpartum to prevent or treat the development of depressive symptoms.

Declaration of interest
None.

Every year as many as 1.5 million women suffer 'near-miss' complications during pregnancy and childbirth worldwide[1] that are so severe that they threaten the woman's immediate survival.[2–4] Women who survive severe obstetric complications are a vulnerable population who can suffer from the physical, social, financial and psychological consequences of the near-miss event for up to 1-year postpartum.[5] Yet the health and subsequent experiences of women who survive severe complications is underexplored in all countries,[6–7] and studies that describe the diverse range of postpartum experiences in detail and over a sufficiently long follow-up period are rare. This paper aims to document psychological distress 12 months after a near-miss event with or without loss of the baby in the Republic of Benin (a setting where near-miss complications are estimated to be ten times more common than maternal deaths)[8] and to investigate the extent to which the relationship between near miss and psychological distress may be mediated through economic stress, poor physical health and spousal abuse.

Method

This combined epidemiological and ethnographic prospective cohort study was conducted in southern Benin, a country with little social protection for the poor and with high maternal mortality (840 deaths per 100 000 live births)[9] despite 80% of mothers attending antenatal clinics and 78% of deliveries occurring in health facilities.[10] Because of the difficulty of determining with sufficient accuracy if a woman has experienced an obstetric complication if she has not used health services, the study population was recruited from six referral hospitals within the study area.[11,12] All near-miss women and a sample of women with uncomplicated childbirth who delivered in the hospitals between September 2004 and January 2005 and lived within 30 km of the recruitment site were approached for inclusion in the study. The catchment area for the sample was mostly urban, but included some rural areas with difficult access to services. Near-miss women were categorised according to the pregnancy outcome: women with near-miss deliveries with a live baby; and women with near-miss deliveries but whose baby died before the woman was discharged from hospital.

The exposure status of the women (uncomplicated delivery, near miss with live baby or near miss with perinatal death) was determined by research midwives on the basis of clinical signs and symptoms of complications, as well as clinical procedures. Those classified as near misses included five categories of complications at term: haemorrhage (leading to shock, emergency hysterectomy and blood transfusion); pregnancy-induced hypertensive disorders (eclampsia and severe pre-eclampsia); dystocia (uterine rupture and impending rupture); infections (hyper/hypothermia and/or clear source of infection with clinical signs of shock); and anaemia (haemoglobin levels below or equal to 50 g/l or clinical signs of severe anaemia). For each near miss, two unmatched controls with uncomplicated deliveries were selected; uncomplicated delivery was defined as having given birth vaginally to healthy infants, with no deformities, weighing at least 2500 g and at term (37–42 weeks) and whose medical records revealed no prenatal, labour or immediate postpartum complications.

On exit from hospital, research midwives summarised each woman's medical records using a structured instrument. Data were recorded on medical history, risk factors, signs and symptoms, treatments and medical interventions, mode of delivery and baby's health status on exit from hospital. Within a fortnight following discharge, the research midwives conducted home visits and, using a structured questionnaire with standardised instruments adapted for use in Benin,[10,13] collected baseline

data on the women's health, socioeconomic status and pregnancy experiences.

The women were interviewed again at 6 and 12 months following discharge, to gather information on consequences and experiences after delivery (Fig.1). The structured questionnaires included questions on women's relationships with family members, perceived physical health and negotiation of hospital fees associated with the delivery. The interviews also incorporated an adapted version of the K10 screening tool to measure the risk of psychological distress in the study population.[14,15] This tool elicits symptoms of anxiety and depression and has been validated specifically for the detection of depressive symptoms in the postnatal period in neighbouring Burkina Faso (see Appendix).[16]

The ethnographic sample consisted of 40 women, selected in the immediate postpartum period from the larger cohort. Women were selected randomly from predefined quota sampling, on the basis of socioeconomic status and parity, according to the larger epidemiological sample. This sampling method was chosen to ensure the inclusion of socially marginalised participants, as well as to ensure sufficient heterogeneity of the sample according to economic status and parity, given the small sample size. In total, 11 women were a near miss with a perinatal death, 15 near miss with a live birth and 14 had uncomplicated deliveries. Two sociologists and an anthropologist conducted repeated qualitative interviews with these women using an in-depth interview guide to generate information on delivery experiences, recovery, other social and economic changes or consequences in the postpartum period, and social context in which the women experienced these changes. The ethnographic sample were interviewed at home at 3 and 6 months, and 20 (50%, owing to resource constraints, selected using purposive sampling) were interviewed again at 12 months postpartum.

