

Factors associated with a positive Tilburg Pregnancy Distress Scale among hospitalized Ghanaian obstetric patients



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BACKGROUND: Psychological distress during the antenatal and postpartum period can negatively impact the quality of life and health of the pregnant person and fetus(es). But there is a discrepancy between Ghanaian community prevalence and engagement with mental health services leading to underdiagnosis and missed therapeutic opportunities. Therefore, it is important to identify factors that contribute to the gap of underdiagnosis and treatment, and screening for pregnancy distress is the first step in bridging this gap.

OBJECTIVE: To identify factors associated with increased prenatal and postpartum pregnancy distress via the administration of the Tilburg Pregnancy Distress Scale (TPDS).

STUDY DESIGN: We performed a cross-sectional study of obstetric patients who were admitted at the largest referral teaching hospital in urban Ghana between November 20, 2023, and December 22, 2023. Patients were eligible to participate if they were admitted to the 275-bed maternity block for an antepartum or postpartum indication, alert and oriented, and able to speak one of the following languages: English, Twi, or Ga. Patients below the age of 18 years, or critically ill or unstable were excluded. Participants were asked about their socioeconomics, medical history, current pregnancy and/or delivery outcomes, and satisfaction with care. All patients then completed the validated TPDS, a multiple-choice questionnaire to determine the level of pregnancy or postpartum-related distress.

RESULTS: Among hospitalized obstetric patients in Ghana, less than 1% reported a diagnosed depression, anxiety, or mental health disorder. However, over 37% of our participants, both antepartum and postpartum, screened positive for pregnancy distress using the TPDS. Among antepartum participants, young age, low household income, and low parity were significantly associated with a positive pregnancy distress screen. Among postpartum participants, no factors were significantly associated with a positive screen in the final, controlled, model.

CONCLUSION: Our study is the first to identify factors associated with Ghanaian patients' pregnancy distress, which can contribute to pregnancy, maternal, and child health consequences. Over one-third of obstetric patients screened positive on the TPDS with prevalence rates comparable across antepartum and postpartum patients. Our study identified antepartum patient factors of young age, low income, and low parity for increased positive screening on the TPDS. Identifying Ghanaian pregnant patients with these factors may help to target those at the greatest need for increased screening and monitoring, which is aligned with the Sustainable Development Goals.

Key words: mental health, low- and middle-income countries, maternal health, public health, depression with peripartum onset, neonatal health, child health

Introduction

Pregnancy is a transformative period of life that can be associated with worries regarding one's appearance, hormonal dysregulation, partner relations, fetal health, and economic well-being.¹ Pregnancy distress is a term used to describe

the psychological stress experienced during the antenatal and postpartum period specifically related to the concern of pregnancy, postpartum, or maternal and fetal outcomes.^{2,3} Pregnancy distress is a focus on concerns specific to the pregnancy distinct from Generalized

Anxiety Disorder which is a focus on concerns related to everyday life.^{3,4} Similarly, the symptoms of pregnancy distress fail to meet the formal criteria for depression with peripartum onset, a type of major depressive disorder occurring during pregnancy or postpartum.⁵

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Why was this study conducted?

To identify factors associated with increased pregnancy distress via the administration of the TPDS.

Key findings

Among hospitalized obstetric patients in Ghana, less than 1% reported a diagnosed mental health disorder. Over 37% of our participants, both antepartum and postpartum, screened positive for pregnancy distress using the TPDS. Among antepartum participants, young age, low household income, and low parity were significantly associated with a positive pregnancy distress screen. Among postpartum participants, no factors were significantly associated with a positive screen in the final, controlled, model.

What does this add to what is known?

Our study's high prevalence of pregnancy distress underscores the importance of maternal mental health screening among obstetric patients in Ghana and other LMICs. Screening is especially critical given the very low number of our participants who had been clinically diagnosed with a mental health issue.

Methods

We performed a cross-sectional study of obstetric patients who were admitted at the largest referral teaching hospital in urban Ghana between November 20, 2023, and December 22, 2023. Patients were eligible to participate if they were admitted to the 275-bed maternity block for an antepartum or postpartum indication, alert and oriented, and able to speak one of the following languages: English, Twi, or Ga. Patients below the age of 18 years, or critically ill or unstable were excluded.

