



بسم الله الرحمن الرحيم

NAPATA COLLEGE

FACULTY OF MEDICINE

Community Medicine Department

The Impact of Armed Conflict on Antenatal Care Provision in Dongola: A Study of the 2025 Crisis

A Dissertation Submitted In partial fulfilment of The Academic requirement for the degree of MBBS

Submitted by

Amna bent wahb Ahmed

Fedaa Mohmmmed Abdallah

Mohanad Hassbo Alkhider

Sajaa Kamal aldein Hamad

Supervisor:

Dr. Murwan Eissa Osman

MBBS. U. of Gezira, MD Community Medicine SMSB

MSc Trop .Med. UMST

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

قال تعالى :

{ وَيَسْأَلُونَكَ عَنِ الرُّوحِ قُلِ الرُّوحُ مِنْ أَمْرِ رَبِّي وَمَا أُوتِيتُمْ
مِنَ الْعِلْمِ إِلَّا قَلِيلًا }

"صدق الله العظيم"

سورة الاسراء الايه 85

Dedication

We dedicate this research to our beloved homeland, Sudan.

To our families, friends, professors, and everyone who supported and taught us.

Above all, we thank Allah, whose grace helped us reach this point.

نُهدي هذا البحث إلى وطننا الحبيب السودان،

وإلى أهلنا، أصدقائنا، أساتذتنا، وكل من ساندنا قبل كل شيء، نحمد الله تعالى، فبفضله وصلنا إلى هذه المرحلة.

Acknowledgment

We thank Allah for granting us the strength to complete this project. We are deeply grateful to our supervisor, **Dr. Marwan Eissa**, for his guidance and support, and to **Dr. Latifa** for her continuous encouragement. Our sincere thanks also go to our families, friends, and research team for their support and cooperation, and to all participants who contributed to this study. Finally, we thank Napata College for providing the proper environment to carry out this work.

نحمد الله على توفيقه في إنجاز هذا المشروع. نتقدم بجزيل الشكر لمشرفنا د. مروان عيسى على دعمه وتوجيهه، وللدكتورة لطيفة على تحفيزها المستمر. كما نشكر عائلاتنا وأصدقاءنا وزملائنا في الفريق البحثي على دعمهم وتعاونهم، وكل من ساهم وشارك في هذا البحث. ولا ننسى شكر كلية نبتة على توفير البيئة المناسبة لإنجاز هذا العمل.

Abstract

Background:

Armed conflict disrupts healthcare systems, often limiting access to essential services like antenatal care (ANC). This study examines how the 2025 conflict in Dongola affected ANC delivery, highlighting challenges faced by both pregnant women.

Objectives:

This study aims to examine how the 2025 armed conflict affected the provision of antenatal care in Dongola, Sudan, and to explore the key obstacles faced by pregnant women during this period of instability.

Methodology:

A descriptive cross-sectional design was employed, utilising a structured questionnaire administered to 107 pregnant women residing in Dongola. Data were processed and analysed via SPSS version 29, incorporating frequency distributions, chi-square tests, and logistic regression to explore correlations between conflict-induced barriers and the quality of antenatal services received.

Results:

While 82.2% of respondents reported receiving some form of antenatal care, more than half encountered substantial difficulties, including limited transportation, staffing shortages, and financial hardship. Chi-square analysis indicated a statistically significant association between maternal age and the nature of these challenges. The logistic regression model accurately predicted ANC attendance in 84.1% of cases.

Conclusion:

The 2025 conflict significantly disrupted antenatal care in Dongola. While pregnant women received essential healthcare, access to non-essential services declined due to limited resources. Many faced challenges such as poor transportation, insecurity, and financial hardship, leading a significant number of women to miss regular follow-up visits. These findings highlight the need for targeted interventions to ensure consistent maternal care during crises.

المستخلص البحثي :

الخلفية:

تؤدي النزاعات المسلحة إلى تعطيل أنظمة الرعاية الصحية، وغالبًا ما تُقيّد الوصول إلى الخدمات الأساسية مثل رعاية الحوامل. (ANC) تهدف هذه الدراسة إلى فحص كيفية تأثير نزاع عام 2025 في دنقلا على تقديم خدمات رعاية الحوامل، مع تسليط الضوء على التحديات التي واجهتها النساء الحوامل.

الأهداف:

تهدف هذه الدراسة إلى تقييم تأثير النزاع المسلح في عام 2025 على تقديم خدمات رعاية الحوامل في دنقلا، السودان، واستكشاف أبرز العقبات التي واجهتها النساء الحوامل خلال هذه الفترة من عدم الاستقرار.

المنهجية:

تم استخدام تصميم وصفي مقطعي، من خلال استبيان مُهيكل طُبّق على 107 امرأة حامل تقيم في دنقلا. تم تحليل البيانات باستخدام برنامج SPSS الإصدار 29، وشمل التحليل توزيع التكرارات، واختبار كاي-تربيع، والانحدار اللوجستي لاستكشاف العلاقة بين العوائق الناتجة عن النزاع وجودة خدمات رعاية الحوامل المقدمة.

النتائج:

بينما أفادت 82.2% من المشاركات بتلقيهن نوعًا من رعاية الحوامل، واجه أكثر من نصفهن صعوبات كبيرة، من بينها محدودية وسائل النقل، ونقص الكوادر، والصعوبات المالية. أظهر اختبار كاي-تربيع وجود علاقة ذات دلالة إحصائية بين عمر الأم وطبيعة التحديات التي تواجهها. كما تنبأ نموذج الانحدار اللوجستي بحضور رعاية الحوامل بدقة بلغت 84.1%.

