International Journal of Women's Health

Dovepress

open access to scientific and medical research

Open Access Full Text Article

ORIGINAL RESEARCH

Prevalence and Factors Associated with Anxiety Disorders Among Pregnant Women at Mulago National Referral Hospital, Uganda

Mariam Nabwire[1], Annettee Nakimuli[1], Noeline Nakasujja[2], Richard Migisha[3,4], Charles Kiggundu[1,†]

[1]Department of Obstetrics and Gynecology, School of Medicine, Makerere University College of Health Sciences, Kampala, Uganda; [2]Department of Psychiatry, School of Medicine, Makerere University College of Health Sciences, Kampala, Uganda; [3]Uganda Public Health Fellowship Program, Uganda National Institute of Public Health, Kampala, Uganda; [4]Department of Physiology, Mbarara University of Science and Technology, Mbarara, Uganda

[†]Charles Kiggundu passed away on 29th December 2020

Correspondence: Mariam Nabwire, Department of Obstetrics and Gynecology, School of Medicine, Makerere University College of Health Sciences, Kampala, Uganda, Tel +256 756600593; +256 775834405, Email nabwirem@yahoo.com

Background: Anxiety disorders in pregnancy are common and represent a global concern. However, data regarding the magnitude of anxiety among pregnant women in Uganda are limited, and yet, these data could pave way for implementing effective mitigation measures. We determined the prevalence of anxiety disorders and associated factors among pregnant women at Mulago Hospital Uganda.

Methods: A cross-sectional study was conducted among pregnant women attending antenatal care clinic at Mulago Hospital between September and November 2015. Systematic sampling was used to enroll eligible women. An interviewer-administered demographic questionnaire and the Hamilton Anxiety Rating Scale for Antenatal Anxiety (HAMA-A) scale were used to assess demographic features and anxiety, respectively. Women with HAMA-A score ≥17 were considered to have anxiety disorder. Factors associated with anxiety disorders were determined using multivariate logistic regression.

Results: A total of 501 pregnant women were enrolled into the study; the prevalence of anxiety disorders was 13% (n=65; 95% CI: 9.8–15.7%). Factors that were significantly associated with anxiety disorders were low income of the participants (adjusted odds ratio [AOR]=2.65, 95% CI: 1.16–6.06), bad relationship with spouse (AOR = 2.50, 95% CI: 1.01–5.82) and history of hypertension in previous pregnancy (AOR = 4.17, 95% CI: 1.68–10.37).

Conclusion: Approximately one in ten women surveyed exhibited anxiety disorders. Anxiety disorders were associated with low-income levels, bad spousal relationships, and a history of hypertension during previous pregnancies. Multidisciplinary approaches that integrate mental health support, social services, and partner involvement may help address anxiety disorders in pregnancy and contribute to improved maternal and child outcomes.

Keywords: anxiety disorders, pregnancy, antenatal care, Uganda

Introduction

Maternal anxiety in pregnancy refers to an excessive and distressing state of worry, fear, and apprehension experienced by pregnant women, often characterized by heightened levels of anxiety related to childbirth, concerns about the well-being of the developing fetus, and the challenges associated with impending parenthood.[1,2] In the fifth edition of the Diagnostic and Statistical Manual (DSM-V), various types of anxiety disorders are recognized, including panic disorder, social phobia, agoraphobia, post-traumatic stress disorder, obsessive-compulsive disorder, and generalized anxiety disorder.[3] Anxiety disorders represent one of the most common mental health disorders in pregnancy; a systematic review reported an overall prevalence of clinical diagnosis ranging from 9.0% to 21% for any anxiety disorder and 1.9% to 6.2% for generalized anxiety disorder.[4] Anxiety disorders in pregnancy are associated with poor maternal and fetal outcomes including obstetric complications, preterm births, and low birth weight;[5–7] moreover, the effect of anxiety may

Received: 14 September 2023
Accepted: 22 January 2024
Published: 5 February 2024

spill into the postpartum period, leading to potential complications.[8] Despite this, access to quality mental health services during pregnancy and postpartum remains a challenge in low-resource settings, including sub-Saharan Africa.[9]

Anxiety disorders in pregnancy are influenced by various factors, including demographic characteristics such as young maternal age, educational level, and socio-economic status.[10,11] The prevalence of anxiety disorders can also differ across trimesters, with higher levels reported in the first and third trimesters.[12] Additional pregnancy-related factors associated with anxiety disorders include parity, presence of comorbidities, history of puerperal complications, previous abortion or instrumental delivery, unwanted pregnancy, abortions, previous stillbirth or difficult labor, and perceived lack of social support.[13–15]