Noguchi Memorial Institute for Medical Research, University of Ghana institutional review board approval was obtained (NMIMR SN:071/22-23). All patients admitted during the study period were sequentially approached at their bedside, in-person, by the research team. Study activities were carried out in one of the three languages of the participants' choice. Eligibility as defined above was assessed. If eligible, the study protocol was thoroughly explained. Patients who were willing to participate underwent informed consent and then enrolled in the study.

A trained research assistant provided the survey to all participants at a single time point during the participant's hospital admission. Those with self-determined English literacy completed the survey independently in English using pen and paper. Participants who spoke Twi or Ga had the survey verbally administered by a trained research assistant in their language of choice. The survey and scale took approximately 30 minutes to complete, and the participants received a small monetary incentive to compensate them for their time, valued at approximately \$1.5 USD. Participants were asked about their socioeconomic and medical history including clinical history of anxiety, depression, or other medical health diagnosis. Participants also reported their overall satisfaction with care they had received on a 5-point Likert scale. The sub-group of antepartum patients were asked clinical questions about their current pregnancy, and their satisfaction with counseling on reason for admission. The sub-group of

Up to 70.5% of women with pregnancy distress can ultimately develop mental health disorders postpartum, such as anxiety and depression.^{6,7}

Psychological distress during the antenatal and postpartum period can negatively impact the quality of life and health of the pregnant person and fetus (es).^{8–10} A diagnosis of an antenatal mood or anxiety disorder is associated with 3.5 times the odds of an adverse obstetric outcome, including gestational diabetes, hypertension in pregnancy, chorioamnionitis, or hemorrhage.^{8,11} Increased pregnancy distress is linked to fetal growth restriction, low birth weight, preterm delivery, and fetal death.^{8,9} Prenatal stressors can also lead to poor childhood neurodevelopment outcomes including behavioral, cognitive and emotional challenges.^{10,12,13}

In Ghana, pregnancy-related complications and maternal and neonatal morbidity are highly prevalent.^{14–17} The relationship between pregnancy distress and negative maternal and neonatal outcomes underscores the importance of including a mental health approach for improving maternal and neonatal well-being. Studies conducted across Ghana reported the presence of maternal distress or anxiety in one-third of pregnancies.¹⁸ A study conducted across four health facilities in Accra,

Ghana reported less than one-fifth of pregnant patients initiated engagement with mental health services.¹⁹ Lack of screening, limited knowledge regarding mental health conditions, societal stigma, and cultural attitudes present major barriers to adequate diagnosis and treatment of these conditions in Ghana.^{20,21} Therefore, a discrepancy between community prevalence and engagement with mental health services leads to underdiagnosis and missed therapeutic opportunities.^{21,22}

Given the clinical significance of pregnancy distress within the Ghanaian context, it is important to identify factors that contribute to the gap of underdiagnosis and treatment. Screening for pregnancy distress is the first step in bridging this gap. The Tilburg Pregnancy Distress Scale (TPDS) is a measurement tool that can be applied to assess pregnancy and postpartum-related distress and identify at-risk patients.²³ However, there is no literature investigating the use of the TPDS to assess pregnancy distress in antepartum and postpartum-pregnant patients in Ghana. Furthermore, there is limited literature assessing factors associated with increased maternal distress in Ghana. Our research seeks to identify factors associated with increased prenatal and postpartum pregnancy distress using the TPDS.

postpartum patients were asked clinical questions about their pregnancy outcomes, and their satisfaction with counseling on cesarean delivery, and their satisfaction with counseling on postoperative care if they received a cesarean delivery.

All patients then completed the validated TPDS, a multiple-choice questionnaire to determine the level of pregnancy or postpartum-related distress.²³ Of the 16 questions on the TPDS, 12 address anxiety, concerns, and fears related to pregnancy and the postpartum period, while the remaining four focus on partner support during these stages. Each question was scored from zero to three with zero correlating with “very often,” and three correlating with “rarely or never.”²³ The TPDS was selected after a scoping review was conducted by the research team, based on validation in other low- and middle-income countries, specificity to pregnancy, and perceived understandability and translatability with local stakeholder engagement.²⁴

For participants who screened positive for pregnancy-related distress, the participants’ inpatient attending physician was notified of their results. This information could be clinically integrated into their care plan per standard practice. In addition, a clinical psychologist was part of the research team and was available to provide clinical support to participants who screened positive.