Epidemiological analysis

Women whose babies died following discharge were excluded from the analysis because subsequent baby deaths would be likely to distort relationships between delivery experiences and psychological distress. Stata/IC 10.0 for Windows was used to derive percentages, means, significance levels and regression coefficients comparing near-miss women with and without perinatal death to those with uncomplicated deliveries in the quantitative analysis.

With limited information on temporal aspects of cause and effect, one cannot be certain whether specific parameters are a consequence or a cause of psychological distress. For example, it is difficult to determine the direction of any association between spousal abuse and K10 score when using measures taken at the same point in time, because, intuitively, spousal abuse could cause psychological distress, yet psychological distress may itself lead to a negative spousal relationship and violence. Therefore, although K10 measurements were taken at both 6 and 12 months, this analysis is limited to the K10 outcome at 12 months postpartum so that the effect of exposures measured at 6 months postpartum can be assessed. This takes advantage of the longitudinal nature of the data-set and facilitates investigation of the roles of debt, poor physical health and spousal abuse over the entire year postpartum.

Associations between chronic debt, poor physical health and spousal abuse in the 6 months following delivery and K10 score at 12 months postpartum were investigated using linear regression adjusting for possible confounders of near-miss status, hospital of recruitment (associated with socioeconomic factors), parity, marital status and wealth quintile. Wealth quintiles were derived from a score of the asset ownership of each woman's household using principal components analysis.[17] Age and education were