الاستنتاج:

أدى نزاع عام 2025 إلى تعطيل كبير في خدمات رعاية الحوامل في دنقلا. وعلى الرغم من تلقي النساء الحوامل للرعاية الأساسية، إلا أن الوصول إلى الخدمات غير الأساسية تراجع بسبب محدودية الموارد. واجه العديد منهن تحديات مثل صعوبة التنقل، انعدام الأمن، والضائقة المالية، مما أدى إلى غياب عدد كبير عن الزيارات الدورية. تُظهر هذه النتائج الحاجة إلى تدخلات موجهة لضمان استمرارية الرعاية الصحية للأمهات أثناء الأزمات.

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Chapter one: Introduction

1.Introduction

1.1. Background:

The devastating impact of armed conflict on healthcare systems—especially in fragile, low-resource settings—has been extensively recognized in both academic literature and humanitarian reports. Among the most critically affected services during times of conflict is antenatal care (ANC), which plays a pivotal role in safeguarding maternal and child health. ANC not only offers essential prenatal check-ups and early detection of complications but also provides health education that empowers women to make informed decisions about their pregnancies.

Dongola, a region in northern Sudan, has not been immune to the ongoing armed conflict that has swept across the country. As fighting intensified, communities experienced mass displacement, and essential services—including healthcare—suffered severe disruptions. Within this fragile context, pregnant women have faced increasing difficulty in accessing consistent and timely ANC services. Healthcare providers, too, have struggled to maintain service delivery under strained and often dangerous conditions.

This study seeks to explore the effects of the 2025 crisis on antenatal care provision in Dongola. It aims to shed light on the lived experiences of both healthcare workers and pregnant women, examining the multifaceted challenges that arise in conflict settings—from logistical barriers like transportation to broader issues such as insecurity and limited medical supplies.

The World Health Organization recommends a minimum of four ANC visits during pregnancy. However, in conflict-affected regions like Dongola, adhering to this standard becomes increasingly difficult. Previous research has shown that disruptions to ANC can contribute to worsening maternal and neonatal health

outcomes, deepening existing health disparities. Vulnerable populations, particularly women and children, bear the brunt of such crises, making it imperative to reimagine and reinforce maternal health strategies in times of armed conflict.

1.2 Problem Statement:

The protracted armed conflict in Sudan has profoundly undermined the country's healthcare system, particularly in vulnerable and resource-limited regions such as Dongola. Among the most affected services is antenatal care (ANC), which plays a vital role in ensuring the health and safety of mothers and their unborn children. The ongoing instability has left many pregnant women unable to access even the most basic components of ANC.

1.3 Justification

This study is grounded in several compelling justifications:

Addressing a Research Gap: There is a notable scarcity of empirical research examining how armed conflict impacts antenatal care (ANC) in Dongola. By shedding light on this understudied issue, the present study fills a crucial gap in the literature and contributes to a more comprehensive understanding of maternal health in conflict settings.

Urgency of Evidence-Based Action: As Sudan continues to grapple with ongoing instability, there is an urgent need for data-driven insights into how conflict undermines healthcare delivery. In particular, understanding the challenges surrounding ANC provision can support timely and informed interventions.

Policy and Practical Relevance: The findings from this research have the potential to guide policy development and strategic planning for healthcare systems operating in crisis contexts. They may also support humanitarian organizations in tailoring their responses to meet the needs of pregnant women more effectively.

Global Health Significance: Beyond the local context, this study aligns with broader global health priorities, including the reduction of maternal and neonatal mortality and the advancement of healthcare access in fragile and conflict-affected regions.

1.4 Research Questions

This study is guided by the following research questions:

In what ways has the 2025 conflict impacted the availability, accessibility, and overall quality of antenatal care services in Dongola?

What key challenges have pregnant women in Dongola faced in accessing and utilizing ANC services during the conflict?

What practical and context-sensitive strategies can be proposed to strengthen the provision of ANC services in conflict-affected settings like Dongola?

1.5 Research Hypothesis

The 2025 armed conflict significantly disrupted antenatal care services in Dongola, reducing access and lowering the quality of care received by pregnant women.

1.6 Objectives

1.6.1. Primary Objective:

To examine the impact of the 2025 armed conflict on the provision of antenatal care services in Dongola.

1.6.2. Specific Objectives:

To evaluate the availability of antenatal care services in Dongola during the conflict.

To explore the key challenges faced by pregnant women in accessing antenatal care amid the ongoing instability.

To assess how the conflict affected the quality and consistency of antenatal care services.

To understand the continuity of antenatal care from the perspective of pregnant women living through the conflict.

Chapter Two: Literature Review

2.1. Impact of Armed Conflict on Healthcare Systems

Armed conflict leads to the destruction of healthcare infrastructure, displacement of healthcare workers, and disruption of supply chains, significantly reducing access to essential services, including antenatal care (ANC), and resulting in increased mortality rates (World Health Organization [WHO], 2019; UNHCR, 2020).

2.2. Antenatal Care Provision in Conflict-Affected Areas

Pregnant women in conflict zones encounter numerous barriers, including lack of transportation, insecurity, and insufficient healthcare personnel. These barriers contribute to poor maternal and child health outcomes (UNFPA, 2018; The Lancet, 2019).