For data analysis, age, which was originally collected continuously in years, was re-coded as 18 to 24, 25 to 34, and 35 or greater; participant’s highest level of education categories of none and primary school were combined as primary school or less; monthly household income was re-coded as less than 650 GHS, 650 to 1000 GHS, and greater than 1000 GHS; location of residence was re-coded as municipal, metropolitan, or sub-metropolitan district; number of spontaneous miscarriages was dichotomized as less than two, or two or greater; satisfaction with care variables were dichotomized with very unsatisfied, unsatisfied, neither satisfied or unsatisfied as “unsatisfied,” and satisfied, or very satisfied as “satisfied”;

number of current gestation(s) was dichotomized with twins, or triplets labeled as multiples versus singleton; admission diagnosis was dichotomized as hypertension-related or not hypertension-related due to the theoretical relationship between hypertension and pregnancy-related distress¹¹; mode of delivery was dichotomized with spontaneous vaginal delivery, or vacuum-assisted vaginal delivery as vaginal delivery versus cesarean delivery; neonate birth was dichotomized as less than 1500 grams or 1500 grams and greater; APGAR scores were re-coded as 0 to 3, 4 to 6, 7 to 10; number of antepartum admissions during this pregnancy was dichotomized as no or yes; and, type of anesthesia was dichotomized with spinal and epidural as regional versus general.

The TPDS score for each participant was obtained by summing individual question scores as directed.²³ Per the standard guidelines for score interpretation²³, the total possible score ranged from 0 to 48 for each participant, with higher total scores indicating increased pregnancy-related distress. Per the scale guidelines, the continuous total score was then categorized for interpretation into two categories: (1) positive screen indicating pregnancy-related distress and (2) a negative screen indicating no pregnancy-related distress. A positive screen was numerically defined as having any one of the following: a total score greater than 17; a negative affect sub-score greater than 12; a partner support sub-score greater than seven.²³

The data were manually entered into Microsoft Excel 365, cleaned, and analyzed with Stata version 16 (College Station, TX, USA). We performed descriptive and inferential statistics including cross tabs with chi-square analysis. Statistical significance was defined at P value $<.05$. A series of logistic regression models were run, with a dichotomous TPDS scale score for both antepartum and postpartum patients as the outcome variable. Variables chosen for the logistic regression models included those which were significantly associated with the outcome at the $P<.1$ level in the bivariate analysis

as well as variables, such as number of current gestations, overall satisfaction with care, mode of delivery, delivery outcome of fetus, which were deemed conceptually important by the research team to include. The margins command was used after the regression was run. This postestimation technique generates predicted margins and estimates marginal effects (ME) (derivatives of a specified variable(s) on the predicted outcome while holding other variables in the model constant), using estimated coefficients and estimated variance of the residual from the previously estimated model. We have also included odds ratio with their 95% confidence interval.

Results

A total of 440 alert and oriented patients who were 18 years or older were admitted to the obstetrics unit of a large, urban, teaching hospital in Ghana between November to December 2023. Twenty patients were not enrolled as they were not interested in the study or had difficulties recalling relevant information for the questionnaire. Out of the final 420 (95%) patients enrolled, all 420 (100%) patients completed participation. Among our enrolled hospitalized patients, 166 (39.5%) patients were antepartum, and 254 (60.5%) were postpartum. Demographics are presented in [Table 1](#). Overall, less than 1% of participants reported having ever had a clinical diagnosis of a mental health disorder, including anxiety or depression.

Overall, 157 (37.3%) patients screened positive for pregnancy distress; 60 (36.1%) antepartum patients, and 97 (38.2%) postpartum patients.

In the bivariate analysis, for antepartum patients, the factors significantly associated with a positive pregnancy distress score included ages 18 to 24 ($P<.001$), monthly income less than 650 cedis ($P=.042$), and lower parity ($P=.049$). For postpartum patients, the factors significantly associated with a positive pregnancy distress score included cohabitation relationship status ($P=.01$), education levels of primary school or less or senior high school ($P=.048$), having a previous antepartum