Anxiety disorders during pregnancy represent a global concern, yet there is a research gap regarding the prevalence and associated factors of anxiety disorders specifically in Uganda. This gap contributes to the neglect of mental health aspects in prenatal and postpartum healthcare, where the primary focus remains on physical well-being. Current antenatal care packages in Uganda have not yet incorporated holistic approaches,[16] including screening and management for mental health disorders. Compounded by prevalent factors such as poverty, lack of spousal support, and exposure to violence in Uganda, anxiety among pregnant women may be exacerbated, leading to an increased risk of substance use like tobacco, alcohol, and drugs.[17] These substances have known detrimental effects on placental function and fetal growth.[18] Additionally, pregnant women experiencing anxiety are less likely to attend regular obstetric visits, adhere to prenatal advice, and follow prescribed medications, ultimately resulting in adverse outcomes for both mother and baby. Thus, it is necessary to optimize mental health in pregnancy because of its intergenerational impact on pregnancy, infants and children's health. This study aimed to address this knowledge gap by determining the prevalence and associated factors of anxiety disorders among pregnant women at Mulago Hospital, the national referral hospital in Uganda. The insights gained from this research will inform policymakers and healthcare providers, facilitating the development of comprehensive antenatal care services and ultimately improving maternal healthcare delivery in Uganda.

Methods

Study Design and Setting

This was a cross-sectional study, which was conducted at the antenatal clinic of Mulago National Referral Hospital from September 2015 to November 2015. The hospital is situated in Kawempe Division of Kampala, the capital city of Uganda. The antenatal clinic is located at assessment center of the Mulago Hospital Complex. Pregnant women are treated at this clinic from Tuesday to Thursday (three days a week). The women are screened for infections, medical conditions and pregnancy related complications. On average, the antenatal care (ANC) clinic at Mulago Hospital attends to approximately 130 women daily with high-risk pregnancies who require medical attention due to medical conditions or pregnancy-related complications. Additionally, approximately 60–80 women with low-risk pregnancies, who do not have significant medical or obstetric complications and are expected to have a normal delivery, are also seen during ANC clinic days. These low-risk pregnancies are typically managed by midwives.

Study Population and Eligibility Criteria

We enrolled pregnant women in the ANC clinic who provided consent to participate in the study and were at least 12 weeks into their pregnancy (≥12 weeks of amenorrhea). Excluded from the study were women who were too ill to respond to the interviewer-administered questionnaire or who required immediate medical attention due to conditions such as severe anemia, severe hypertension, antepartum hemorrhage, and other similar cases.

Sample Size and Sampling

The sample size for this study was calculated using Fleiss statistical formula for rates and proportions using Open Epi.[19] The sample size estimation was based on the hypothesis that the prevalence of anxiety higher among women with parity <4 (23%) and compared to parity ≥4 (13%), as reported in a previous study done in Nigeria.[20] We assumed a two-sided confidence level (1-alpha) of 95%, power of 80%, and the minimum detectable odds ratio of 2.2. This yielded a total sample size of 500 participants after accounting for a 20% non-response rate.

Systematic sampling was used where every fifth mother according to the registration book was recruited in the study if they fulfilled the eligibility criteria.

Data Collection Procedure and Study Variables

The trained research assistants (two midwives) or the principal investigator explained to the selected participants the purpose of the study, benefits, risks and sought their participation. Those who agreed to participate and were eligible were requested to sign a consent form by writing their name and signature and were assigned a study number. Pre-tested interviewer administered questionnaire and Hamilton anxiety rating scale were used to collect data. A maximum of 16 participants were interviewed on each of the three clinic days per week for 3 months (September 2015 to November 2015).

The dependent variable was anxiety disorders in pregnant women and the independent variables were socio-demographic/economic factors including (age, marital status, level of education, and occupation), biomedical, behavioral and obstetric/gynecologic factors. Other independent variables included violence experienced by the participants, as well as perceived support from spouses or family members.

Data Collection Tools

The tools used included interviewer administered questionnaire to assess factors associated with anxiety and the Hamilton Anxiety Rating Scale for Antenatal Anxiety (HAMA-A) Scale for determining severity of anxiety. The HAMA-A is one of the rating scales developed to measure the severity of anxiety symptoms. The scale consists of 14 items, each defined by a series of symptoms, and measures both psychic anxiety (mental agitation and psychological distress) and somatic anxiety (physical complaints related to anxiety). Each item is scored on a scale of 0 (not present) to 4 (severe), with a total score range of 0–56, where <17 indicates mild severity, 17–24 mild to moderate severity and 25–30 moderate to severe.[21] In this study, the total scores were dichotomized: participants scoring <17 were classified as not having anxiety, whereas those scoring ≥17 were categorized as having anxiety disorder during pregnancy.

