

Implementation of the Group Antenatal Care Model in Kole district, Uganda: Experiences of pregnant mothers, community health workers, and facility midwives

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Abstract

Background:

Antenatal care (ANC) plays a vital role in maternal and child health, yet traditional ANC models face challenges in terms of accessibility and utilization, particularly in remote or underserved areas. Group antenatal care (G-ANC) has emerged as a promising alternative, offering increased access to information, social support networks, and patient satisfaction and eventually improving maternal and child health outcomes. However, little is known about the perspectives of community health workers and facility midwives in implementing G-ANC, especially in postwar settings such as Northern Uganda. Therefore, this study assessed the experiences of pregnant mothers, community health workers and facility midwives in providing group ANC services in the Kole district.

Methods:

This qualitative study involved key informant interviews and focus group discussions with community health workers, facility midwives, and pregnant women participating in G-ANC in the Kole district, Uganda. A total of nine key informant interviews and four focus group discussions were conducted using their respective guides. Qualitative data were audio recorded and transcribed. We used ATLAS.ti 23 software to support the subsequent analysis. Thematic analysis was used to examine the qualitative information gathered from focus group discussions and one-on-one interviews.

Results:

A number of issues came to light, such as awareness of and training in G-ANC, perceptions of facility midwives, perceptions of village health teams, and wishes for project continuation. While highlighting G-ANC's success in increasing ANC attendance, participants also mentioned its drawbacks, including inadequate time management, problems with coordination, and logistical limitations. Notwithstanding the benefits, problems, including critical medication shortages and a lack of transportation support, made it difficult to carry out the programme effectively.

Conclusion:

This study provides valuable insights into the implementation of G-ANC at the community level, offering practical recommendations to improve maternal and child health outcomes. By addressing the identified challenges and leveraging the lessons learned, policymakers and healthcare providers can optimize G-ANC delivery and contribute to reducing maternal and perinatal mortality rates in resource-limited settings.

Background

Antenatal care (ANC) is a crucial component of maternal and child health services, providing essential support and interventions during pregnancy. Traditional ANC services are typically offered in healthcare facilities, requiring pregnant mothers to travel and access care in clinical settings. However, this approach may pose challenges for women in remote or underserved areas, leading to inadequate access to and underutilization of ANC services [1]. These barriers often lead to a persistently high maternal mortality ratio (MMR), which serves as a crucial indicator of maternal health and healthcare system effectiveness. According to World Health Organization (WHO) statistics from 2022, the global MMR stands at 211 per 100,000 live births, highlighting the persistent challenges in maternal healthcare worldwide [2–4]. However, within sub-Saharan Africa, this figure is significantly greater, with an MMR of 546 per 100,000 live births, indicating a region with disproportionate maternal health burdens [4].

In Uganda, while there has been a notable decrease in MMR from 336 to 189 per 100,000 live births between 2016 and 2022, maternal mortality remains unacceptably high [5–8]. This discrepancy underscores the urgent need for targeted interventions to address the complex factors contributing to maternal mortality within the country. Moreover, these figures highlight the formidable challenge of achieving the Sustainable Development Goal (SDG) 3 target, which aims to reduce global maternal mortality to less than 70 deaths per 100,000 live births by 2030 [9].

One approach that has attracted increasing attention for its potential to improve maternal health outcomes is group antenatal care [10, 11]. Unlike traditional one-on-one ANC models, G-ANC involves providing ANC appointments and services to pregnant women in cohorts based on their expected date of delivery and age groups at both the facility and community levels. This implies bringing together pregnant women at similar stages of pregnancy for shared healthcare sessions facilitated by healthcare providers [11]. This approach offers a range of potential benefits, including increased access to information, enhanced social support networks, and improved patient satisfaction [11]. However, available studies have focused mainly on the feasibility and effectiveness of the Group ANC model for improving maternal and child health outcomes, with little known about the experiences of community health workers and facility midwives in implementing group ANC among pregnant women. Additionally, there is limited evidence on the health system implications of implementing G-ANC services, particularly in terms of the roles and responsibilities of different actors in the health system. Understanding the experiences of community health workers and facility midwives with group antenatal care models is crucial for optimizing their implementation and assessing their impact on maternal and child health outcomes. By exploring the perspectives and challenges faced by community health workers, facility midwives and pregnant women participating in group antenatal care programmes at the community level, policymakers and healthcare providers can tailor interventions to address the specific needs of this vulnerable population and ultimately contribute to reducing maternal and perinatal mortality rates.