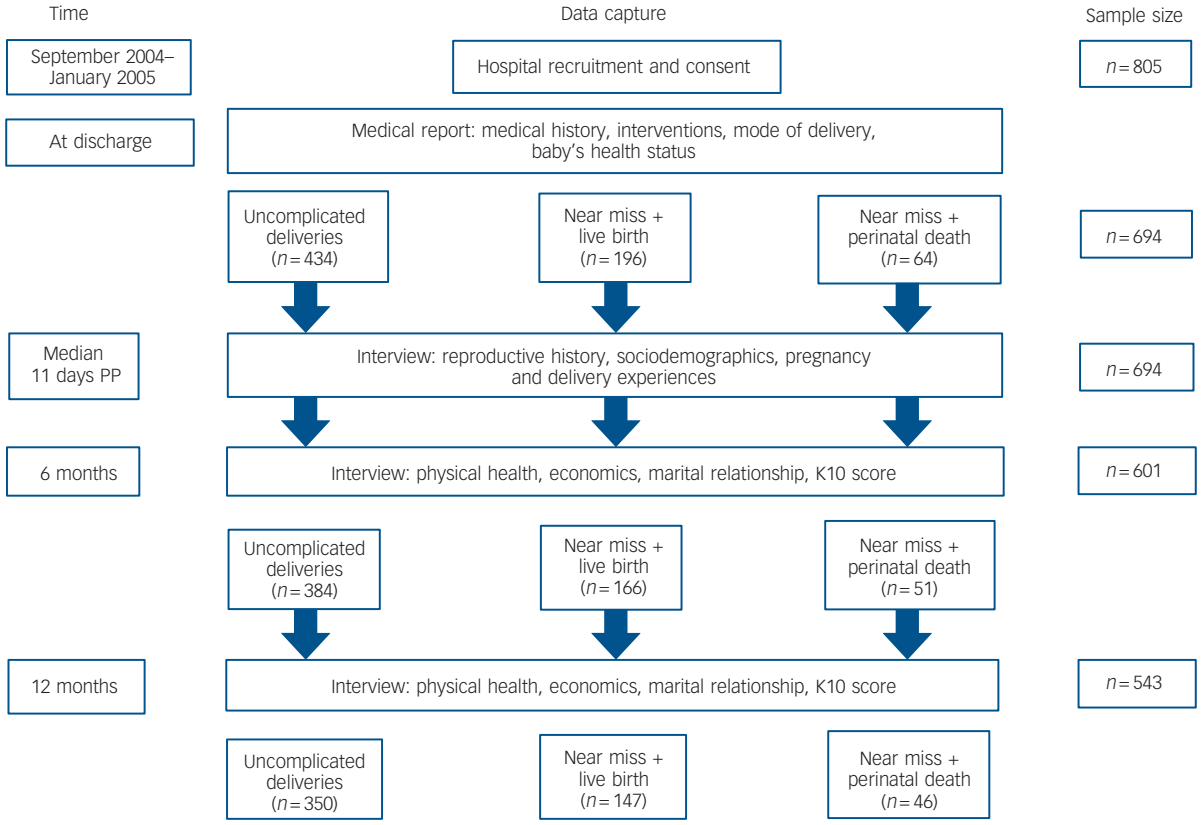

Fig. 1 Schematic of eligibility, recruitment and follow-up, by delivery status (normal delivery, near-miss live birth, near-miss perinatal death). PP, postpartum.

not used as confounders because of correlation with parity and wealth, respectively. Regression analyses were also controlled for exposures of 'high' and 'low' risk of psychological distress at 6 months (derived from K10) to account for any associations between debt, poor physical health and spousal abuse and depressive symptoms at 12 months that may be as a result of confounding between these factors and psychological distress at 6 months postpartum.[16]

Mediation analysis was based on the hypothesis that severe complications are more than a physical event – in addition to physical shock, there may be an economic impact in countries where treatment of such complications is not covered by health insurance. This may lead to adverse social consequences, as economic stress on the family unit may, in turn, lead to psychological distress. Psychological distress may also be an independent consequence of the loss of one's baby through near miss. Linear regression models were fitted on the 12-month K10 score taking into account hypothesised hierarchical relationships between near miss, medical debt (measured as unpaid hospital debts at 6 or 12 months postpartum), poor physical health (measured as self-reported physical illness that prevents the woman from conducting her daily activities) and spousal abuse (measured as new events of physical, sexual or emotional abuse and/or neglect that women report as happening within the first 6 months postpartum and not occurring before or during pregnancy) to test how these risk factors may mediate the direct effect of near miss on psychological distress. In the first step of the analysis, near-miss status is entered along with potential confounding factors and the resulting regression coefficient represents the overall adjusted effect of near miss on K10 score. The subsequent stepwise addition of variables is used to identify the extent to which the effect of near-miss status is mediated through the other factors. In other words, the final model estimates the remaining independent effect of near miss on K10 score, or the effect not mediated through physical morbidity, initiation of spousal abuse and debt.

Ethnographic analysis

Ethnographic analysis focused specifically on exploring the local salience of mediating factors between reproductive experiences and postpartum psychological distress. For this, two types of comparative analysis based on an in-depth case-study method were undertaken. The first mirrored the quantitative study, and compared women who had an uncomplicated delivery with those who had a near miss, both with and without perinatal death. Within these subgroups, women with high and low K10 scores, at either 6 or 12 months postpartum, were also compared. As a starting point, a 14-point cut-off was used to discern clinically significant mental morbidity.[16] To increase our sample size, women with scores of 11 or above were considered at potential risk of mental morbidity and were also included in our comparative analysis.

The second comparative analysis focused on comparing standard cases (women with near-miss experiences and high K10 scores) with what can be conceptualised as exceptions or 'atypical cases', that is, those women whose experiences and practices deviated from the general patterns established by the epidemiological analysis.[18,19] Atypical cases, then, included women with near misses with or without perinatal deaths who demonstrated low K10 scores.

The study was approved by the Ministry of Health, Benin and the ethics committee of The London School of Hygiene and Tropical Medicine, UK.

Results

Recruitment and follow-up

Of 805 consenting women, 694 (86%) contributed to the study. Of the remaining 111, 96 failed to complete the exit interview and 15 were excluded because of infant deaths in the 12 months following delivery. Approximately 78% of eligible women interviewed at discharge were followed to the end of the study period (Fig. 1).

The ethnographic sample ($n = 40$) included 6 women with K10 scores above 13: three near misses with live-births, two near misses with perinatal loss and one uncomplicated delivery. An additional nine women had scores above ten: three near misses with live-births, five near misses with perinatal loss, and one uncomplicated delivery.