The assessment of violence and support was conducted using open-ended interview questions. We captured participants' experiences of physical violence, verbal assault, sexual assault, and the various forms of violence they might have encountered from their spouses. Support during pregnancy was defined to encompass physical (tangible aid such as assistance with household chores, transportation, or any other physical tasks that contributed to the well-being of the pregnant mother), social (emotional and psychological support provided by the spouse and/or family members), and economic support, such as financial contributions or material resources from both the spouse and/or family members.

Data Management and Statistical Analysis

Data was double entered into Epidata version 3.1 (EpiData, Odense, Denmark) and exported to STATA version 12.0 (StataCorp, College Station, Texas, USA) for all the analyses.

The prevalence of anxiety disorders was calculated by the number of women who had anxiety disorders (HAMA-A score≥17) divided by the total number of women recruited into the study. To assess factors associated with anxiety disorders in pregnancy, bivariate analysis was performed to compute odds ratios at the 95% level of significance. To assess independent associations of the exposure factors, multivariate analysis was performed. Variables eligible for inclusion in the multivariate logistic regression model were those with a p-value of less than 0.2 at bivariate analysis. Additionally, variables with biological plausibility, such as a history of alcohol consumption and mode of delivery in the past pregnancy, were considered for inclusion. Factors with p-value <0.05 in the final multivariate model were considered statistically significant.

Ethical Considerations

Approval to conduct this study was obtained from the Department of Obstetrics and Gynecology Mulago hospital, School of Medicine Research and Ethics committee accredited by the Uganda National Council for Science and Technology. Written informed consent was sought from all study participants. Permission was obtained from the Institutional Review Board (IRB) for the emancipated minors to consent on their own. The participants were further notified that they were free to withdraw from the study at any time during the course of the study. Information obtained from patients was

treated with utmost confidentiality and used for study purpose only. For purposes of clarification of raw data by the principal investigator, only the patient clinic and study numbers were recorded to assist in retrieving the recorded information. All women attending ANC clinic continued to be offered a range of antenatal services.

Participants with moderate-to-severe symptoms of anxiety were referred for psychiatric care at the mental health clinic in Mulago Hospital. We adhered to the principles outlined in the Helsinki Declaration and CIOMS-2002 (Council for International Organizations of Medical Sciences) guidelines concerning human research, ensuring the prevention of any form of physical or moral harm.

Results

The age of the participants ranged between 16 and 38 years with an average age of 27 years. Half of the participants (n=252; 50%) were aged 25–34 years (Table 1). Of the 501 participants, the vast majority (94%) were married or cohabiting. More than half of the participants (57%) had completed secondary education. A significant proportion (85%) of participants reported a monthly income of 200,000 Ugandan shillings or less. A small proportion (8%) of participants reported having relatives with a history of mental illness.

Table 1 Socio-Demographic, Biomedical, Obstetric and Gynecological Characteristics of Study Participants at Mulago Hospital, Uganda

Characteristics	Frequency (n=501)	Percentage (%)
Age (years)		
16–24	195	39
25–34	252	50
≥35	54	11
Marital status		
Single/separated/divorced	31	6
Married /cohabiting	470	94
Education level		
No formal education and Primary	148	30
Secondary	288	57
Tertiary	65	13
Participants' Income per month (Ugandan shillings)		
≤200,000	424	85
>200,000	77	15
Husband has income	76	15
Relationship with spouse is good	374	75
Survivor of violence*	411	82
Number of meals in a day		
<3 meals	92	18
≥3 meals	409	82
Received support during pregnancy	481	96
Takes alcohol during pregnancy	48	10
Relatives known to have mental illness	41	8
Past medical history of chronic illnesses	74	19
Parity		
0	109	22
1–3	322	64
≥4	70	14
Gestational age (weeks)		
13–24	37	7
25–38	373	75
>38	90	18

(*Continued*)

Table 1 (Continued).

Characteristics	Frequency (n=501)	Percentage (%)
Planned to have the pregnancy	303	60
History of previous abortions	137	34
Complications in past pregnancy		
None	333	67
Hypertension	51	10
Others[¶]	117	23
Mode of delivery in past pregnancy		
Normal vaginal delivery	254	65
Assisted/Caesarean	136	35

Notes: *Indicates participants who cited physical violence, verbal assault, sexual assault and/or all the three forms of violence. [¶]Indicates participants who cited diabetes, asthma, cardiac disease, HIV, among others.