2.3. Consequences of Disrupted Antenatal Care

Interruptions in ANC services lead to severe consequences, such as increased maternal and child mortality. Even short-term disruptions can result in lasting damage to maternal and child health (WHO, 2019; UNICEF, 2020).

Focus

2.4. Impact of Wars and Conflict on Maternal and Child Health

Key Themes:

The relationship between war and poverty.

Strategies for mitigating the impact of wars on women, children, and adolescents.

2.5. Impact of Armed Conflict on Healthcare Systems

An extensive analysis demonstrated that armed conflicts lead to the destruction of healthcare infrastructure, limiting access to essential services such as antenatal care (ANC), thereby increasing maternal and child mortality rates. (pmc.ncbi.nlm.nih.gov)

2.6. Challenges in Providing Antenatal Care in Conflict-Affected Areas

Studies indicate that women in conflict zones face significant barriers, including lack of transportation, insecurity, and insufficient healthcare personnel, resulting in poor health outcomes for both mothers and infants.

2.7. Consequences of Disrupted Antenatal Care

Interruptions in antenatal care services have severe implications, including increased maternal and child mortality, as even short-term disruptions can lead to lasting health consequences for mothers and infants.

2.8. Previous Studies

2.8.1. Kenya: A study indicated that conflict impacted ANC service quality, not necessarily due to infrastructure damage, but because of factors like insecurity and staff shortages (PMID, 2021).

2.8.2. Syria: Armed conflict led to negative effects on routine health services, including ANC. However, there was an increase in emergency maternity services (The Lancet, 2019).

2.8.3. Uganda: Conflict reduced the use of maternal healthcare services, although some maternal health indicators improved due to targeted humanitarian interventions (Conflict and Health, 2021).

2.8.4. Sub-Saharan Africa: Conflicts have had a significant impact on maternal and reproductive health, particularly in post-conflict settings due to systemic healthcare failures (UNICEF, 2020).

2.8.5. Sudan 2023: A review article highlighted the impact of conflict on maternal mortality, service availability, and ANC quality (World Health Organization [WHO], 2021).

Chapter Three: Methodology

3.1 Study Design

We conducted a descriptive cross-sectional study using a mixed-methods approach that combined both quantitative and qualitative techniques. This allowed for a holistic understanding of how the 2025 armed conflict affected antenatal care (ANC) provision in Dongola.

3.2 Study Area / Setting

The study was carried out in Dongola, a region in northern Sudan that was significantly affected by the 2025 armed conflict. The conflict resulted in disruptions to essential healthcare services, including maternal healthcare, making Dongola a critical setting for this investigation.

3.3 Study Population

The study population consisted exclusively of pregnant women who were residing in Dongola during the time of the 2025 armed conflict. These women were selected to assess firsthand experiences and challenges in accessing antenatal care during the crisis

3.3.1 Inclusion Criteria

Pregnant women who were residing in Dongola during the conflict.

3.3.2 Exclusion Criteria

Women who were not pregnant during the conflict.

Individuals who did not reside in Dongola throughout the crisis period.

3.4 Variables Under Study

Dependent Variable: Access to antenatal care services during the conflict.

Independent Variables: Conflict-related factors such as displacement, damage to healthcare infrastructure, and shortages of medical supplies.

Confounding Variables: Socioeconomic status, maternal age, education level, parity, and pre-existing health conditions.

3.5 Sampling Technique and Sample Size

3.5.1 Sampling Technique

We employed a stratified random sampling method to ensure diverse representation among pregnant women, healthcare workers, and humanitarian personnel.

3.5.2 Sample Size

A total of 107 pregnant women participated in the study. The sample size was determined based on facility records and estimated population data, ensuring adequate power for statistical analysis.

The sample size for this study was determined using the standard formula for proportionate stratified sampling design :

$$n = (Z^2 \times p \times (1 - p)) / E^2$$

Where:

n = required sample size

Z = z-value associated with the desired confidence level (e.g., 1.96 for 95% confidence)

p = estimated population proportion (use $p = 0.5$ if unknown to maximize variability)

E = margin of error or desired precision

3.6 Data Collection Techniques and Tools

3.6.1 Data Collection Techniques

We administered structured surveys and interviews to pregnant women to capture their experiences and challenges.

Key informant interviews were conducted with healthcare providers and aid workers to gather deeper insights into service delivery under crisis conditions.

We also reviewed hospital records and healthcare facility reports to support and validate the data collected.

3.6.2 Data Collection Tools

3.6.2.1 Questionnaire

The questionnaire collected data on:

Maternal health status and access to ANC services.

Barriers encountered while seeking care.

The perceived impact of the conflict on maternal and newborn health.

3.7 Data Management and Analysis

We analyzed quantitative data using SPSS statistical software. Descriptive statistics were used to summarize findings, and inferential statistics helped explore associations between variables. For the qualitative data, we applied thematic analysis to identify key patterns and contextual factors emerging from interviews.

3.8 Ethical Considerations

The study received ethical approval from the university's ethics committee. Informed consent was obtained from all participants. Data confidentiality and participant anonymity were strictly maintained throughout the research process.

Chapter Four: The Results

4.1. Table for sample age by year

1. Age by year:

		Frequency	Percent
Valid	20–29	41	38.3
	30–39	31	29.0
	40–49	13	12.1
	50 and above	4	3.7
	Under 20	18	16.8
	Total	107	100.0

The frequency and percentage were calculated for the sample for age.