Women's characteristics

Sociodemographic characteristics and differences between exposure groups are summarised in Table 1. The mean age and parity of the sample as a whole was 27 years (range 14 to 42) and 2.44 (range 1 to 10), respectively. There were significant differences at baseline between the three groups included in the epidemiological analysis with respect to socioeconomic and demographic characteristics. Women included in the ethnographic study showed no significant differences in age, parity, marital status, education or wealth compared with women in the larger sample (results not shown).

Consequences of near miss

Table 2 highlights the physical, social and economic consequences of near misses compared with uncomplicated births. Overall,

Table 1 Sociodemographic characteristics of the study population

Characteristic	Near-miss women: With live birth, $n = 196$	Near-miss women: With perinatal death, $n = 64$	Uncomplicated delivery, $n = 434$	Test statistic	P
Age, years: mean	25.76	26.60	27.31	F-ratio = 5.47	0.004
Parity, mean number	2.16	3.02	2.47	F-ratio = 7.45	0.001
Marital status, %				$\chi^2 = 4.39$	0.356
Monogamous	77.55	71.88	76.91		
Polygamous	18.88	21.88	21.02		
Single	3.57	6.25	2.08		
Any formal education, %	61.73	51.56	77.14	$\chi^2 = 27.40$	<0.001
Wealth quintiles, %				$\chi^2 = 59.00$	<0.001
Most poor	29.53	33.33	13.43		
Least poor	10.88	9.52	25.46		

Table 2 Physical, social, economic and psychological consequences of near miss at 6 and 12 months postpartum

Outcome	Delivery status			Test statistic	*P*
	Uncomplicated	Near miss with live baby	Near miss with perinatal death		
K10 score, mean (95% CI)					
6 months	5.47 (5.97–5.99)	4.91 (4.21–5.61)	7.81 (6.18-9.45)	*F*-ratio = 6.54	0.002
12 months	4.15 (3.63–4.68)	4.37 (3.61–5.14)	6.86 (5.03-8.71)	*F*-ratio = 5.94	0.003
Self-reported serious illness, *n* (%)					
6 months	76 (19.84)	27 (16.36)	14 (27.45)	$\chi^2 = 3.11$	0.211
12 months	69 (19.88)	37 (26.53)	16 (34.78)	$\chi^2 = 6.55$	0.038
Self-reported subsequent pregnancy, *n* (%)					
6 months	1 (0.40)	0 (0)	1 (2.70)	$\chi^2 = 3.57$	0.168
12 months	10 (3.23)	2 (1.80)	12 (30.00)	$\chi^2 = 54.90$	<0.001
Viewed more negatively since pregnancy end, *n* (%)[a]					
6 months	29 (7.55)	19 (11.45)	13 (25.49)	$\chi^2 = 16.31$	<0.001
12 months	12 (3.48)	14 (9.52)	6 (13.04)	$\chi^2 = 11.26$	0.004
Feelings of blame since pregnancy, *n* (%)[a]					
6 months	19 (4.95)	8 (4.82)	9 (17.65)	$\chi^2 = 13.45$	0.001
12 months	7 (2.02)	2 (1.36)	5 (10.87)	$\chi^2 = 13.82$	0.001
New spousal abuse/neglect since pregnancy end, at 6 months: *n* (%)	134 (35.64)	44 (27.50)	27 (55.10)	$\chi^2 = 12.72$	0.002
No acceptance by in-laws at exit from hospital, *n* (%)[a]	18 (4.22)	9 (4.79)	8 (12.90)	$\chi^2 = 8.41$	0.015
Feelings of indebtedness since pregnancy, *n* (%)[a]					
6 months	114 (29.69)	57 (34.34)	26 (50.98)	$\chi^2 = 9.52$	0.009
12 months	62 (17.87)	40 (27.21)	14 (30.43)	$\chi^2 = 7.73$	0.021
Unpaid hospital debts, *n* (%)					
6 months	15 (3.91)	35 (21.08)	12 (23.53)	$\chi^2 = 47.48$	<0.001
12 months	6 (1.73)	26 (17.69)	10 (21.74)	$\chi^2 = 50.32$	<0.001

a. Women's self-reports in interviews.