The majority (75%) of participants reported having a good relationship with their spouse. Most (82%) of participants reported being survivors of violence, which included physical violence, verbal assault, sexual assault, or a combination of all three forms. The majority (82%) of participants reported having three or more meals per day, and a vast majority (96%) received support during their pregnancy. The majority (75%) of participants were in the second trimester of pregnancy (13–24 weeks of amenorrhea), while 18% were in the third trimester (>38 weeks).

Two-thirds (67%) of participants reported having no complications in their previous pregnancies. The majority (65%) of participants experienced a normal vaginal delivery in their previous pregnancy.

Prevalence of Anxiety Disorders Among Pregnant Women

Out of the total 501 study participants, 65 (13%; 95% CI: 9.8–15.7%) were diagnosed with anxiety disorders; the remaining 436 participants (87%) exhibited no anxiety disorder. Among the 65 participants with anxiety disorders, the majority (n=54; 83.1%) were diagnosed with mild-to-moderate anxiety, while the remaining 11 (16.9%) presented with severe anxiety.

Factors Associated with Anxiety Disorders Among Pregnant Women

Women with a monthly income of 200,000 Ugandan shillings or less exhibited a higher likelihood of experiencing anxiety disorders (OR=2.39, 95% CI: 1.23–4.62, p=0.010) (Table 2). Additionally, participants reporting a not-good relationship with their spouse were more likely to have anxiety disorders (OR=2.13, 95% CI: 1.13–3.99, p=0.019), as were those with a history of violence (OR=6.38, 95% CI: 1.49–27.32, p=0.012).

Pregnant women without anxiety disorders had a lower prevalence of past medical history compared to those with anxiety disorders. Among women without anxiety disorders, 83% had no previous medical complications, while 71% of those with anxiety disorders reported no medical history. Notably, women with a history of hypertension were more likely to have anxiety disorders, with a statistically significant crude odds ratio of 2.91 (95% CI: 1.26–6.71, p=0.012). However, there was no significant association between other medical complications (eg, diabetes, asthma, cardiac disease, cancer, HIV, and other complications) and anxiety disorders (p=0.280), with a crude odds ratio of 1.51 (95% CI: 0.72–3.19) (Table 3). Among women with anxiety disorders during the current pregnancy, those with a history of hypertension during previous pregnancies showed a significantly higher likelihood, with an odds ratio of 2.93 (95% CI: 1.26–6.81), compared to women without anxiety disorders.

The factors that were independently associated with anxiety disorders among pregnant women at multivariate analysis were low income level of the participants, bad relationship of the woman with her spouse, and history of hypertension in previous pregnancy (Table 4). Pregnant women with a monthly income of <=200,000 shillings had a significantly higher likelihood of experiencing anxiety disorders (AOR = 2.65, 95% CI: 1.16–6.06, p = 0.021) compared to those with an income greater than 200,000 shillings. Women who reported having a not-good relationship with their spouse had a significantly higher odds of experiencing anxiety disorders (AOR = 2.52, 95% CI: 1.09–5.82, p = 0.030) compared to

Table 2 Bivariate Analysis for Socio-Demographic and Economic Factors Associated with Anxiety Disorders in Pregnant Women at Mulago Hospital, Uganda

Characteristics	No anxiety disorder: N= 436 (%)	Anxiety disorder present: N=65 (%)	Crude OR, (95% CI)	p-value
Age group of pregnant women				
16–24	170 (39)	25 (38)	1	
25–34	222 (51)	30 (46)	0.92 (0.50–1.60)	0.77
≥35	44 (10)	10 (15)	1.55 (0.70–3.50)	0.289
Marital status				
Single/separated/divorced	24 (6)	7 (11)	1	
Married/cohabiting	412 (95)	58 (89)	0.97 (0.26–3.64)	0.961
Education level				
No formal education and Primary	125 (29)	23 (35)	1	
Secondary	254 (58)	34 (52)	0.86 (0.44–1.70)	0.672
Tertiary	57 (13)	8 (12)	0.97 (0.33–2.80)	0.950
Participants Income per month (Shillings)				
≤200,000	371 (85)	53 (81)	2.39 (1.23–4.62)	0.010
>200,000	65 (15)	12 (19)	1	
Relationship with spouse				
Good	338 (78)	36 (56)	1	
Not good*	98 (22)	28 (44)	2.13 (1.13–3.99)	0.019
Survivor of violence				
None	88 (20)	2 (3)	1	
Yes †	348 (80)	63 (97)	6.38 (1.49–27.32)	0.012
Number of meals in a day				
<3 meals	78 (18)	14 (22)	1	
≥3 meals	358 (82)	51 (78)	0.68 (0.34–1.37)	0.284
Received support during pregnancy				
No	15 (3)	5 (8)	1	
Yes	421 (97)	60 (92)	0.94 (0.22–4.03)	0.937

Notes: *Indicates participants who cited fair and bad relationship, †Indicates participants who cited physical violence, verbal assault, sexual assault and/or all the three forms of violence.
Abbreviation: CI, Confidence interval.