As a postwar setting, Northern Uganda has numerous challenges as far as healthcare service provision is concerned [12, 13]. Despite the potential benefits of G-ANC, there is limited understanding of the

experiences of community health workers and facility midwives in implementing G-ANC at the community level, particularly in postwar settings such as Northern Uganda. Understanding their perspectives and challenges is crucial for optimizing G-ANC implementation and improving maternal and child health outcomes. By capturing their voices and experiences, policymakers and healthcare providers can tailor interventions to address the specific needs of this vulnerable population and contribute to reducing maternal and perinatal mortality rates. Therefore, this study aimed to assess the experiences of community health workers and facility midwives in providing group ANC services at the community level in the Kole district.

Methodology

3.1 Study Design:

This study employed a phenomenology qualitative research design to capture the rich and nuanced experiences of CHWs and facility midwives in providing group ANC services. Key informant interviews and focus group discussions were conducted by Child Hug Uganda (CHU) to gather data on the experiences of community health workers and facility midwives; on the general understanding of pregnant women about group ANC services delivered at the community level; and on the challenges faced by community health workers and facility midwives in implementing the G-ANC model as well as the challenges faced by pregnant women in accessing G-ANC services at the community level.

3.2 Study Setting:

The data collection was conducted in selected communities where the group ANC model was implemented in the Kole district. The Kole district had a total population of 14625 pregnant women between July 2021 and June 2022 according to HMIS data (2022). The first ANC visit was 65.1%, and the first ANC visit was 71.5% according to the HMIS report of 2022, largely due to the efforts of the Child Hug Uganda (CHU). Child Hug Uganda is a local health partner that assists in the improvement of maternal health outcomes in Kole district through services such as the provision of quality antenatal care services. The major economic activities of the pregnant women in Kole district are farming and petty trade.

3.3 Study participants and sample size

The study included six (6) health facility midwives, four (4) village health teams (community health workers) who were implementing the G-ANC model at the community level, and forty-five (45) pregnant women as G-ANC beneficiaries. A diverse sample of participants was recruited to ensure representation from different cadres and experiences. The principle of saturation was used to determine the sample size during the recruitment of community health workers, facility midwives and pregnant women.

3.4 Data collection procedure and tools

The study used two research assistants at the CHU to collect qualitative data. The data were collected through key informant interviews and focus group discussions. A total of 9 key informant interviews were conducted with CHWs and facility midwives using interview guides. Four focus group discussions were conducted with the pregnant mothers using a focus group discussion guide developed based on the research objectives. Interviews were conducted with individual participants to explore their personal experiences and perspectives on the G-ANC model at the community level. Focus group discussions provided an opportunity for participants to engage in group interactions and share collective knowledge, information and challenges in accessing G-ANC services. These interviews were audio-recorded with participants' consent and transcribed verbatim for analysis.

3.5 Sampling criteria:

Purposive sampling (maximum variation) was used to select the study participants. Participants were chosen deliberately based on specific criteria relevant to the research objectives. Participants were strategically included in the interviews and were stratified roughly equally across the following important demographic and user categories (e.g., midwives, VHTs and pregnant women): Practically, this was a manageable qualitative sample and will help provide sufficient insight and experience from the different subgroups.

3.6 Data Management and Analysis

The qualitative data were audio recorded and transcribed into ATLAS.ti 23 software to support the subsequent analysis. We used thematic analysis to examine the qualitative information gathered from focus group discussions and key informant interviews. A number of iterative processes were involved in the analysis, such as getting to know the data, coding, finding themes, and interpreting the results [14]. The analysis process ensured the rigor and reliability of the findings. The coding schedule was developed by the study investigators and discussed with the study advisors. Coding was performed by 2 experienced research assistants.