near-miss women with perinatal loss suffered consequences to a greater extent than those with a live baby. The mean K10 score was significantly higher in the near-miss with perinatal death group compared with other near-miss women ($P = 0.001$ at 6 months and $P = 0.011$ at 12 months) and women with uncomplicated deliveries ($P = 0.006$ at 6 months; $P = 0.002$ at 12 months). A greater proportion of near-miss women with perinatal deaths reported serious physical illness within 12 months postpartum, and significantly so in comparison with women with uncomplicated deliveries ($P = 0.010$). All near-miss women were more likely to owe money to the hospital at 6 and 12 months postpartum compared with women with uncomplicated deliveries (Table 2) ($P < 0.001$ at 6 months and 12 months), but a greater proportion of near-miss women with perinatal deaths (who were also generally poorer before) were in debt at 12 months postpartum compared with the other near-miss women, although this difference was not statistically significant ($P = 0.711$).

Compared with near-miss women with surviving babies, women with perinatal deaths were also significantly more likely to report feeling being viewed negatively ($P = 0.013$ at 6 months; $P = 0.494$ at 12 months), blamed ($P = 0.003$ at both 6 and 12 months), indebted ($P = 0.032$ at 6 months; $P = 0.671$ at 12 months) and rejected by their marital family ($P = 0.028$). Similarly, the proportion of near-miss women with perinatal deaths experiencing spousal abuse in the 6-month period following pregnancy but not before delivery was significantly higher compared with other near-miss women ($P < 0.001$) and women with uncomplicated deliveries ($P = 0.008$) (Table 2).

Exploring mediators – ethnographic analyses

The ethnographic results showed that women who had experienced a near miss were undoubtedly troubled by the childbirth experience itself, and described their postpartum period as emotionally challenging and tumultuous. When asked directly, these women attributed feelings of sadness, worry and discouragement to their near-miss event, particularly when interviewed soon after birth. However, near-miss women who experienced sustained sadness, and thus had high K10 scores at 6 or 12 months ($n = 14$ if using 11 as cut-off score, and $n = 6$ if using 14 as cut-off score), differed from those whose sense of sadness waned over time, in that they struggled with the cumulative effect of life-events that ensued following near miss. These included, most notably, financial debt relating to the costs of birth, inability to resume employment, emotional and physical fatigue, marital uncertainty, and strained relations with family and in-laws.

These cascading events were both exacerbated and more intensely interconnected in families who had also suffered a perinatal loss ($n = 4$). These families spiralled into a highly stressful marital situation, characterised by frequent disputes, suspected infidelity and, at times, physical violence. For these individuals, it was not necessarily the perinatal loss alone that caused tensions, but the fact that these women had already endured more than one difficult and/or costly birth, sometimes with prior perinatal deaths as well. Together with sustained difficulties in paying off hospital bills, this strained relations with family members from whom funds had been borrowed, a fact that in turn led to the couple's difficulty in acquiring additional postpartum support.

That these women did not yet have the full number of children they had hoped for and yet had husbands who were beginning to tire from reproductive failures exacerbated existing tensions and generated considerable doubt about the future. For these women, perinatal loss signalled a potential underlying health problem, which in turn accentuated anxieties relating to both future reproductive abilities and investment of limited resources on another potentially unsuccessful pregnancy. Such women described feeling pressured to prove their reproductive capabilities

as soon as possible. However, the absence of an intimate and supportive relationship between husband and wife further constrained the couple's ability to draw strength from one another and begin trying for another child. For example, two of these women believed that if they could help settle their husband's debt, they would be able to regain their husband's confidence, try for another child and thus ensure the continuation of their marriage. However, both physical fatigue and an inability to borrow the capital needed to resume women's informal sector activities meant that these women were unsuccessful in achieving these goals. As all of these women described, traumatic birth and ensuing social, personal and economic instability were final events in a series of life challenges that led them to feel 'desperate'.

Exploring mediators – epidemiological analyses

The first column in Table 3 quantifies the risk factors for elevated K10 scores at 12 months postpartum. The risk of elevated scores was significantly higher for women experiencing near misses with perinatal death compared with those with uncomplicated deliveries when controlling for potential confounding effects of psychological distress at 6 months, parity, marital status, wealth and recruitment hospital. Similarly, debt, physical illness and spousal abuse are each shown to have significant associations with elevated K10 scores after adjustment.