Table 3 Bivariate Analysis for Biomedical, Behavioural and Obstetric/Gynecological Factors Associated with Anxiety Disorders in Pregnant Women

Characteristic	No Anxiety Disorder: N=436 (%)	Anxiety Disorder Present: N=65 (%)	Crude OR, (95% CI)	p-value
Took alcohol in current pregnancy				
No	397 (91)	56 (86)	1	
Yes	39 (9)	9 (14)	0.63 (0.27–1.44)	0.274
Relatives known to have mental illness				
No	401 (92)	59 (91)	0.65 (0.05–8.62)	0.741
Yes	35 (8)	6 (9)	1	
Parity				
0	90 (21)	19 (29)	1	
1–3	285 (65)	37 (57)	0.64 (0.70–5.60)	0.688
≥4	61 (14)	9 (14)	0.84 (0.09–7.75)	0.880
Gestational age				
13–24	33 (8)	4 (6)	1	
25–38	322 (74)	51 (79)	2.40 (0.49–11.70)	0.280
>38	80 (18)	10 (15)	2.28 (0.40–12.86)	0.350

(*Continued*)

Table 3 (Continued).

Characteristic	No Anxiety Disorder: N=436 (%)	Anxiety Disorder Present: N=65 (%)	Crude OR, (95% CI)	p-value
Planned to have pregnancy				
Yes	270 (62)	33 (51)	1	
Just happened	158 (36)	30 (46)	1.50 (0.75–3.01)	0.252
Forced/Raped	8 (2)	2 (3)	-	-
Number of children alive				
0	101 (23)	20 (31)	1	
1–3	287 (66)	37 (57)	0.79 (0.09–7.31)	0.839
>3	48 (11)	8 (12)	1.16 (0.06–21.30)	0.922
History of previous abortions				
No	238 (67)	32 (63)	0.79 (0.37–1.67)	0.529
Yes	118 (33)	19 (37)	1	
Complications in past pregnancy				
None	300 (69)	33 (51)	1	
Hypertension	37 (9)	14 (22)	2.93 (1.26–6.81)	0.012
Others[‡]	99 (23)	18 (28)	1.30 (0.25–6.83)	0.760
Mode of delivery in past pregnancy				
Normal vaginal delivery	225 (65)	29 (63)	1	
Assisted/Caesarean	119 (35)	17 (37)	0.934 (0.46–1.91)	0.859
Complications during delivery				
None	309 (71)	37 (57)	1	
Excessive per vaginal bleeding	32 (7)	8 (12)	1.85 (0.71–4.77)	0.205
Other complications[§]	95 (22)	20 (31)	3.24 (0.44–23.57)	0.246

Notes: [‡]Indicates participants who cited fits/convulsions, bleeding while pregnant at 7 months of pregnancy, labor/rupture of membranes before 37 weeks of amenorrhea and other complications like epistasis, vaginal itching, and severe malaria; [§]Indicates participants who cited blood transfusion, fever and/or pus discharge from the vagina, pain and/or swelling around the nipples, and other complications like abdominal pain, rigors, and body swelling.

Table 4 Multivariate Analysis for the Factors Associated with Anxiety Disorders Among Women Attending Antenatal Care at Mulago Hospital, Uganda

Variables	Adjusted Odds Ratio	95% CI		P-value
		Lower	Upper	
Marital status				
Single	1			
Married	0.78	0.17	3.52	0.745
Education level				
No education/primary	1			
Secondary	0.92	0.40	2.09	0.832
Tertiary	2.19	0.58	8.33	0.251
Participants' income per month (shillings)				
≤200,000	2.65	1.16	6.06	0.021
>200,000	1			
Husband's income				
Does not know	1			
Earns some income	0.35	0.10	1.29	0.114
Relationship with spouse				
Good	1			
Not good	2.52	1.09	5.82	0.030

(*Continued*)

Table 4 (Continued).