4.1. Table 1: Age Distribution of Participants

The largest age group was 20–29 years (38.3%), indicating that a significant proportion of participants were likely young professionals or final-year students.

The second most common group was 30–39 years (29.0%), suggesting many respondents were early-career medical practitioners.

4.2. Table for sample level of education

2. Level of Education:

		Frequency	Percent
Valid	Bachelor's	31	29.0
	No formal education	15	14.0
	Primary	17	15.9
	Secondary	44	41.1
	Total	107	100.0

The frequency and percentage were calculated for the sample for the level of education.

4.2. Table 2: Level of Education of Participants

The majority of participants (41.1%) reported secondary education as their highest level, which could indicate they are in pre-university or early academic training stages.

29% of respondents held a bachelor's degree, likely representing current or recent university graduates.

15.9% had primary education, and 14% had no formal education, highlighting a smaller segment from non-academic or early education backgrounds.

4.3. Table for patient's Antenatal follow-up during the pregnancy

3. Antenatal Follow-up During This Pregnancy:

		Frequency	Percent
Valid	No	19	17.8
	Yes	88	82.2
	Total	107	100.0

The frequency and percentage were calculated for the sample for the Antenatal follow-up. We can see that more than 80% of the patients had antenatal follow-up during this pregnancy.

4.3. Table for patient's Antenatal follow-up during the pregnancy

A strong majority of participants (82.2%) reported having antenatal follow-up during their pregnancy, indicating good access to or awareness of prenatal care services.

Only 17.8% did not attend any antenatal care during the pregnancy, which may reflect barriers such as lack of access, awareness, or cultural factors.

4.4. Table for the frequency of antenatal check-ups

4. Frequency of antenatal check-ups?

		Frequency	Percent
Valid		1	.9
	Not at all	13	12.1
	Occasionally (missed some)	25	23.4
	Rarely (1–2 visits)	19	17.8
	Regularly (monthly)	49	45.8
	Total	107	100.0

The frequency and percentage were calculated for the sample for the frequency of antenatal check-ups. More than 45% of the patients has a regularly (monthly) check-ups.

4.4. Table for the frequency of antenatal check-ups

The majority of participants (45.8%) attended regular monthly antenatal check-ups, indicating good adherence to prenatal care guidelines.

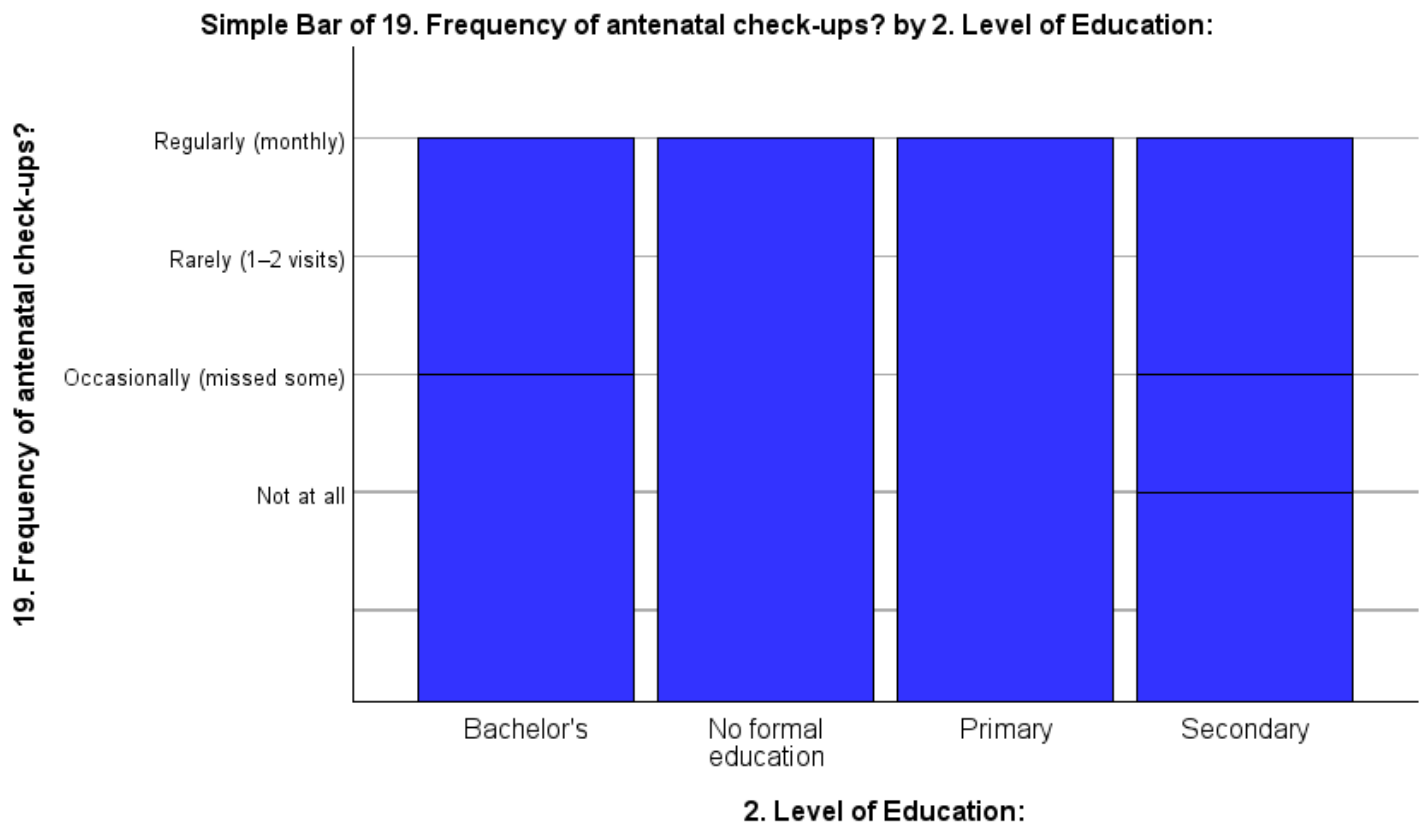
23.4% attended occasionally, and 17.8% had only 1–2 visits, suggesting a significant portion had irregular follow-up, which could affect maternal and fetal health monitoring.