Table 3 also shows results from the mediation analysis based on the theorised hierarchical relationship between exposures, whereby (as shown in Table 2) delivery outcome is an important determinant of economics, health and social relationships, each of which are associated with K10. The overall effect of near misses with perinatal death on K10 score is described in Model 1, which only includes near-miss status and potential confounding factors. Addition of chronic debt (Model 2) estimates the effect of near misses that is not mediated through debt (i.e. regression coefficient 1.68 (95% CI 0.12–3.24)). Likewise, addition of self-reported serious illness in Model 3 estimates the remaining effect of near misses that is not mediated through debt and self-reported serious illness. The final model (Model 4) includes spousal abuse and estimates the remaining independent effect of near misses with perinatal death on K10 score not mediated through chronic debt, self-reported serious illness and postpartum spousal abuse; this remaining effect is not significant, meaning there is no evidence of an independent effect of perinatal death on K10 score at 12 months postpartum.

Social significance of mediators

Comparative ethnographic analysis of 'atypical cases' gives additional insight into potential causal pathways and the significance of the mediators identified in Table 3. For this analysis, we first considered near-miss women with live births who had K10 scores below 11, indicating low risk for psychological distress ($n=8$). Although these women had a live birth, they experienced severe emotional, financial, and personal difficulties, similar to those relayed by women who had experienced a perinatal loss. Unlike those with perinatal loss, however, we found that the former women were able to lessen the negative consequences that a near miss often entails by channelling their energies into their newborn child. Most of them, for example, were finally able to rejoice in having a healthy live baby after having experienced several unsuccessful pregnancies, whereas others were, after several attempts, finally fulfilled by having a child of their desired gender. Perinatal loss, then, may have a more lasting influence on psychological well-being because there is no

Table 3 Effects of risk factors for elevated K10 score at 12 months postpartum and hierarchical multivariate modelling based on theorised causal pathway from near miss through economic difficulties, poor physical health and deteriorated marital relationships

Exposure	Crude		Adjusted[a]		Model 1[b]		Model 2[c]		Model 3[d]		Model 4[e]	
	Regression coefficient (95% CI)	*P*	Regression coefficient (95% CI)	*P*	Regression coefficient (95% CI)	*P*	Regression coefficient (95% CI)	*P*	Regression coefficient (95% CI)	*P*	Regression coefficient (95% CI)	*P*
Delivery outcome[f]												
Near miss with live baby	0.22 (−0.76 to 1.20)	0.657	0.59 (−0.40 to 1.59)	0.444	0.59 (−0.40 to 1.59)	0.444	0.41 (−0.60 to 1.43)	0.422	0.37 (−0.63 to 1.36)	0.471	0.40 (−0.59 to 1.39)	0.429
Near miss with baby loss	2.71 (1.16 to 4.26)	0.001	1.93 (0.39 to 3.47)	0.014	1.93 (0.39 to 3.47)	0.014	1.68 (0.12 to 3.24)	0.036	1.53 (−0.01 to 3.08)	0.052	1.28 (−0.26 to 2.82)	0.103
Economics: any chronic debt (unpaid at 6 or 12 months)	1.82 (0.56 to 3.09)	0.005	1.52 (0.23 to 2.81)	0.021			1.12 (−0.16 to 2.41)	0.088	1.01 (−0.26 to 2.28)	0.118	1.11 (−0.15 to 2.37)	0.084
Health: self-reported serious illness at 6 or 12 months postpartum	2.21 (1.33 to 3.08)	<0.001	1.97 (1.08 to 2.85)	<0.001					1.85 (0.98 to 2.72)	<0.001	1.71 (0.84 to 2.58)	<0.001
Social relationships: abuse from partner within 6 months of pregnancy end	2.03 (1.13 to 2.92)	<0.001	1.54 (0.64 to 2.44)	0.001							1.27 (0.40 to 2.14)	0.005

a. Reference group is women with uncomplicated deliveries.
b. Model 1: delivery status plus potential confounding factors .
c. Model 2: Model 1 plus unpaid hospital debts at 6 or 12 months postpartum.
d. Model 3: Model 2 plus self-reported serious illness at 6 or 12 months postpartum.
e. Model 4: Model 3 plus new spousal abuse in the first 6 months postpartum.
f. Adjusted for 6 month depressive group (K10⩾14), parity, marital status, wealth quintile and hospital of recruitment.

live birth to assuage the cyclical nature of the relationships between financial, social and personal consequences of the near miss.