Variables	Adjusted Odds Ratio	95% CI		P-value
		Lower	Upper	
Took alcohol				
No	1			
Yes	0.48	0.17	1.36	0.167
Gestational age (weeks)				
13–24	1			
25–38	2.11	0.40	11.18	0.379
>38	1.66	0.27	10.40	0.588
Complications in past pregnancy				
None	1			
Hypertension	4.17	1.68	10.37	0.002
Others	0.79	0.12	5.28	0.811
Mode of delivery in past pregnancy				
Normal	1			
Assisted/caesarean	1.31	0.60	2.85	0.501
Complications during delivery				
None	1			
Excessive per vaginal bleeding	1.88	0.62	5.68	0.264
Other complications	6.83	0.93	50.28	0.059

those with a good relationship. Pregnant women with a history of hypertension during past pregnancies had a significantly increased likelihood of anxiety disorders (AOR = 4.17, 95% CI: 1.68–10.37, p = 0.002) compared to those with no complications. Although not statistically significant (AOR = 6.83, 95% CI: 0.93–50.28, p = 0.059), pregnant women who experienced other complications during delivery had a noteworthy higher odds of anxiety disorders.

Discussion

Approximately one in ten women attending antenatal care at the national referral hospital exhibited anxiety disorders. This study identified significant associations between anxiety disorders and specific factors, including low-income levels among participants, challenging spousal relationships, and a history of hypertension during previous pregnancies. Overall, these findings underscore the significance of healthcare professionals, particularly those involved in antenatal care, in proactively screening for anxiety symptoms and risk factors during their comprehensive assessments. Implementing policies that enable the referral of women with anxiety symptoms to specialized mental health clinics or hospitals could ensure they receive timely and appropriate care.

The prevalence of anxiety disorders during pregnancy at Mulago National Referral Hospital was found to be 13%, a rate comparable to other studies investigating maternal mental health in Africa. A comprehensive review of the literature on pre and postnatal mental health in Africa reported an antenatal anxiety rate of 14.8% across the continent.[22] However, it is important to note that our results were lower than those reported by Adewuya et al, who found anxiety rates of 39% in pregnant Nigerian women compared to 16.3% in the non-pregnant population.[23] This discrepancy may be attributed to differences in methodology, particularly the rating scales used. Adewuya et al measured anxiety using the trait anxiety inventory, while our study employed the HAM-A, which assessed a combination of specific psychic and somatic anxiety symptoms. In a study conducted by Heron et al with 8000 pregnant women in Great Britain, 21.9% exhibited anxiety symptoms, which was nearly double the prevalence observed in our study.[24] This notable difference in prevalence could be attributed to the contrasting study settings, with Britain representing a more developed setting in comparison to Uganda; there are variations in healthcare infrastructure, socio-economic conditions, and cultural factors

between the two settings. Furthermore, the study in Britain assessed symptoms of anxiety across the transition from pregnancy to the postpartum; this could explain the higher rates of anxiety disorders in this study than ours.

This study investigated the prevalence of anxiety disorders during pregnancy and identified significant factors associated with such disorders. Notably, low-income levels, problematic spousal relationships, and a history of hypertension in previous pregnancies showed strong associations with antenatal anxiety. These findings were consistent with studies conducted by Nasreen et al and Levine et al, which also reported similar associations between poor household economy, poor relationships with husbands, and partner violence with antepartum anxiety symptoms.[25,26] Low income demonstrated a significant association with anxiety disorders during pregnancy, similar to studies conducted in Malaysia[27] and Bangladesh,[25] suggesting that poverty may significantly contribute to anxiety in pregnant women due to financial stress and healthcare expenses.

Another significant factor associated with anxiety disorders during pregnancy was problematic spousal relationships. This association was consistent with findings from other studies, such as Nasreen et al, indicating that the quality of the relationship with the spouse can significantly impact a pregnant woman's anxiety levels.[25] Furthermore, gender-based violence emerged as a crucial predictor of anxiety in women, with almost all participants (97%) experiencing anxiety disorder as a result of gender-based or sexual violence.

A noteworthy association emerged between a history of hypertension in previous pregnancies and anxiety disorders among pregnant women in our study. Although we did not find specific studies linking hypertension directly to anxiety disorders, a study conducted in Malaysia demonstrated a positive relationship between pregnancy-related complications and anxiety.[27] This suggests that concerns about health and pregnancy outcomes based on past health issues, such as hypertension, may contribute to anxiety in pregnant women. However, further studies are warranted to validate and strengthen our findings.

These findings highlight the importance of a multidisciplinary approach in managing antenatal anxiety disorders and the need for routine screening to identify and address anxiety disorders effectively. A multidisciplinary approach that integrates mental health support, social services, and partner involvement may help address anxiety disorders in pregnancy and contribute to improved maternal and child outcomes.

