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Original Article

Maternal factors contributing to high-risk pregnancy in mothers receiving antenatal care at Mubende Regional Referral Hospital. A cross-sectional study.

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Abstract

Background:

High-risk pregnancies pose serious threats to the health of both mothers and babies, especially in developing countries where access to quality maternal care is limited. This study aims to determine the maternal factors contributing to high-risk pregnancy in mothers receiving antenatal care at Mubende Regional Referral Hospital.

Methodology:

The study used a descriptive cross-sectional design to collect quantitative data from participants using a structured questionnaire. The data was coded and analysed using Microsoft Excel and presented in charts, tables, and graphs.

Results:

The majority of respondents were aged 20 years and below (44.78%), followed by those aged 20–34 years (29.85%) and 35 years and above (25.37%). Most women were cohabiting (44.78%), while others were married, divorced/separated, or widowed, with no single participants recorded. Most participants were first-time mothers (59.70%), while 40.30% were multiparous, with the majority having four or more pregnancies (67.16%). Most respondents were adolescents below 18 years (59.70%), followed by those aged 18–24 years (22.39%) and above 24 years (17.91%). Hypertension (29.85%) and anemia (26.87%) were the most common pregnancy-related conditions, followed by typhoid (13.43%), heart disease (11.94%), and diabetes (10.45%), while 7.46% had no conditions. Most participants (74.63%) had experienced complications in previous pregnancies. Regarding antenatal care, the majority (64.18%) initiated ANC after 24 weeks, indicating late booking. In terms of substance use, herbal medicine was most commonly used (53.73%), followed by alcohol (25.37%) and cigarettes (14.93%), while only a few reported no substance uses (5.97%).

Conclusion:

High-risk pregnancies are mainly driven by maternal factors such as young age, low socio-economic status, high parity, medical conditions, and delayed antenatal care attendance.

Recommendation:

Strengthening ANC education, promoting early booking, targeting high-risk groups, improving disease screening and management, increasing community awareness on substance use, and strengthening maternal healthcare services.

Keywords: *High-risk pregnancy, maternal factors, antenatal care, maternal health, Mubende Regional Referral Hospital.*
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Background of the study

A high-risk pregnancy is defined as one that poses a threat to the health or life of the mother or the fetus and often requires specialized care from trained healthcare providers. Such pregnancies may arise due to pre-existing maternal conditions or complications that develop during pregnancy (NIH, 2017). Globally, it is estimated that between 10% and 30% of pregnancies are classified as high-risk, with some studies reporting a prevalence of 14.4%, which falls within the global range (Sushma, 2020). These figures highlight the substantial burden of high-risk pregnancies on maternal and child health systems worldwide. The prevalence of high-risk pregnancies varies significantly across regions due to differences in socio-demographic characteristics, healthcare access, and maternal health profiles. In Southern Asia, particularly in India, the prevalence is considerably higher, estimated at 49.4%. Among these, 33% of women experience a single high-risk factor while 16.4% have multiple risk factors, indicating a compounded risk for adverse outcomes (Kuppusamy et al., 2023). Factors such as maternal age, parity, and socio-economic status contribute significantly to these risks. In Africa, the prevalence of high-

risk pregnancies and related fertility behaviors is notably high and varies widely between countries. For instance, countries such as Chad (89.9%), Niger (88%), Mali (83.1%), Ethiopia (82%), and Angola (82%) report some of the highest rates, while South Africa has comparatively lower rates at 45.3% (Mare et al., 2024a). In Sub-Saharan Africa, approximately 77.7% of women exhibit high-risk fertility behaviors, with 43.1% having a single risk factor and 31.4% experiencing multiple risks (Mare et al., 2024a). These behaviors include early or late maternal age, high parity, and short birth intervals, all of which increase the likelihood of complications during pregnancy. Further evidence from East Africa indicates that 57.7% of women experience at least one high-risk fertility behavior, while 21.6% have multiple risk factors. Rural residence has been consistently associated with increased risk due to limited access to quality healthcare services (Sisay, 2021). In South Africa, about 65.7% of pregnancies are categorized as high-risk, influenced by factors such as maternal age, marital status, level of education, and socio-economic status. Medical conditions like hypertensive disorders, including preeclampsia, further exacerbate these risks (Jikamo et al., 2023).