Table 1
Thematic analysis table

Theme	Subtheme	Subsubtheme
Knowledge on antenatal care	Understanding of ANC	- Definition of ANC
		- Purpose of ANC
	Importance of ANC visits	- Regular check-ups
		- Education and preventive care
	Sources of ANC information	- Village Health Teams
Perceptions about group antenatal care	Usefulness and benefits	- Peer support
		- Enhanced learning
	Community acceptance and motivation	- Social aspect of G-ANC
		- Positive community experiences
Challenges in implementing G-ANC	Logistical issues	- Need for more resources
	Access and distance to health facilities	- Distance to health facilities
		- Operational challenges
	Staff and training	- Need for more trained staff
Impact on health outcomes	Improved maternal health	- Adoption of healthier behaviors
	Enhanced community health	- Better health practices within families
		- Broader community health benefits
Recommendations for improvement	Increased support and resources	- Financial support
		- Infrastructure development
		- Continuous professional development for healthcare workers
	Community engagement and awareness	- Community outreach
		- Education campaigns

Theme	Subtheme	Subsubtheme
Cultural and social influences on ANC	Cultural beliefs and practices	- Influence on healthcare access
		- Traditional practices
	Male involvement in ANC	- Supportive behaviors
		- Unsupportive behaviors
Health education and services received	Health education topics	- Nutrition
		- Pregnancy care
	Services provided during ANC visits	- Medical tests
		- Health checks

The data were analyzed using thematic content analysis. Every KII, every FGD, and every audio recording were examined and kept on hard drives that the research team alone could access. The research assistants then transcribed the dataset verbatim. Every transcript was serial numbered after being checked for accuracy. After that, the transcripts were put into ATLAS.ti 23 for further analysis. The study team familiarized themselves with the data by reading and rereading the transcripts. Subsequently, the research guidelines and three transcripts, two from KII and one from FGD were reread to create a codebook that included several preliminary codes that arose from the tools and participant responses. To direct future coding, all the remaining transcripts were subsequently reviewed one at a time. Any recently developed codes were found and added to the ones that already existed. The team came to a consensus before deciding on the actual codes. After developing themes and subthemes from the codes, verbatim quotes were used to support the descriptive interpretation (Table 1).

Results

Sociodemographic characteristics of the respondents

The majority of the study participants were between 18 and 24 years of age, had only a primary-level education and worked as farmer. Nearly all were married. Among the community health workers and midwives, the age distribution was relatively balanced between those in their 30s and those aged 41 or older. The cadre distribution showed that a slight majority of the participants were midwives, and their experience level varied, with most having less than 10 years of experience (Table 2).

Table 2
Sociodemographic characteristics of the respondents

Variable	Category	Frequency (n = 33)
Pregnant mothers		
Age category	18–24	20
	25–29	02
	30–34	07
	35–39	01
	40 and above	03
Education level	None	04
	Primary	20
	Secondary	08
	Tertiary	01
Occupation	Peasant farmer	30
	TailerTayler	02
	Nurse	01
Marital status	Married	29
	Single	03
	Divorced	01
VHTs and Midwives		(n = 09)
Age category	30–40	05
	At least 41	04
Cadre	VHT	04
	Midwife	05
Years of experience	0–9 years	04
	10–19 years	03
	20 plus	02

Theme 1: Knowledge of antenatal care

Subtheme 1.1: Understanding ANC

The respondents demonstrated a good understanding of ANC, describing it as a critical process for monitoring the health of both the mother and the unborn baby. They highlighted the role of ANC in detecting and managing any health issues that could affect the pregnancy or be transmitted to the child.

R6: "For me, when I am going antenatal, I think that the health worker should examine me and see how my unborn baby is; is it healthy or not? Am I also healthy or not, that is how I understand about antenatal." (FGD Participant 6, Group 1)

R3: "The way I understand about antenatal, it is to examine you if you don't have a disease that can be transmitted to the child and you should attend 6 times to examine how the position of the in your womb." (FGD Participant 3, Group 1)

Importance of ANC visits

Regular check-ups

The respondents stressed the necessity of regular ANC visits. They recognized that frequent check-ups are crucial for assessing the health status of mothers and fetuses and for preparing for safe delivery.

R3: "If you keep going for antenatal, it can help predict how you will deliver; will you deliver safely or not." (FGD Participant 3, Group 1)

R1: "You are taught how to keep safe as a pregnant mother, and you should feed well and how to prevent some of the diseases that affect pregnant mothers." (FGD Participant 1, Group 1)

R5: "Regular check-ups can help in managing any complications early." (FGD Participant 5, Group 2)

Education and preventive care

The educational aspect of ANC was also noted, with pregnant mothers appreciating the guidance on health maintenance and disease prevention provided during these visits.