TABLE 1
Demographics of 420 enrolled patients

Demographics		Antepartum (n=166) ^a n (%)	Postpartum (n=254) ^a n (%)
Language	English	103 (62.1)	132 (52.0)
	Ga	5 (3.0)	9 (3.5)
	Twi	58 (34.9)	113 (44.5)
Age	18–24	22 (13.3)	42 (16.5)
	25–34	97 (58.4)	138 (54.3)
	35 or older	47 (28.3)	74 (29.1)
Marital status	Married	110 (66.3)	148 (58.3)
	Not married—Cohabiting	22 (13.3)	49 (19.3)
	Not married—Single	19 (11.5)	25 (9.8)
	Not married—Divorced/separated	15 (9.0)	31 (12.2)
	Not married—Widowed	0 (0.0)	1 (0.4)
Highest completed education	Primary school or less	15 (9.0)	31 (12.2)
	Junior high school	36 (21.7)	77 (30.3)
	Senior high school	58 (34.9)	71 (28.0)
	Tertiary	57 (34.4)	74 (29.1)
Insurance status	Public	159 (95.8)	241 (94.9)
	Private	2 (1.2)	6 (2.5)
	None	4 (2.4)	7 (2.8)
Diagnosis of depression, anxiety, or other mental health disorder	Yes	3 (1.8)	1 (0.4)
	No	263 (97.2)	253 (99.6)

^a Categories may not sum to equal total n due to missingness.Thiyagarajan. Factors associated with a positive Tilburg Pregnancy Distress Scale. *AJOG Glob Rep* 2025.

admission ($P=.025$), and having an emergency cesarean delivery ($P=.036$) (Tables 2 and 3). Diagnosis of depression, anxiety, or other mental health disorders categories were too small for comparison.

The logistic regression for antepartum patients demonstrated that compared to patients aged 18 to 24 years, patients 25 to 34 years old or 35 years or older were 28.8% and 32.7% less likely to have a positive TPDS screen, respectively (ME -0.288 , -0.327 , respectively). Additionally, compared to patients with a primary school education or less, patients with educational levels of junior high school, senior high school, or tertiary were 41.9%, 33.4%, and 40.2% less likely to have a positive TPDS screen, respectively (ME -0.419 , -0.334 , -0.402 , respectively), when

controlling for marital status, income, parity, overall satisfaction with care, and a hypertension diagnosis (Table 4).

The logistic regression for postpartum patients noted no factors significantly associated with a positive TPDS screen when controlling for age, marital status, highest level of education completed, income, parity, overall satisfaction with care, mode of delivery, delivery outcome, and birthweight (Table 4).

Discussion

Principal findings

Among hospitalized obstetric patients in Ghana, less than 1% reported a diagnosed depression, anxiety, or mental health disorder. However, over 37% of our participants, both antepartum and postpartum, screened positive for

pregnancy distress using the TPDS. Among antepartum participants, young age, low household income, and low parity were significantly associated with a positive pregnancy distress screen. Among postpartum participants, no factors were significantly associated with a positive screen in the final, controlled, model.

Results

Thirty-six percent of our antepartum participants screened positive for pregnancy distress on the TPDS. The primary factors were younger age, lower incomes, and lower parity. Although research on pregnancy distress in West Africa is limited, low parity has been associated with a positive TPDS among pregnant patients in the Netherlands. Similarly, in Ethiopia, young age and