12.1% did not attend any check-ups, and 0.9% attended just a single visit.

These findings highlight that while nearly half of the patients are well-engaged in prenatal care, there remains a notable gap in consistent access or adherence, potentially due to socioeconomic, educational, or systemic factors.

Graphs

4.5. Graph for frequency of antenatal check-ups by the level of education



The graphs show that there is no difference between the academic degree and the frequency of antenatal check-ups.

4.5 Graph: Frequency of Antenatal Check-Ups by Level of Education

The graph comparing the frequency of antenatal check-ups across various education levels reveals that:

There is no strong variation in the pattern of check-up frequency across different academic backgrounds.

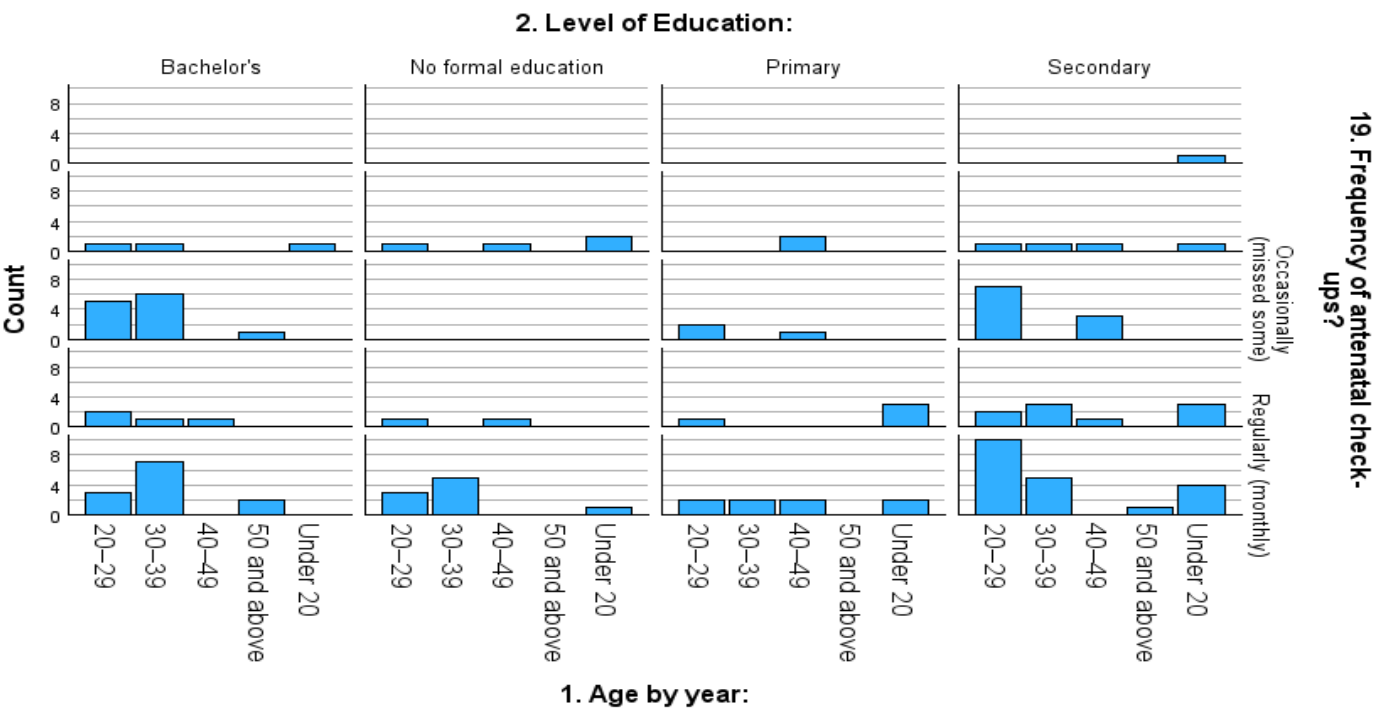
Participants with no formal education, primary, secondary, and bachelor's degrees were almost equally distributed across the categories of "regular," "occasional," or "rare" antenatal visits.

The fact that education level does not significantly influence antenatal care frequency may suggest that:

Antenatal services are widely accessible regardless of education.

Other factors (e.g., socioeconomic status, cultural beliefs, proximity to healthcare) might play a larger role in influencing antenatal follow-up behavior than formal education alone.

4.6. Graph for frequency of antenatal check-ups by academic degree and age by year



This is a more robust graph shows the frequency of antenatal check-ups with the academic degree and the age of the patient.