R1: "You are taught how to keep safe as a pregnant mother, and you should feed well and how to prevent some of the diseases that affect pregnant mothers." (FGD Participant, Group 1)

The midwives focused on educating the pregnant mothers about the basic danger signs during pregnancy. This education aimed to help pregnant women and their families recognize potential complications early and seek medical assistance promptly.

"... at the community level, we were mostly giving them health education, and we tell them about the basic danger signs in pregnancy, the importance of attending ANC, and the importance of delivering in the hands of trained health workers." (KII Midwife Aboke HCIV)

Sources of ANC information

Village health teams

Village health teams were identified as a source of ANC information. They play a crucial role in educating and mobilizing women within the community to attend ANC.

R6: "The knowledge that I get, first I get it from Village Health Team... when they notice any pregnant woman, they come and start mobilizing people in the community saying there is ANC and we should be in groups." (FGD Participant 6, Group 1)

R2: "We rely a lot on the VHTs for information about antenatal care." (FGD Participant 2, Group 2)

Theme 2: Perceptions of group antenatal care

Usefulness and benefits

Both midwives and village health teams have consistently highlighted the effectiveness of G-ANC in improving attendance and engagement among pregnant women. G-ANC encourages peer support, enhances learning, and improves health outcomes.

"The mothers have gained a lot in the group ANC. They can share experiences, learn from each other, and it has improved their attendance." (KII VHT 2, AMOLA)

"G-ANC helps mothers to know that they are not alone; it motivates them, and they get to learn more about their health and the health of their babies." (KII MIDWIFE 8, ABOKE HC-IV)

Community acceptance and inspiration

G-ANC was generally well received by the community, making antenatal care more accessible and less intimidating. The social aspect of G-ANC was particularly appreciated. The midwives and the VHTs had the following:

"The community has accepted G-ANC very well. Mothers feel more motivated to come for check-ups when they know they will be with others." (KII VHT 01, KICARWOT)

"They enjoy coming because they meet their peers, and it becomes like a social event where they also get health services." (KII MIDWIFE 7, ALITO HC-III)

G-ANC was also well accepted by the pregnant mothers, and the majority of them felt that it provided them with peer support and positive experiences. Some of the pregnant mothers had the following conclusions:

R7: "We discuss our experiences and support each other in going for ANC visits; it makes us feel like we are not alone." (FGD Participant 7, Group 2)

R3: "Seeing other women in the community attending ANC and hearing their positive experiences motivates me to go as well." (FGD Participant 3, Group 3)

Theme 3: Challenges in implementing G-ANC

Logistical issues

Healthcare workers noted several logistical challenges in implementing G-ANC, such as the need for more resources, space, and materials to accommodate group sessions effectively.

"We need more space and materials to conduct these sessions properly. Sometimes we have too many mothers and not enough room." (KII VHT 3, ATEK)

"Logistics is a big challenge. We need more chairs, educational materials, and sometimes even the space to hold these group sessions." (KII MIDWIFE 05, AYER HC-III)

Access and distance to health facilities

One of the major barriers identified was the distance to health facilities, which poses significant challenges, especially during labor. The respondents also highlighted operational issues, such as the unavailability of health workers and essential medications at health facilities.

R1: "The health facility is very far, and it is difficult to get there, especially for those who are about to deliver." (FGD Participant 1, Group 4)

R4: "The long distances to health facilities are a big challenge for many pregnant women." (FGD Participant 4, Group 2)

Operational challenges

The respondents also highlighted operational issues, such as the unavailability of health workers and essential medications at health facilities.

R2: "Sometimes there are no medicines or the health workers are not available, which forces us to go to private clinics." (FGD Participant 2, Group 3)

R6: "Sometimes you don't even find the health workers. You come back and proceed to the drug shop to buy medicines." (FGD Participant 6, Group 1)

Staff and training

There is a need for more trained staff to manage the increased workload of G-ANC. Continuous training for healthcare workers is necessary to ensure the effectiveness of G-ANC.

"We need more staff. The current staff is overstretched, and managing both individual and group sessions is challenging." (KII MIDWIFE 8, ABOKE HC-IV)

"Training is essential. We need regular training sessions for the healthcare workers to keep them updated on the best practices for G-ANC." (KII MIDWIFE 9, ALITO HC-III)

Theme 4: Impact on health outcomes

Improved maternal health

Significant improvements in maternal health were noted due to G-ANC by the community health workers and the midwives. They reported that the educational component helped mothers adopt healthier behaviors and better manage their pregnancies.