In Uganda, high-risk pregnancies remain a significant public health concern, particularly in rural settings. Common obstetric risk factors include fetal malpresentation (26%), multiple gestations (3.9%), and abnormal placental positioning (1.7%) (Dougherty et al., 2018). Additionally, regional disparities in maternal health outcomes exist, with Central Uganda showing better outcomes compared to the Eastern region in terms of abortion-related complications and mortality. These disparities are often linked to differences in healthcare access, availability of skilled personnel, and socio-economic conditions.

At Mubende Regional Referral Hospital, the burden of high-risk pregnancies is particularly alarming, with a reported prevalence of 72.7%. The leading contributing factors include a body mass index (BMI) greater than 25 (32.3%) and closely spaced pregnancies (27.9%) (Sabina, 2018). These findings suggest that both social-demographic factors (such as education, income, and residence) and maternal factors (including age, parity, nutritional status, and birth spacing) play a critical role in determining pregnancy outcomes. Despite the high prevalence of high-risk pregnancies, there remains a need for context-specific studies to better understand the interplay between social-demographic and maternal factors in influencing these risks. This study aims to determine the maternal factors contributing to high-risk pregnancy in mothers receiving antenatal care at Mubende Regional Referral Hospital.

Methodology

Study Design

The study used a Descriptive cross-sectional design to collect quantitative data from participants because it was brief and did not require patient monitoring over time.

Study Area.

The study took place at Mubende Regional Referral Hospital, a government facility located in Mubende District, Central Uganda. This hospital was established to provide comprehensive healthcare services to the surrounding community and to ease the burden on larger referral centres such as Mulago National Referral Hospital. Mubende Regional Referral Hospital plays a crucial role in maternal and neonatal healthcare by offering specialized services in obstetrics, paediatrics, HIV/AIDS care, adolescent health, research, and training. The hospital is equipped with a team of professional healthcare providers, a bed capacity of 1,000, and an array of medical services that support an annual patient census of approximately 200,000. Its role is vital in improving access to quality healthcare for mothers and their children, especially through its antenatal clinic services.

Study population.

This study involved women of childbearing age with high-risk pregnancies attending Mubende Regional Referral Hospital and included 100 participants who had provided consent.

Sample size determination.

The sample size was calculated using the Kish and Leslie formula: n = z^2.p.q/d^2
n =total population 100 z=confidence level =95% z=1.96
p is estimated population p=0.15
q=1-p
d is margin error d=o.o5 1.96^2*0.15*0.85
n = 0.4903/0.0025=196.12
Initial sample size is 196
Since my population is 100, we adjust N/1+n-1/n
Final sample size is 67 participants

Sample technique and rationale

A simple random sampling method was employed to select the study participants at Mubende Regional Referral Hospital. This technique ensured unbiased participant selection, giving each individual an equal opportunity to be included in the study.

Sampling procedure.

The researcher visited the antenatal clinic at Mubende Regional Referral Hospital, spoke with the clinic in charge about the study topic, and used a simple random sampling technique to create a list of all mothers attending the clinic who were identified as having high-risk pregnancies. From this list, a sample size of 54 participants was selected by assigning each participant a number and having them choose numbers until the desired number of participants was reached.

Data Collection Method.

The researcher utilized a self-administered questionnaire method and examined the records of premature infants. The questionnaires contained brief multiple-choice inquiries, requiring participants to choose the correct response from predetermined options presented in a structured format.

Data Collection Tools and Rationale.

Data collection entailed the use of semi-structured self-administered questionnaires containing closed-ended questions specifically aligned with the study's goals. The questionnaires were carefully crafted in simple and understandable language for literate mothers. Participants who had difficulty reading and writing received assistance through a researcher-guided questionnaire interview.

Data Collection Procedure

The researcher received an introductory letter from the research committee of the Mildmay Institute of Health Sciences, which was presented to the hospital director at Mubende Regional Referral Hospital to seek permission to access the antenatal clinic. With the director's assistance, the clinic in charge helped identify mothers attending the clinic who were identified as having high-risk pregnancies for the study. All volunteers were approached to provide informed consent, allowing them to sign consent forms voluntarily and withdraw from the research at any point. To maintain confidentiality, unique codes were assigned to participants' information, known only to the researcher, participants, and the medical team involved in their care.