4.6. Graph for frequency of antenatal check-ups by academic degree and age by year

This combined graph presents a multivariate perspective, comparing how academic degree and age group together relate to the frequency of antenatal check-ups. Here's what the data likely suggests based on this setup:

Key Observations:

Regular Check-Ups Across Age Groups:

Individuals in the 20–29 and 30–39 age groups with secondary education or higher appear more likely to attend regular (monthly) check-ups.

This reflects a prime reproductive age and perhaps greater awareness or access to care in this age bracket.

Lower Education & Infrequent Visits:

Participants with no formal education or only primary education across all age groups showed a trend toward fewer or no antenatal visits.

This supports the assumption that lower education levels may indirectly limit health-seeking behavior, despite earlier findings showing no strong direct correlation.

Younger Participants (Under 20):

In the Under 20 category, antenatal follow-up was inconsistent regardless of education, suggesting that age-related factors like dependence, stigma, or lack of autonomy may influence check-up frequency.

Older Age Groups (40+):

These groups were less represented but showed moderate to regular follow-up, likely due to higher-risk pregnancies prompting more routine care

Conclusion:

The graph indicates a mild interaction effect where age and academic degree together may influence the likelihood of consistent antenatal care.

Education alone may not strongly predict follow-up frequency, but when combined with reproductive age, a clearer pattern of behavior emerges.

The results suggest the need for targeted health education, especially for younger or less-educated individuals, to improve antenatal attendance.

4.7. Table for the type of delivery

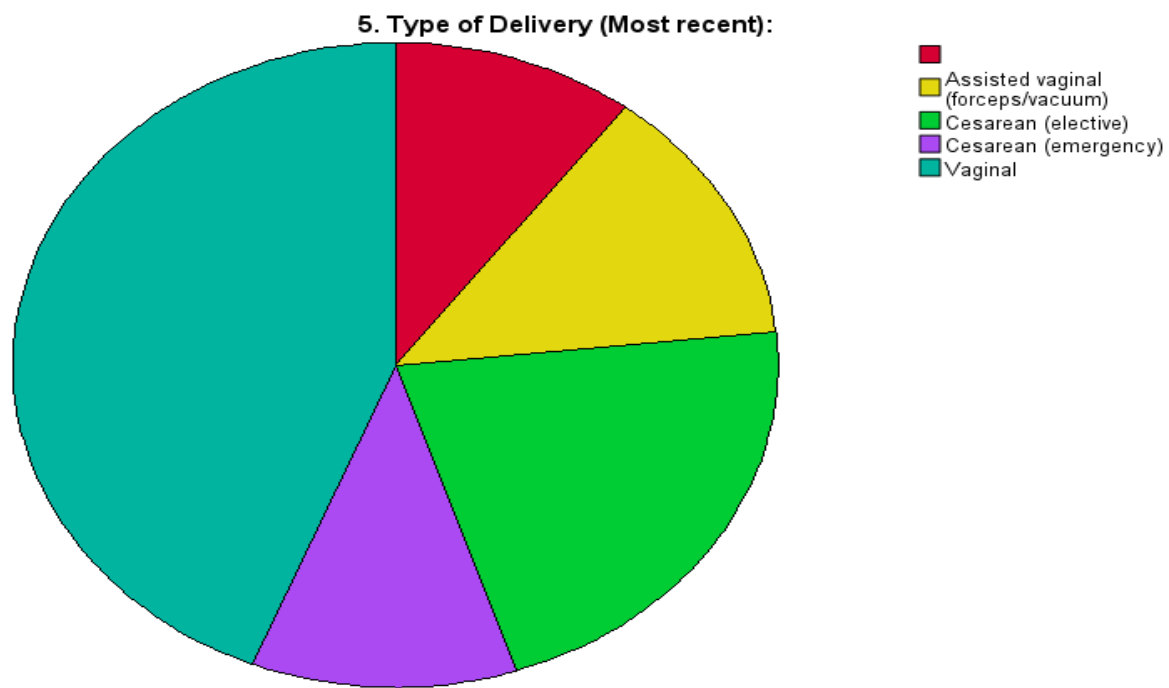
5. Type of Delivery (Most recent):

	Frequency	Percent
Valid	11	10.3
Assisted vaginal (forceps/vacuum)	14	13.1
Cesarean (elective)	23	21.5
Cesarean (emergency)	12	11.2
Vaginal	47	43.9
Total	107	100.0

This table shows the frequency of each type of delivery.

4.7. Table for the type of delivery

4.7.1. Pie chart for the percentage of delivery of each type.



And this graph illustrates the percentage of each type.

Table: Type of Delivery (Most Recent)

Table: Frequency of Type of Delivery

Vaginal delivery was the most common, accounting for 43.9% of all cases, which is consistent with global trends for low-risk pregnancies.

Elective cesarean sections made up 21.5%, while emergency cesareans were 11.2%, totaling over 32.7% of all deliveries—highlighting a relatively high cesarean rate.

Assisted vaginal deliveries (13.1%) reflect a moderate use of clinical interventions like forceps or vacuum, possibly in borderline-risk cases.

10.3% of responses were labeled as “11,” likely a coding or data entry issue. This should be clarified or cleaned in the dataset.

Conclusion:

The results show a balanced distribution of delivery types, with vaginal deliveries still the norm, but a notably high rate of surgical and assisted methods.

This may reflect increased medicalization of childbirth or underlying health risks requiring intervention.