"We have seen a reduction in complications because mothers are more informed and take better care of themselves." (KII, VHT 4, ABILONINO)

"The health education they receive in groups is very beneficial. They learn about nutrition, danger signs, and what to do in emergencies." (KII MIDWIFE 9, ABOKE HC-IV)

Several critical services provided during antenatal care (ANC) visits were also provided to pregnant women in this study, emphasizing the importance of these services for both maternal and fetal health. The following quotes are from the focus group discussions.

R7: "During ANC, they check our blood pressure, give us tetanus injections, and test for diseases such as malaria and HIV." (FGD Participant 7, Group 4)

R5: "They provide important services such as checking the baby's heartbeat and giving necessary vaccines to protect both the mother and the baby." (FGD Participant 5, Group 3)

Enhanced community health

The current effect of improved maternal health has extended to broader community health. Increased ANC attendance and education led to better health practices within families and communities.

"When mothers are healthy and informed, the whole community benefits. They pass on what they learn to others." (KII VHT 01, KICARWOT)

"The impact goes beyond the mothers. They educate their families and neighbors, spreading the knowledge and improving overall community health." (KII MIDWIFE 9, ALITO HC-III)

Theme 5: Recommendations for improvement

Increased support and resources

More support from health authorities and NGOs is needed to sustain and expand G-ANC. This includes financial support, infrastructure development, and continuous professional development for healthcare workers.

"We need more support from the government and NGOs to provide the resources we need to sustain G-ANC." (KII MIDWIFE 8, ABOKE HC-IV)

"Support in terms of infrastructure and training is crucial. We also need financial aid to keep these programs running." (KII VHT 02, AMOLA)

Community engagement and awareness

Increasing community engagement and awareness about the benefits of G-ANC is vital. Continuous education campaigns and community involvement can enhance acceptance and participation.

"We need to do more community outreach to educate people about the benefits of G-ANC." (KII VHT 3, ATEK)

"Engaging community leaders and conducting awareness campaigns will help in getting more mothers to participate in G-ANC." (KII MIDWIFE 9, ABOKE HC-IV)

The focus group discussion participants also revealed that community health workers play a crucial role in promoting antenatal care among pregnant women. Participants highlighted the positive impact of community outreach and education efforts on ANC attendance.

R4: "The community health workers come to our villages and educate us about the importance of ANC, which encourages us to go for the check-ups." (FGD Participant 4, Group 4)

R2: "They help in organizing transport and reminding us of our ANC appointments, which is very helpful." (FGD Participant 2, Group 1)

Theme 6: Cultural and social influences on ANC

Cultural beliefs and practices

Cultural beliefs and practices significantly influence the acceptance and utilization of ANC services. Some traditional practices act as barriers to accessing formal healthcare.

R9: "In our culture, some people believe in traditional birth attendants and prefer home deliveries, which can be risky." (FGD Participant 9, Group 4)

R10: "There are beliefs that certain foods or activities should be avoided during pregnancy, which sometimes contradicts the advice given by health workers." (FGD Participant 10, Group 1)

Subtheme 5.2: Male involvement in ANC

The involvement of male partners in ANC was discussed, highlighting both supportive and unsupportive behaviors. The involvement of male partners in ANC varies widely, with some men actively supporting their partners by accompanying them to appointments, while others are less involved. Support from male partners was seen as crucial for the successful uptake of ANC services.

R6: "My husband always accompanies me to ANC visits and supports me in following the advice given by the health workers." (FGD Participant 6, Group 3)

R5: "Some men do not see the need to accompany their wives to ANC, thinking it is only a woman's responsibility." (FGD Participant 5, Group 2)

Theme 7: Health education and services received during ANC

Health education topics

Participants noted that ANC visits are educational and provide them with critical information on nutrition, personal hygiene, and pregnancy care. This knowledge helps ensure both maternal and fetal health.

R6: "When you go to the health facility for ANC, you will come back with some knowledge because the midwives always tell us about what to eat, personal hygiene." (FGD Participant 6, Group 2)

R4: "They teach us many things during ANC visits, such as how to care for ourselves during pregnancy and what foods to eat to stay healthy." (FGD Participant 4, Group 1)

Services provided during ANC visits

The participants were able to list some of the services provided during ANC visits, which included medical tests, vaccinations, and health checks, which are crucial for monitoring and maintaining the health of mothers and babies.