Comparative analysis of women who had both near miss and a perinatal loss, but who had low K10 scores ($n = 5$) highlighted a similar underlying factor that lessened the effects of the causal pathway between near miss and psychological distress. In the majority of these cases, women were either young and at the beginning of their reproductive lives, or felt reproductively healthy, despite their prolonged postpartum recuperation. As a result, these women demonstrated positive feelings about their future reproductive success and so tended to also be in more secure marriages, factors that enabled them to temper any lasting effect of the near miss and perinatal loss on their mental health.

Discussion

Quantitative analysis shows that near miss is not associated with greater psychological distress at 6 and 12 months postpartum when women give birth to live infants compared with uncomplicated deliveries. Perinatal loss, however, is very important in initiating symptoms of psychological distress, as demonstrated by higher K10 scores in this near-miss group compared with the other comparison groups. Nevertheless, mediation analysis shows that, at 12 months, the overall effect of near miss with perinatal death on risk of psychological distress is almost entirely mediated through financial debt, physical illness and marital disputes, each of which is exacerbated by, if not a consequence of, the delivery complication and perinatal death.

Ethnographic data support these findings, highlighting that women's postpartum mental health is affected by the cumulative effects of interrelated detrimental life circumstances that ensued from the near miss and perinatal loss. In Benin, perinatal loss, economic debt, difficulty regaining economic activities, marital tensions and feeling physically exhausted appear to influence one another in a cyclical manner during the postpartum period, such that it is difficult to disentangle the independent effects of perinatal loss on mental morbidity. In addition, ethnographic findings suggest that women who have a high K10 score in the postpartum period were already in a situation of social, financial and personal stress at the time of childbirth, to the extent that the perinatal loss was a final event in a series of difficult episodes accounting for psychological distress. Women experiencing near miss with a live birth were not necessarily in a less precarious situation than those who experienced perinatal loss; rather, the birth of a live baby protected near-miss women from increased financial and social vulnerability by giving them and their husbands hope and a positive element in their lives. Similarly, near-miss women without signs of psychological distress did not necessarily have less traumatic experiences, but either benefited from stronger social and financial support from their immediate family, or tended to be younger and more hopeful about future reproductive outcomes.

Strengths and limitations

Our results may appear counterintuitive at first, as one could have expected the perinatal-death effect to remain stronger for a longer period.[20] The follow-up rate of the epidemiological sample over 12 months was acceptable for a study of this type and we used a translated version of a popular psychological distress screening tool that has previously been validated for use in the postpartum period in a neighbouring country in francophone West Africa.[16] However, the study would have benefited from quantitative measurements of psychological distress and other key risk factors, such as economic stress and marital disputes before delivery and in the early postpartum period. Without such measurements, our results only partially describe the course and reasons of postpartum mood disorders, which may in reality originate more strongly in the antenatal period.[21] Disentangling cause and effect in any mediation analysis is difficult, and it is possible that reverse causality was present in the final model; for example, self-reported ill health may be a symptom rather than a cause of psychological distress. At the same time, the in-depth and life-course methods used in the ethnography give some empirical indication of the temporal relationship between events and influences. Furthermore, postpartum disorders are higher in the near-miss group with perinatal death, and it is unlikely that perinatal death is a direct result of psychological distress.