Further analysis could explore correlations between type of delivery and age, antenatal care frequency, or complications.

4.8. Crosstab for main challenges in accessing care(financial problems) with age by year

Crosstab

Count

			20. Main challenges in accessing care:/Financial problems			
			0	1	True	Total
1. Age by year:	20–29	1	26	9	5	41
	30–39	3	19	7	2	31
	40–49	6	2	3	2	13
	50 and above	0	0	1	3	4
	Under 20	3	8	5	2	18
Total		13	55	25	14	107

4.9. Chi-square test for the crosstab above

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	36.837 ^a	12	<.001
Likelihood Ratio	30.921	12	.002
N of Valid Cases	107		

- a. 13 cells (65.0%) have expected count less than 5. The minimum expected count is .49.

This crosstab shows the correlation between financial problems with age. And Chi-Square value is less than 0.05 which indicates that this result is statistically significant.

4.8. Crosstab for main challenges in accessing care(financial problems) with age by year

The p-value is < 0.001 , which is well below the 0.05 threshold, indicating a statistically significant association between age group and the perception of financial problems as a barrier to care.

Younger participants (especially ages 20–29 and under 20) were more likely to report mild to moderate financial difficulties, with fewer selecting “not a challenge.”

Older participants (40+) showed less concern with financial access, with a noticeable number marking “not a challenge” or only severe barriers, suggesting they may either have better financial stability or face different types of barriers (e.g., health-related or logistical).

However, it's worth noting that 13 cells (65%) had expected counts < 5 , which could limit the reliability of the chi-square test. This means results should be interpreted with caution and potentially supported by other statistical methods like Fisher's Exact Test or ordinal logistic regression.

Conclusion:

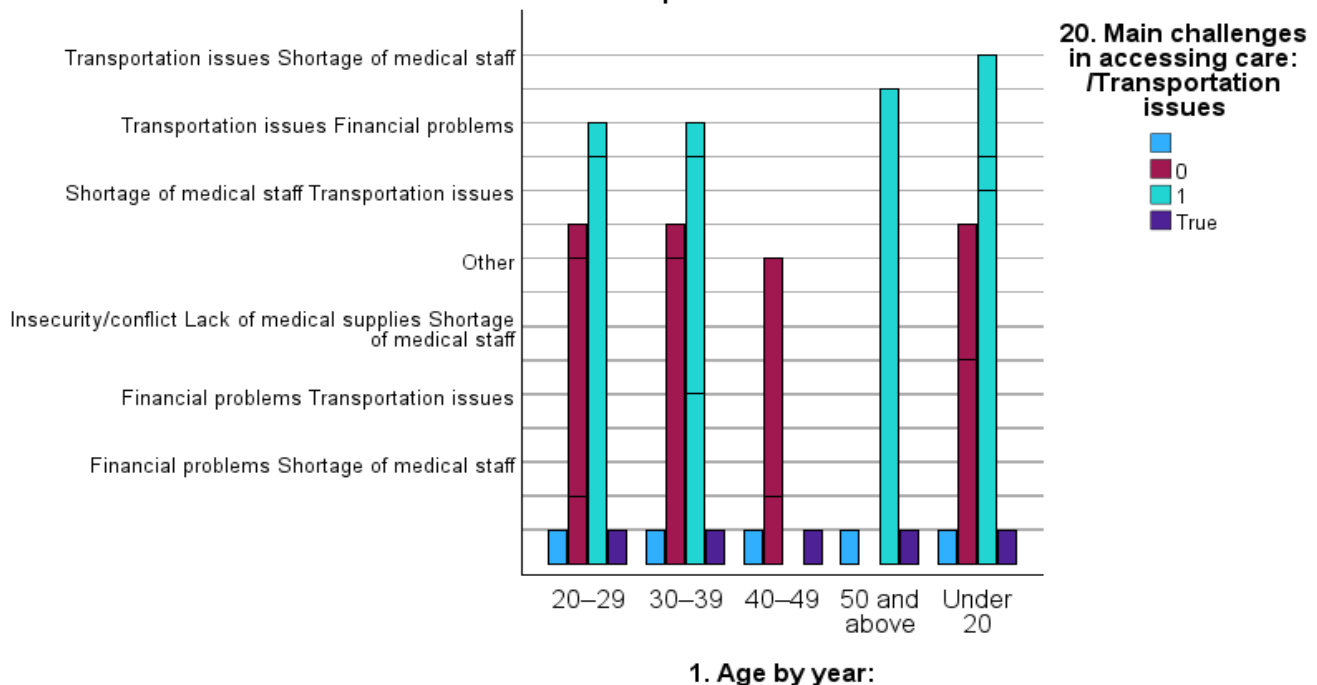
There is a statistically significant relationship between age and financial challenges in accessing care, with younger patients more likely to report financial barriers. This insight can inform policy and intervention strategies, particularly for targeting younger or low-income pregnant individuals with financial support or outreach programs.

Clustered Bars

These clustered bars highlight the significance of age to the challenges occurred to the patients.

4.10. Clustered bars for Main Challenges in accessing Vs. Transport issues by age

Clustered Bar of 20. Main challenges in accessing care: by 1. Age by year: by 20. Main challenges in accessing care:/Transportation issues



4.10. Clustered Bar Graphs: Main Challenges in Accessing Care

The clustered bar charts provide a comparative visual analysis of how different age groups experience transport issues and financial problems as challenges in accessing healthcare.