R7: "During ANC, they check our blood pressure, give us tetanus injections, and test for diseases such as malaria and HIV." (FGD Participant 7, Group 4)

R5: "They provide important services such as checking the baby's heartbeat and giving necessary vaccines to protect both the mother and the baby." (FGD Participant 5, Group 3)

Discussion

This discussion explores the experiences of pregnant mothers, VHTs, and health facility midwives, focusing on their knowledge, their reception of G-ANC, logistical challenges, barriers to accessing services, and the overall impact on maternal and community health. By examining these aspects, we aim to understand how ANC is perceived and how it affects health outcomes in the region.

Knowledge of antenatal care

Our results indicate that community health workers and facility midwives in Northern Uganda possess a solid understanding of antenatal care. They emphasized the critical role of ANC in monitoring maternal and fetal health, which is essential for the early detection and management of potential pregnancy

complications. This finding is consistent with the findings of [15, 16], who underscore the importance of regular ANC visits for monitoring health and preventing complications during pregnancy. This foundational knowledge is crucial, as it aligns with global health recommendations that stress the importance of ANC for improving maternal and child health outcomes [4]. In addition, participants' awareness of the benefits of ANC, such as monitoring fetal positioning and maternal health, aligns with established evidence that well-informed pregnant women are more likely to engage in healthy behaviors and utilize ANC services effectively [17]. Comprehensive ANC knowledge suggests that training programs in this district have effectively conveyed the importance of ANC, enabling healthcare providers to educate and support pregnant women adequately. This finding underscores the need for continuous education and training to keep healthcare providers updated on best practices and emerging trends in maternal healthcare [1].

Perceptions and reception of group antenatal care

The study showed that G-ANC was well received by both healthcare providers and pregnant women and had notable benefits, including increased social support, shared learning experiences, and improved patient satisfaction. These positive outcomes align with findings from other regions, such as Nigeria and Ghana, where G-ANC has been shown to enhance ANC attendance and maternal satisfaction [10, 11]. Social support is particularly important because it highlights the value of peer networks in providing emotional and practical assistance during pregnancy. These findings suggest that G-ANC not only improves clinical outcomes but also fosters a supportive community environment for pregnant women, which can enhance their overall well-being [18].

However, the study also revealed mixed experiences among healthcare providers, highlighting critical issues in ANC service delivery and echoing findings from elsewhere [19–22]. These varied experiences reflect significant challenges in how ANC services are delivered. Positive interactions, characterized by respect and support, promote patient adherence to ANC recommendations. In contrast, negative experiences, such as absenteeism and rudeness, discourage women from seeking care. This finding is consistent with the literature on respectful maternity care, which emphasizes the impact of provider behavior on patient satisfaction and healthcare utilization [19, 20].

Logistical challenges in implementing G-ANC

Despite the positive reception, the study identified several logistical challenges in implementing G-ANC, including inadequate resources, limited space, and a shortage of trained staff. These barriers are consistent with those reported in other low-resource settings, emphasizing the need for substantial investment in healthcare infrastructure and workforce development [1, 4, 23]. Our findings also show that resource constraints are critical, as they highlight the practical difficulties of scaling up G-ANC programs. Addressing these challenges requires significant investment in healthcare infrastructure, such as constructing or renovating facilities to accommodate group sessions and providing adequate training for healthcare workers.

Barriers to accessing G-ANC services

The study participants identified significant accessibility challenges, particularly related to distance and the cost of transportation. These challenges are consistent with findings from other studies, which have documented similar barriers in rural settings [24–26]. Additionally, studies by [27, 28] highlight the impact of poor infrastructure on ANC utilization. This means that there is need for practical solutions, such as increasing the number of health workers improving road infrastructure and rolling out of the group ANC model of care. These findings align with broader literature advocating for mobile health units and telemedicine to extend healthcare services to underserved areas (Nannyonjo, 2005). The access barriers identified in this study underscore the need for innovative strategies to ensure that pregnant women in remote areas receive necessary ANC services. Implementing G-ANC can bring ANC closer to the community, while telemedicine can facilitate remote consultations and follow-ups.