Relationship with economic stress

Research in low- and middle-income countries has shown that healthcare systems that rely heavily on out-of-pocket payments push families into poverty, particularly if this is associated with loss of income because of prolonged illness.[22] The economic burden of emergency obstetric care in this sample is lasting and significant, with little improvement in debt reports between 6 and 12 months. Other studies have shown that, should a woman develop severe obstetric complications during labour, the costs of hospital management escalate rapidly, with a potential catastrophic impact on household budgets for up to 1 year after payment.[23] Economic shocks can lead to a vicious cycle of poverty and psychological distress exacerbated by lost household productivity because of possible long-term morbidity and severe illness.[23,24] Economic stressors have been shown to be associated with both the onset of new episodes of depression and the persistence of existing episodes in low- and middle-income countries.[24–26] In an earlier study in Benin, women delivering in health facilities explained that the financial negotiations with their husbands often led to quarrels and anger, as their financial dependency could end up being humiliating.[27]

Spousal abuse, procreation and cultural context

The proportion of women reporting that spousal abuse began in the 6 months following delivery is high, being similar to lifetime prevalence rates of intimate partner violence reported by others.[13,28] The evidence from the present study that a near-miss complication associated with perinatal death increases risk of abuse is a worrying indication of the increased vulnerability of women with adverse pregnancy outcomes. Using diverse methods, researchers have consistently demonstrated significant associations between marital conflict and depression in diverse countries.[13,29,30] In this study, the importance of marital conflict in the aetiology of psychological distress may relate, at least in part, to the specific sociocultural context of Benin.[31] Anthropological studies in Africa, for example, have shown that infertility and perinatal loss have adverse social consequences for women, especially where gender identities and values are defined quite directly by their fertility.[32] In Benin, as in other parts of Africa, to bear children is not only a deeply personal experience that almost all women actively seek, it is a family and social obligation, the primary and sometimes only way women can acquire social status and recognition within their community, and an essential event in assuring continuity of marriage.[27] The high frequency of self-reported subsequent pregnancy in near-miss women with perinatal loss (Table 2) is therefore not surprising. However, there is no evidence that subsequent pregnancy modified the effects of near miss with perinatal loss on social support, financial difficulties or K10 score to any large degree (results not shown), although the sample size and timescale of the study did not permit a thorough investigation of this.

Implications for services in low-income countries

Women with near misses and perinatal death were at higher risk of psychological distress, yet the largest number of women likely to be in need of further mental healthcare was in the other two groups. Although improved access to emergency obstetric and neonatal care and good-quality antenatal and delivery services is likely to play an important role in the prevention of psychological distress in the postpartum period, there is also a role for general postpartum services in the management of postpartum mood disorders. This role has not yet received the attention it deserves in many low- and middle-income countries. Mental health needs to be integrated into maternal healthcare in low-income settings and, given the shortage of mental health workers, the role of care may need to be met initially by nurses, midwives, gynaecologists and paediatricians during routine postnatal visits.[30,33,34] Vigilance towards mothers who have experienced perinatal loss may reduce the risk of negative consequences described in this study, and enable the early detection of clinically significant depressive symptoms so that effective psychological treatments may be offered. Evidence for prevention of postpartum mood disorders in low- and middle-income countries is weak, although strategies such as support groups have been shown to be acceptable to mothers and can lead to reduced morbidity and psychological distress.[35] Such approaches are likely to be more affordable for health services than a series of individualised postpartum support activities and may also incorporate parent counselling to promote marital communication.[30] It may be unlikely, however, that postpartum women who are psychologically distressed as a result of perinatal loss would want to meet in a group and these women may require more intensive one-to-one care using a combination of behavioural, social, reproductive and pharmacological interventions when needed.[36]

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Appendix

K10 score items (adapted from Baggely et al)[16]

Questions from the English language version of the K10, upon which the West African French translation was based:

In the past 30 days, about how often did you feel . . .
(a) . . . tired for no good reason?
(b) . . . nervous? (if never go to question d)
(c) . . . so nervous that nothing could calm you down?
(d) . . . hopeless?
(e) . . . restless or fidgety? (if never go to question g)
(f) . . . so restless that you could not sit still?
(g) . . . depressed? (if never go to question i)
(h) . . . so depressed that nothing could cheer you up?
(i) . . . that everything was an effort?
(j) . . . worthless?

Scoring of answers:
Never, 0
Occasionally, 1
Sometimes, 2
Most of the time, 3
All of the time, 4

The total K10 scores are computed using the equation:

$$\textit{Total score} = \frac{\textit{Sum of item scores}}{\textit{Number of valid items}} \times \textit{Number of items}$$

with the result being rounded to the nearest whole number. If any required item has not been completed, it is excluded from the calculation and not counted as a valid item.

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