TABLE 2

Comparison of sociodemographic factors in relation to a positive TPDS

Patient factor		Antepartum			Postpartum		
		Positive TPDS <i>n</i> (%) (<i>n</i> =60) ^a	Negative TPDS <i>n</i> (%) (<i>n</i> =106) ^a	<i>P</i> value	Positive TPDS <i>n</i> (%) (<i>n</i> =97) ^a	Negative TPDS <i>n</i> (%) (<i>n</i> =157) ^a	<i>P</i> value
Language	English	39 (65.0)	64 (60.4)	.746	54 (55.7)	78 (49.7)	.218
	Ga	1 (1.7)	4 (3.8)		1 (1.0)	8 (5.1)	
	Twi	20 (33.3)	38 (35.8)		42 (43.3)	71 (45.2)	
Age (y)	18–24	16 (26.7)	6 (5.7)	<.001	22 (22.7)	20 (12.7)	.110
	25–34	34 (56.6)	63 (59.4)		50 (51.5)	88 (56.1)	
	35 or older	10 (16.7)	37 (34.9)		25 (25.8)	49 (31.2)	
Marital status	Married	34 (56.7)	76 (71.7)	.110	45 (46.5)	103 (65.7)	.010
	Not married—Cohabiting	8 (13.3)	14 (13.2)		24 (24.7)	25 (15.9)	
	Not married—Single	9 (15.0)	10 (9.4)		8 (8.2)	17 (10.8)	
	Not married—Divorced/separated	9 (15.0)	6 (5.7)		19 (19.6)	12 (7.6)	
	Not married—Widowed	0 (0.0)	0 (0.0)		1 (1.0)	0 (0.0)	
Highest completed education	Primary school or less	9 (15.0)	6 (5.7)	.090	15 (15.5)	15 (9.6)	.048
	Junior high school	11 (18.3)	25 (23.6)		23 (23.7)	54 (34.4)	
	Senior high school	24 (40.0)	34 (32.1)		34 (35.1)	37 (23.6)	
	Tertiary	16 (26.7)	41 (38.6)		24 (24.7)	50 (31.8)	
Insurance status	Public and private	58 (96.6)	103 (97.2)	.189	94 (96.9)	153 (97.5)	.666
	None	1 (1.7)	3 (2.8)		3 (3.1)	4 (2.5)	
Monthly household income (GHS)	<650	32 (53.4)	37 (34.9)	.042	35 (36.2)	51 (32.4)	.953
	650–1000	11 (18.3)	27 (25.5)		21 (21.6)	30 (19.1)	
	>1000	15 (25.0)	42 (39.6)		21 (21.6)	42 (26.8)	
Residence	Municipal district	45 (75.0)	82 (77.4)	.188	74 (76.3)	112 (71.3)	.462
	Metropolitan district	7 (11.7)	4 (3.8)		4 (4.1)	10 (6.4)	
	Sub-metropolitan district	8 (13.3)	17 (16.0)		15 (15.5)	33 (21.0)	

^a Categories may not sum to equal total *n* due to missingness.

Thiyagarajan. Factors associated with a positive Tilburg Pregnancy Distress Scale. *AJOG Glob Rep* 2025.

low education—likely correlating with lower income—were linked to positive scores on the Kessler Psychological Distress Scale.^{2,25,26} In contrast, a study among women in Taiwan reported that prenatal psychological distress was more common in multiparous women.²⁷

Among our postpartum participants, multiple factors were significant in the bivariate analysis however none remained significantly associated with pregnancy distress in the final regression. While no previous study has investigated factors associated with

pregnancy distress among Ghanaian postpartum patients, prior studies have identified that relationship status and education level,²⁸ and parity greater than three²⁹ were associated with perinatal depression. Consistent with our bivariate analysis, emergency cesarean delivery was associated with postnatal depression among postpartum patients in Australia and Sweden.^{30,31}

Clinical implications

Our study's high prevalence of pregnancy distress underscores the importance of maternal mental health

screening, including pregnancy distress screening, among antepartum and postpartum patients in Ghana and other LMICs. Screening is especially critical given the very low number of our participants who had been clinically diagnosed with a mental health issue. In Ghana currently, there is no national policy for routinely screening pregnant or postpartum patients for pregnancy distress or other mental health disorders.³² With a recruitment rate of 95% and completion rate of 100%, our study also demonstrated that patients are willing to complete the screening scale.