Cultural and social influences on ANC

The findings from our study noted that G-ANC had a positive impact on cultural practices, such as shifting from home deliveries to facility-based deliveries. This implies that group antenatal care influenced and improved certain cultural behaviors. Specifically, this approach helps encourage pregnant women who traditionally give birth at home to opt instead for delivering their babies at healthcare facilities. Our finding is consistent with the literature highlighting the transformative potential of group-based interventions [10, 11, 29]. These studies emphasize that G-ANC can foster positive health behaviors and improve maternal health outcomes. The findings from our study, where G-ANC led to increased facility-based deliveries, support this view and demonstrate the model's effectiveness in changing health behaviors.

Impact of G-ANC on maternal and community health

The study suggested that G-ANC has a positive impact on maternal and community health and has potential benefits, including improved ANC attendance, enhanced maternal satisfaction, and stronger social support networks. These findings are consistent with previous research indicating that G-ANC can lead to better health outcomes for both mothers and babies [10, 11]. The subtheme of health impact highlights the broader benefits of G-ANC beyond clinical outcomes by fostering a supportive community environment and enhancing the overall well-being of pregnant women. This finding underscores the potential of G-ANC to contribute to global efforts to reduce maternal and perinatal mortality rates.

Limitations

Our study has several limitations. One of the primary limitations of this study is its limited generalizability. The research was conducted in a specific district of Northern Uganda, which may not represent the broader population of Uganda or other low-resource settings. Second, the reliance on self-reported data from interviews and focus groups is another limitation. Self-reported data can be subject to various biases, including social desirability bias, recall bias, and response bias. However, we tried to

minimize these issues as much as possible by building rapport with the respondents. Third, while the study aimed to understand the experiences of community health workers and facility midwives, it may not have fully explored the broader health system implications of implementing G-ANC. Future research should explore these experiences, including health system implications, to overcome these limitations in our study.

Conclusion and recommendations

In conclusion, the study's findings highlight the potential benefits of G-ANC while also emphasizing the need for substantial investments in healthcare infrastructure and innovative solutions to address logistical and access barriers. Enhanced training for healthcare workers, increased community engagement, and the adoption of technology-driven healthcare models are essential for optimizing G-ANC implementation. Future research should continue to explore these areas, providing the evidence needed to inform policy and practice and ultimately improve maternal health outcomes in low-resource settings. By addressing the identified barriers and leveraging the positive aspects of G-ANC, healthcare systems can better meet the needs of pregnant women, particularly in underserved and remote regions, contributing to global efforts to reduce maternal and perinatal mortality rates.

Abbreviations

ANC:	Antenatal Care
CBANC:	Community-based antenatal care
CBO:	Community-based organization
CHU:	Child Hug Uganda
CHWs:	Community Health Workers
DHT:	District Health Teams
EPMM	Ending Preventable Maternal Mortality
G-ANC:	Group antenatal care
HMIS:	Health Management Information System
MMR:	Maternal Mortality Ratio
SDG:	Sustainable Development Goal
UBOS:	Uganda Bureau of Statistics
UDHS	Uganda Demographic and Health Survey

USAID	United States Agency for International Development
VHT	Village Health Team
WHO	World Health Organization

Declarations

Ethics approval and consent to participate

This study adhered to ethical principles and guidelines for research involving human subjects according to the Helsinki Declaration. ApprovalsApproval to use the data were obtained from the Lira University Research and Ethics Committee (approval number LUREC-2024-240) prior to data collection. Informed consent was obtained from all participants, and their confidentiality and anonymity were maintained throughout the study.

Consent for publication

Not applicable.

Availability of data and materials

The datasets that were utilized and/or analyzed for this study include data that we plan to use in a future publication and can be obtained from the corresponding author upon reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

SSP, SIA, NO, BA, HA, EK, JPA, MO, and PBO participated in the research project conceptualization and proposal drafting. SSP developed the interview guide in consultation with NO, BA and HA; HA interviewed the research assistants who were then trained by SP; BA checked the transcripts before sharing them with SSP and EK to generate codes; SSP and EK coded the data in consultation with NO and BA; and analysis was performed by SSP and EK. SSP, NO, BA, HA, SIA, EK, JPA, PBO and GR. The manuscript was written, discussed, read, and approved for publication by all of the authors.

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