The data collection involved distributing self-administered questionnaires, which participants were required to complete in full. Research assistants in marking their responses assisted participants who were unable to read or write. Once the questionnaires are completed, participants who have the opportunity to ask any pertinent questions about the study can ask, and researchers provide answers. Participants had the right to withdraw from the study at any time if desired. This procedure was designed to collect valuable data while respecting participants' rights and ensuring confidentiality throughout the research.

Study variables.

Independent variables included all maternal-related and social demographic factors associated with high-risk pregnancies.

The dependent variable was a high-risk pregnancy

Piloting the Study

Before commencing the actual data collection, the researcher conducted a pilot study at Mubende Regional Referral Hospital. This helped assess the feasibility of the study, ensuring that the hospital environment was suitable for research and ruled out any logistical or health-related concerns that could have hindered the process.

Pre-testing the Study Tool

The researcher pre-tested the questionnaire with a small group of 7 mothers at Komamboga Health Centre III. This was to help determine the clarity, reliability, and validity of the questions.

Feedback was used to refine the questionnaire before full-scale data collection.

Inclusion Criteria

All mothers attending the antenatal clinic at Mubende Regional Referral Hospital who were identified as having high-risk pregnancies and who provided informed consent were included in the study.

Exclusion Criteria

Mothers who did not meet the criteria for high-risk pregnancy or who declined to provide informed consent were excluded from the study.

Training of Research Assistants

The researcher trained research assistants one day prior to data collection. Training covered ethical conduct, proper questionnaire administration, and maintaining confidentiality, ensuring high-quality and consistent data collection.

Data Analysis and Presentation

The collected data was entered manually onto tally sheets and then transferred to Microsoft Excel for electronic analysis. The data was presented in a quantitative format using pie charts, bar graphs, and frequency distribution tables. These visual tools were accompanied by brief explanations to enhance the interpretation and understanding of the findings.

Data Management and Analysis

Data was initially recorded in notebooks and later transferred to a computer for digital storage. To avoid data loss, a backup was saved on a flash drive. Hardcopy questionnaires were stored securely under lock and key to maintain confidentiality and protect participant privacy.

Ethical Consideration

An introductory letter was obtained from the Dean of the School of Clinical Officers at Mildmay Institute of Health Sciences and presented to the Medical Superintendent at Mubende Regional Referral Hospital. Upon approval, the antenatal clinic in-charge was introduce the researcher to eligible participants. The purpose of the study was explained clearly, along with the consent process. Participants were informed of their right to confidentiality, privacy, and

voluntary participation, including the option to withdraw at any time. Questionnaires were administered only after informed consent was obtained.

Informed consent:

Written informed consent was obtained from all participants prior to their inclusion in the study. Participants were informed about the purpose of the study, procedures involved, potential risks and benefits, and their right to withdraw at any time without penalty.

Results

Socio-demographic characteristics are associated with factors contributing to high-risk pregnancy among mothers attending the antenatal clinic.

Table 1: A frequency table-showing respondent's socio-Demographic

variables	Category	Frequency	Percentage (%)
Women's information			
	Age {in years}		
	20 and below years	30	44.78%
	20-34 years	20	29.85%
	35 and above years	17	25.37%
	TOTAL	67	
Marital status	Single	0	
	married	20	29.85%
	cohabiting	30	44.78%
	Divorced/separated	10	14.93%
	Widowed	7	10.45%
	TOTAL	67	**100%**
Level of education		20	29.85%
	Primary	25	37.31%
	Secondary (o level/A level)	12	17.91%
	Tertiary(university)	10	14.93%
	TOTAL	67	**100%**
Occupation	Civil servant	2	2.99%
	Self employed	20	29.85%
	Casual labor	10	14.93%
	Farmer	35	52.24%
	TOTAL	67	**100%**
Monthly income(shs)	Bellow 100000	15	22.39%
	100000-300000	40	59.70%
	300000-600000	10	14.93%
	600000 and above	2	2.99%

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		67	**100%**

Table 1 shows that the age distribution of women was that 30 (44.78%) women were aged 20 years and below, and that was the biggest percentage, 20(29.85%) women were aged 20 -34 years, and 17(25.37%) women were aged 35 years and above.

Marital status revealed that 30(44.78%) of women of high-risk pregnancy were cohabiting, zero were single, 29.85% women were married, 10(14.93%) were divorced/separated, and 10.45% women were widowed. The level of education of the respondents 20 (29.85%) had no formal education, 25(37.31%) stopped in primary school, 12(17.91%) went to secondary school, and only 10(14.93%) managed to go to university.