TABLE 3
Comparison of clinical factors in relation to a positive TPDS

Patient factor		Antepartum			Postpartum		
		Positive TPDS n (%) (n=60) ^a	Negative TPDS n (%) (n=106) ^a	P value	Positive TPDS n (%) (n=97) ^a	Negative TPDS n (%) (n=157) ^a	P value
Parity	Mean (SD)	1.2 (0.174)	1.6 (0.126)	.049	2.2 (0.149)	2.5 (0.129)	.120
Number of spontaneous miscarriages	Less than two	55 (91.7)	93 (87.7)	.434	83 (85.6)	144 (91.7)	.181
	Two or more	5 (8.3)	13 (12.3)		13 (13.4)	13 (8.3)	
Overall satisfaction with care	Satisfied	51 (85.0)	93 (87.8)	.689	86 (88.7)	145 (92.3)	.260
	Not satisfied	8 (13.3)	12 (11.3)		10 (10.3)	10 (6.4)	
Antepartum-only factors							
Gestational age (wk)	Mean (SD)	29.9 (0.995)	30.4 (0.806)	.348			
Number of current gestation	Singleton	54 (90.0)	91 (85.8)	.621			
	Multiples	5 (8.3)	13 (12.3)				
History of prior cesarean delivery	Yes	13 (21.7)	37 (34.9)	.116			
	No	73 (71.6)	69 (65.1)				
Hypertension diagnosis	Yes	7 (11.7)	24 (22.6)	.081			
	No	53 (88.3)	82 (77.4)				
Satisfaction with counseling on reason for admission	Satisfied	48 (80.0)	89 (84.0)	.572			
	Not satisfied	11 (18.3)	16 (15.1)				
Postpartum-only factors							
Previous antepartum admissions	Yes				23 (23.7)	21 (13.4)	.025
	No				74 (76.3)	136 (86.6)	
Total duration of admission (d)	Mean (SD)				4.06 (0.410)	4.24 (0.583)	0.415
Received blood transfusion during this admission	Yes				16 (16.5)	22 (14.0)	.601
	No				79 (81.4)	131 (83.5)	
Delivery outcome	Live birth				93 (95.9)	145 (92.4)	.262
	Stillbirth				4 (4.1)	12 (7.6)	
Sex of neonate	Female				43 (44.3)	68 (43.3)	.972
	Male				52 (53.6)	86 (54.8)	
Birthweight	≥/ > 1500 grams				94 (96.9)	144 (91.7)	.093
	< 1500 grams				3 (3.1)	13 (8.3)	
Apgar score at 5 min	0–3				8 (8.2)	13 (8.3)	.948
	4–6				5 (5.2)	10 (6.4)	
	7–10				77 (79.4)	129 (82.2)	
Mode of delivery	Vaginal delivery				43 (44.3)	79 (50.3)	.353
	Cesarean delivery				54 (55.7)	78 (49.7)	
Delivered by cesarean delivery					n=54	n=78	
Timing status	Emergency				42 (77.8)	49 (62.8)	.036
	Elective				10 (18.5)	29 (37.2)	
Satisfaction with counseling for cesarean delivery	Yes				46 (85.2)	63 (80.8)	.365
	No				7 (13.0)	15 (19.2)	
Satisfaction with postoperative care	Yes				49 (90.7)	71 (91.0)	.789
	No				4 (7.4)	7 (9.0)	
Type of anesthesia	Regional				48 (88.9)	67 (85.9)	.438
	General				5 (9.3)	11 (14.1)	

^a Categories may not sum to equal total n due to missingness.

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TABLE 4

Multivariate logistic regression with positive TPDS screen as outcome variable

Patient factor		Antepartum		Postpartum	
		Odds ratio (95% CI)	Marginal effects	Odds ratio (95% CI)	Marginal effects
Age (y)	18–24	Reference	Reference	Reference	Reference
	25–34	0.263 (0.082–0.842) ^a	–0.288	0.716 (0.308–1.66)	
	35 or older	0.214 (0.053–0.865) ^a	–0.327	0.774 (0.274–2.18)	
Marital status	Married	1.17 (0.348–3.91)		0.655 (0.252–1.70)	
	Not married—Cohabiting	0.838 (0.193–3.63)		1.25 (0.438–3.58)	
	Not married—Single	Reference	Reference	Reference	Reference
	Not married—Divorced/separated	2.03 (0.416–9.92)		1.95 (0.589–6.43)	
Highest completed education	Primary school or less	Reference	Reference	Reference	Reference
	Junior high school	0.129 (0.029–0.566) ^a	–0.419	0.439 (0.165–1.16)	
	Senior high school	0.204 (0.050–0.829) ^a	–0.334	0.802 (0.299–1.51)	
	Tertiary	0.142 (0.030–0.672) ^a	–0.402	0.458 (0.139–1.51)	
Monthly household income (GHS)	<650	Reference	Reference	Reference	Reference
	650–1000	0.644 (0.237–1.74)		1.19 (0.542–2.61)	
	>1000	0.695 (0.259–1.86)		0.985 (0.409–2.37)	
Parity		0.752 (0.537–1.05)		0.887 (0.678–1.16)	
Overall satisfaction with care	Satisfied	Reference	Reference	Reference	Reference
	Not satisfied	0.649 (0.217–1.94)		0.627 (0.213–1.84)	
Hypertension diagnosis	Yes	0.485 (0.169–1.39)			
	No	Reference	Reference		
Mode of delivery	Vaginal delivery			Reference	Reference
	Elective cesarean delivery			0.871 (0.355–2.14)	
	Emergency cesarean delivery			1.62 (0.831–3.14)	
Delivery outcome	Live birth			Reference	Reference
	Stillbirth			0.418 (0.100–1.74)	
Birthweight	Greater than 1500 grams			Reference	Reference
	Less than 1500 grams			1.21 (0.685–2.15)	
Previous antepartum admissions	Yes			1.84 (0.864–3.91)	
	No			Reference	Reference

CI, confidence interval.