Limitations

During the course of this study, it was observed that discussing psychological and social issues with some clients evoked emotional responses. Nonetheless, the research team was well equipped and trained to handle such situations, ensuring appropriate support was provided to participants with moderate-to-severe symptoms by linking them to a mental health clinic for specialized care. Despite these efforts, it is possible that some participants may have been hesitant to disclose their true anxiety symptoms, leading to an underestimation of the prevalence of anxiety disorders in our study. Consequently, this underestimation could potentially bias our associations towards the null, masking some of the true associations between the identified factors and antenatal anxiety.

Conclusion

In conclusion, our study revealed that anxiety disorders during pregnancy are common, consistent with findings from various settings around the world. Notably, low-income levels, problematic spousal relationships, and a history of hypertension in previous pregnancies were significant risk factors associated with anxiety disorders. This emphasizes the critical importance of intervening during the antenatal period to promote maternal health and mental well-being. To address anxiety disorders in pregnancy effectively, healthcare professionals, especially those involved in antenatal care, should prioritize screening for anxiety symptoms and related risk factors as part of routine assessments. Identifying and supporting pregnant women experiencing anxiety early on could lead to timely referrals for appropriate mental health care, potentially reducing the adverse consequences of anxiety on both mother and child. Future research should focus on understanding the outcomes of anxiety disorders in pregnant women, particularly in the local context of Uganda, so as to improve maternal health outcomes and the overall well-being of mothers and their children.

Abbreviations

ANC, Antenatal care; AOR, Adjusted odds ratio, CI, Confidence interval; DSM, Diagnostic and Statistical Manual; HAMA-A, Hamilton anxiety rating scale; OR, Odds ratio.

Acknowledgments

We appreciate the research assistants who collected the data. We would like also to express our thanks to the pregnant women at Mulago Hospital who participated in this study for generously giving their time to the interviews.

Author Contributions

Each of the authors (MN, NN, CK, RM, and AN) significantly contributed to the study's conception, design, data acquisition, analysis, and interpretation. They all participated in both the initial drafting and subsequent critical revisions of the article to ensure its important intellectual content. They collectively consented to submit the manuscript to the present journal, provided their final approval for the publication version, and committed to being responsible for all aspects of the work.

Funding

This research did not receive any specific grant from any funding agencies.

Disclosure

The authors declare no conflict of interest with regard to publication of this work.