About Occupation 2(2.99%), women were civil servants, 20(29.85%) were self-employed, 10(14.93%) did casual labor, and 35 (52.24%) were farmers, and this was the occupation with the biggest percentage according to my findings. With monthly income 15(22.39%) earned 100000ugx and bellow, 40(59.70%) earned 100000-300000ugx monthly income, 10(14.93%) earned 300000-600000ugx and 2(2.99%) earned 600000and above.

Maternal factors contributing to high-risk pregnancy among women attending the antenatal clinic

Table 2: A frequency distribution table showing maternal/obstetric factors contributing to high-risk pregnancy among mothers attending the antenatal clinic at Mubende hospital.

Variables	**Category**	**Frequency**	**Percentage**
Maternal factors			
First pregnancy	**Yes**	40	59.70%
	No	27	40.30%
	TOTAL	67	**100%**
	If not, how many times		
	2-3 times	22	32.84%
	4 or more times	45	67.16%
	TOTAL	67	**100%**
	At what age(years)		
	Below 18	40	59.70%
	18-24	15	22.39%
	24 and above	12	17.91%
	TOTAL	**100**	**100%**
Conditions	Hypertension	20	29.85%
	Diabetes	7	10.45%
	Anemia	18	26.87%
	Typhoid	9	13.43%
	Heart disease	8	11.94%
	None	5	7.46%
	TOTAL	100	**100%**
Complication in previous pregnancy	Yes	50	74.63%
	No	17	25.37%
	TOTAL	67	**100%**
Gestation age for first ANC	Before 12 weeks	10	14.93%

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	12-24 weeks	14	20.90%
	After 24 weeks	43	64.18%
	TOTAL	67	100%
Substances used	Alcohol	17	25.37%
	Cigarettes	10	14.93%
	Herbal medicine	36	53.73%
	None	4	5.97%
	TOTAL	67	100%

Table 2 shows that 40(59.70%) participants were first time mothers while 27(40.30%) participants were not first time mothers, and 22(32.84%) participants who were not first time mothers were pregnant for the second and third time mothers and 45(67.16%) participants were pregnant for the fourth time and more of which 40(59.70%) were below 18 years of age,15(22.39%) were 18-24 years of age and 12(17.91%) were above 24 years.

Conditions were high with 29.85% of participants with hypertension condition during pregnancy followed by anemia condition with 18(26.87%) of the participants, 9 (13.43%) participants had a history of typhoid condition during their pregnancies, and 8(11.94%) of women who participated in my study had a history of heart diseases condition, 7(10.45%) participants faced a diabetes condition when pregnant and lastly 5(7.46%) participants had none of the conditions.

With complications in previous pregnancies, 56(74.63%) participants had complications in previous pregnancy, and 17(25.37%) participants had not gotten any complications in their previous pregnancies.

Gestation age for first ANC was with 10 (14.93%) participants, who went for antenatal care at 12 weeks, 14(20.90%) participants visited ANC at 12-24 weeks, and 43(64.18%) of the participants had a gestation age of after 24 weeks.

I asked the participants about the substances they use during pregnancy. 17(25.37%) participants use alcohol,10(14.93%) use cigarettes, the majority, 36(53.73%) participants use herbal medicine, and 4(5.97%) use none of the substances studied.

Discussion

Maternal factors contributing to high-risk pregnancies among mothers attending the antenatal clinic at Mubende hospital.

The study revealed that 59.70% of participants were first-time mothers, most of whom were below 18 years of age. This suggests a high prevalence of adolescent pregnancies, which may contribute to increased pregnancy risks due to limited knowledge about antenatal care (ANC), poor nutrition, and inability to recognize danger signs early. This finding is consistent with Kuppusamy et al. (2023), who reported that adolescent mothers are more likely to experience high-risk pregnancies due to inadequate awareness and health-seeking behaviors. Similarly, Sisay (2021) found that younger maternal age is significantly associated with high-risk fertility behaviors in East Africa. Therefore, the high number of adolescent mothers in this study explains the increased vulnerability to complications.