^a P value <.05.

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While universal screening has advantages, most LMICs including Ghana have a proportionally low numbers of health workers with a high burden of workplace demands.³³ Therefore, our study has identified the highest-risk group of antepartum patients to focus screening efforts; those with young age, low income, and low parity.

Importantly, pregnancy distress is associated with poor pregnancy outcomes such as preterm delivery, hypertensive disorders of pregnancy, and

impaired neurodevelopment of the child.^{2,10,11,34,35} In addition, pregnancy distress can result in the development of a mental health disorder such as depression.³⁶ Previous studies in Ghana have demonstrated a prevalence of 15% to 40% of perinatal depression and anxiety among Ghanaian patients when evaluated in research settings.^{29,37} This suggests that mental health disorders are likely under-evaluated, diagnosed, and treated in Ghana. This largely reflects widely-held socio-cultural

beliefs in West Africa that mental health abnormalities do not exist during the perinatal period and where maternal mental health disorders are negatively perceived and highly stigmatized.^{20,38}

Research implications

Future research would be beneficial to investigate rates of pregnancy distress in the general, nonhospitalized pregnancy population. Additionally, is it important to identify methods for universal screening that minimize clinician

time-burden to help increase diagnosis and treatment of mental health disorders as well as observing downstream clinical outcomes. Further investigations into Ghanaian culture surrounding mental health disorders in pregnancy and postpartum will be crucial to identify how barriers and obstacles can be overcome to ensure successful acceptance of screening, diagnosis, and treatment. Notably, while participants who screened positive were offered support from a clinical psychologist, participants' acceptance of and response to this clinical support was not evaluated; this is an important area for future research.

Strengths and limitations

Our study is the first to use the TPDS tool in assessing pregnancy distress across antepartum and postpartum patients in Ghana with important associated factors that can influence policy and clinical screening protocols in LMIC settings. While not specifically utilized within the Ghanaian context previously, the TPDS has been validated in other LMICs.^{39,40} Our study is limited by clinical data being dependent on patient report. Due to verbal administration of the survey, non-English speaking patients may have had concerns about sharing sensitive responses, however, no differences in TPDS scores were seen across languages. Given translation of the TPDS from English, there may have been concerns related to translations and/or miscommunication, but the trained research assistants who administered the survey were fluent in all three languages to limit this concern. Our study population only includes hospitalized patients who may have a different incidence of pregnancy distress rather than the general pregnant population. We did not evaluate the history of trauma, or specific neonatal outcomes which may have provided more insight into identified factors. Finally, our conclusions are limited by administering the TPDS at a single time point, rather than monitoring throughout the pregnancy and postpartum period, as pregnancy distress may vary throughout

the various stages of pregnancy and postpartum.

Conclusions

Our study is the first to identify factors associated with Ghanaian patients' pregnancy distress, which can contribute to pregnancy, maternal, and child health consequences. Over one-third of obstetric patients screened positive on the TPDS with prevalence rates comparable across antepartum and postpartum patients. Our study identified antepartum patient factors of young age, low income, and low parity for increased positive screening on the TPDS. Identifying Ghanaian pregnant patients with these factors may help to target those at the greatest need for increased screening and monitoring, which is aligned with the Sustainable Development Goals.⁴¹

CRedit authorship contribution statement

Dhanalakshmi Thiyagarajan: Writing – review & editing, Writing – original draft, Formal analysis. **Astrid Sarfo:** Writing – review & editing, Writing – original draft, Data curation. **Alim Swarray-Deen:** Writing – review & editing, Methodology. **Sarah Compton:** Writing – review & editing, Formal analysis. **Emma Lawrence:** Writing – review & editing, Methodology, Conceptualization. **Promise Sefogah:** Writing – review & editing, Methodology, Conceptualization.

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