References

1. Brunton RJ, Dryer R, Saliba A, Kohlhoff J. The initial development of the pregnancy-related anxiety scale. *Women Birth*. 2019;32(1):e118–e130. doi:10.1016/j.wombi.2018.05.004
2. Huizink AC, Mulder EJ, de Medina PGR, Visser GH, Buitelaar JK. Is pregnancy anxiety a distinctive syndrome? *Early Hum Dev*. 2004;79(2):81–91. doi:10.1016/j.earlhumdev.2004.04.014
3. Brown TA, Barlow DH. Dimensional versus categorical classification of mental disorders in the fifth edition of the diagnostic and statistical manual of mental disorders and beyond: comment on the special section. *J Abnorm Psychol*. 2005;114(4):551. doi:10.1037/0021-843X.114.4.551
4. Dennis C-L, Falah-Hassani K, Shiri R. Prevalence of antenatal and postnatal anxiety: systematic review and meta-analysis. *Br J Psychiatry*. 2017;210(5):315–323. doi:10.1192/bjp.bp.116.187179
5. Maina G, Saracco P, Giolito MR, Danelon D, Bogetto F, Todros T. Impact of maternal psychological distress on fetal weight, prematurity and intrauterine growth retardation. *J Affect Disord*. 2008;111(2–3):214–220. doi:10.1016/j.jad.2008.02.017
6. Grote NK, Bridge JA, Gavin AR, Melville JL, Iyengar S, Katon WJ. A meta-analysis of depression during pregnancy and the risk of preterm birth, low birth weight, and intrauterine growth restriction. *Arch Gen Psychiatry*. 2010;67(10):1012–1024. doi:10.1001/archgenpsychiatry.2010.111
7. Ding XX, Xu YL, Xu SJ, et al. Maternal anxiety during pregnancy and adverse birth outcomes: a systematic review and meta-analysis of prospective cohort studies. *J Affect Disord*. 2014;159:103–110. doi:10.1016/j.jad.2014.02.027
8. Vythilingum B. Anxiety disorders in pregnancy and the postnatal period. *Cont Med Educ*. 2009;27:10.
9. Mutahi J, Larsen A, Cuijpers P, et al. Mental health problems and service gaps experienced by pregnant adolescents and young women in Sub-Saharan Africa: a systematic review. *EClinicalMedicine*. 2022;44:101289. doi:10.1016/j.eclinm.2022.101289
10. Akinsulore A, Temidayo AM, Oloniniyi IO, Olalekan BO, Yetunde OB. Pregnancy-related anxiety symptoms and associated factors amongst pregnant women attending a tertiary hospital in south-west Nigeria. *South Af J Psych*. 2021;27:1616. doi:10.4102/sajpsychiatry.v27i0.1616
11. Madhavanprabhakaran GK, D'Souza MS, Nairy KS. Prevalence of pregnancy anxiety and associated factors. *Internat J Afr Nurs Sci*. 2015;3:1–7. doi:10.1016/j.ijans.2015.06.002
12. Esimai O, Fatoye F, Quiah A, Vidal O, Momoh R. Antepartum anxiety and depressive symptoms: a study of Nigerian women during the three trimesters of pregnancy. *J Obstet Gynaecol*. 2008;28(2):202–203. doi:10.1080/01443610801912352
13. Ezeme M, Dinwoke V, Ohayi S. Risk factors and co-morbid anxiety and depression in pregnancy in a tertiary hospital in southeast Nigeria. *Internat J Med Health Develop*. 2018;23(2):276–283.
14. Rubertsson C, Hellström J, Cross M, Sydsjö G. Anxiety in early pregnancy: prevalence and contributing factors. *Arch Women's Mental Health*. 2014;17:221–228. doi:10.1007/s00737-013-0409-0
15. Fertl KI, Bergner A, Beyer R, Klapp BF, Rauchfuss M. Levels and effects of different forms of anxiety during pregnancy after a prior miscarriage. *Eur J Obstetrics Gynecol Reprod Biol*. 2009;142(1):23–29. doi:10.1016/j.ejogrb.2008.09.009
16. Rahman A. Maternal depression and child health: the need for holistic health policies in developing countries. *Harvard Health Policy Rev*. 2005;6(2):70–80.
17. Wynn A, Nabukalu D, Lutalo T, et al. Alcohol use during pregnancy in Rakai, Uganda. *PLoS One*. 2021;16(8):e0256434. doi:10.1371/journal.pone.0256434
18. Popova S, Lange S, Shield K, et al. Comorbidity of fetal alcohol spectrum disorder: a systematic review and meta-analysis. *Lancet*. 2016;387(10022):978–987. doi:10.1016/S0140-6736(15)01345-8

19. Dean A. OpenEpi: open source epidemiologic statistics for public health, version 2.3. 1; 2010. Available from: http://www.openepi.com. Accessed January 23, 2024.
20. Fatoye FO, Adeyemi AB, Oladimeji BY. Emotional distress and its correlates among Nigerian women in late pregnancy. *J Obstet Gynaecol*. 2004;24(5):504–509. doi:10.1080/01443610410001722518
21. Hamilton M. The assessment of anxiety states by rating. *Br J Med Psychol*. 1959;32:50–55. doi:10.1111/j.2044-8341.1959.tb00467.x
22. Sawyer A, Ayers S, Smith H. Pre-and postnatal psychological wellbeing in Africa: a systematic review. *J Affect Disord*. 2010;123(1–3):17–29. doi:10.1016/j.jad.2009.06.027
23. Adewuya A, Ola B, Aloba O, Mapayi B. Anxiety disorders among Nigerian women in late pregnancy: a controlled study. *Arch Women's Mental Health*. 2006;9:325–328. doi:10.1007/s00737-006-0157-5
24. Heron J, O'Connor TG, Evans J, Golding J, Glover V, Team AS. The course of anxiety and depression through pregnancy and the postpartum in a community sample. *J Affect Disord*. 2004;80(1):65–73. doi:10.1016/j.jad.2003.08.004
25. Nasreen HE, Kabir ZN, Forsell Y, Edhborg M. Prevalence and associated factors of depressive and anxiety symptoms during pregnancy: a population based study in rural Bangladesh. *BMC Womens Health*. 2011;11(1):1–9. doi:10.1186/1472-6874-11-22
26. Levine RE, Oandasan AP, Primeau LA, Berenson AB. Anxiety disorders during pregnancy and postpartum. *Am J Perinatol*. 2003;20(05):239–248. doi:10.1055/s-2003-42342
27. Jusoh A, Abdullah KL, Ahmad AB, et al. Anxiety symptoms and associated factors among outpatient antenatal mother: a cross-sectional study at university malaya medical centre, Malaysia. *Int Medical J*. 2014;21(6):531–535.