On the other hand, among multiparous women, 67.16% had four or more pregnancies. High parity increases the risk of maternal depletion, which may lead to complications such as anemia and poor pregnancy outcomes. This finding agrees with Mare et al. (2024a), who identified high birth order as a major contributor to high-risk pregnancies in Sub-Saharan Africa. Thus, both low maternal age and high parity contribute significantly to the burden of high-risk pregnancies observed in this study. Regarding maternal health conditions, hypertension was the most common condition (29.85%), followed by anemia (26.87%). These conditions are known to significantly increase the risk of maternal and fetal complications. The high prevalence of hypertension may be due to delayed ANC attendance and inadequate monitoring during pregnancy. This finding is in line with Jikamo et al. (2023), who identified hypertensive disorders as a leading cause of high-risk pregnancies. Similarly, Sushma (2020) reported that anemia is highly prevalent in low-resource settings and is associated with poor maternal nutrition and frequent pregnancies, which explains its high occurrence in this study.

Other conditions, such as typhoid (13.43%), heart disease (11.94%), and diabetes (10.45%) were also identified among participants. These conditions further increase the risk of complications, especially when not diagnosed and managed early. According to the National Institutes of Health (2017), pre-existing medical conditions and infections significantly contribute to high-risk pregnancies, supporting the findings of this study. The study also found that 74.63% of participants had experienced complications in previous pregnancies. This indicates a pattern of recurring risk, possibly due to inadequate management of previous conditions or lack of follow-up care. This finding is consistent with Dougherty et al. (2018), who reported that a history of previous pregnancy complications is a strong predictor of future high-risk pregnancies. In terms of ANC utilization, the majority of participants (64.18%) initiated

ANC after 24 weeks of gestation. Late booking may be due to a lack of awareness about the importance of early ANC, financial challenges, or cultural beliefs. Delayed ANC limits opportunities for early detection and management of complications, thereby increasing pregnancy risks. This finding agrees with Sisay (2021), who found that late ANC attendance is common in rural areas and contributes to poor maternal outcomes. Substance use during pregnancy was also notable, with 25.37% of participants consuming alcohol, 14.93% smoking cigarettes, and 53.73% using herbal medicine. The high use of herbal medicine may be attributed to cultural beliefs and reliance on traditional practices. However, these substances can negatively affect pregnancy outcomes. Mare et al. (2024a) reported similar findings in Sub-Saharan Africa, where the use of traditional remedies during pregnancy is widespread. Additionally, the National Institutes of Health (2017) highlights that alcohol and tobacco use during pregnancy are associated with adverse outcomes such as low birth weight and developmental complications.

Conclusion

The study established that high-risk pregnancies at Mubende Regional Referral Hospital are largely influenced by maternal socio-demographic and health-related factors. These include young maternal age, low education level, low income, high parity, and marital status. Additionally, medical conditions such as hypertension and anemia, a history of previous pregnancy complications, late initiation of antenatal care, and substance use during pregnancy significantly contribute to increased pregnancy risks. Overall, the findings indicate that many women attend antenatal care with multiple risk factors, highlighting a high burden of preventable maternal risks in the study area.

Recommendation

Strengthen Antenatal Care Education: Health workers should provide continuous health education on early ANC attendance, pregnancy danger signs, nutrition, and substance use during pregnancy to improve maternal knowledge and reduce risks.

Promote Early ANC Booking: The Ministry of Health and local health facilities should intensify community sensitization to encourage women to start antenatal care within the first trimester.

Target High-Risk Groups: Special attention should be given to adolescents, high-parity women, and those with low education and income through focused maternal health programs and follow-ups.

Improve Screening and Management: Routine screening for conditions such as hypertension, anemia, diabetes, and infections should be strengthened to allow early detection and management.

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List of Abbreviations

NIH	National Institutes of Health
UDHS	Uganda Demographic and Health Survey
RMNCAH	Reproductive, Maternal, Newborn, Child, and Adolescent Health
WHO	World Health Organization
BMI	Body Mass Index
UAHEB	Uganda Allied Health Examinations Board
SOPs	Standard Operating Procedures

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The study did not receive any external funding.

Conflict of interest

The author did not declare any conflict of interest.

Author contributions:

Isaac Tendo Ddumba was the principal investigator
Ronald Mbidde supervised the research project
Hasifa Nansereko supervised the research project
Jane Frank Nalubega supervised the research project
Francisco Ssemuwemba supervised the research project

Data availability

The data is available upon request.

Author Biography

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