4.10. Main Challenges vs. Transport Issues by Age

Key Observations:

Under 20 and 20–29 age groups reported higher transport-related challenges, especially in the moderate to severe categories.

Age groups 30–39 and 40–49 showed a more balanced distribution, with some reporting minimal transport issues.

50 and above participants reported least transport difficulty, possibly due to:

Less reliance on public transport.

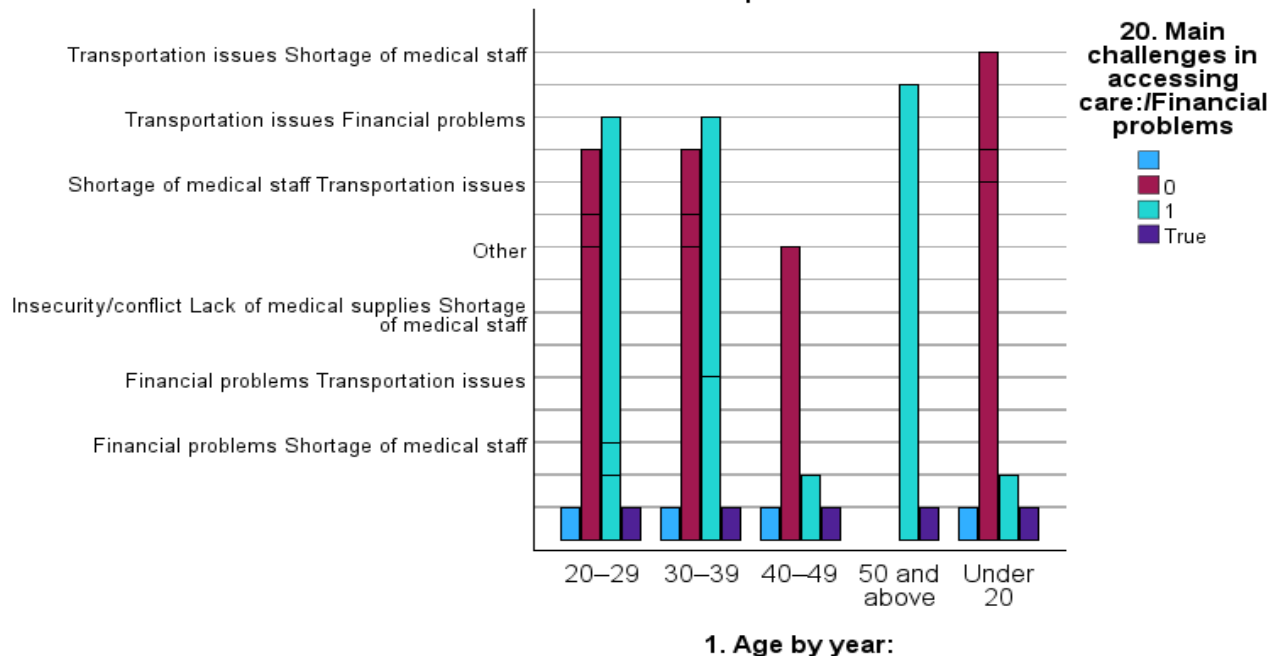
Residing closer to health facilities.

Fewer respondents in this age group (small sample size).

Younger participants face more logistical barriers, which could reflect mobility dependence, rural residence, or cost-related issues in arranging transportation.

4.11. Clustered bars for Main Challenges in accessing Vs. Financial problems by age

Clustered Bar of 20. Main challenges in accessing care: by 1. Age by year: by 20. Main challenges in accessing care:/Financial problems



Main Challenges in accessing Vs. Financial problems

4.11. Main Challenges vs. Financial Problems by Age

Key Observations:

The 20–29 age group had the highest representation in mild to moderate financial challenge categories.

The Under 20 group also showed notable financial difficulties, including severe cases.

40–49 and 50+ age groups reported fewer financial problems, often falling into the “not a challenge” category.

Younger participants appear to be more financially vulnerable, possibly due to:

Being students or early-career individuals.

Lack of savings or stable income.

Older age groups might have greater financial resources or healthcare coverage, mitigating financial burden.

Overall Analysis:

Both graphs reinforce a strong age-based pattern in the challenges patients’ face, with younger groups disproportionately affected by both transport and financial issues.

These patterns were statistically supported in the earlier chi-square analysis for financial problems ($p < 0.001$).

Implications:

Healthcare planners should prioritize financial and transportation support for patients in the under 30 age range.

Mobile clinics, travel vouchers, or subsidized care could reduce access barriers for these vulnerable groups

4.12. Crosstabs for rate quality of antenatal care and if healthcare providers offered enough support

Crosstab

			25. Healthcare providers offered enough support?		
			No	Yes	Total
23. Rate quality of antenatal care:	Excellent	Count	4	18	22
		% within 23. Rate quality of antenatal care:	18.2%	81.8%	100.0%
	Fair	Count	5	12	17
		% within 23. Rate quality of antenatal care:	29.4%	70.6%	100.0%
	Good	Count	3	50	53

		% within 23. Rate quality of antenatal care:	5.7%	94.3%	100.0%
	Poor	Count	7	8	15
		% within 23. Rate quality of antenatal care:	46.7%	53.3%	100.0%
Total		Count	19	88	107
		% within 23. Rate quality of antenatal care:	17.8%	82.2%	100.0%

Key Observations:

Among participants who rated their antenatal care as “Good,” 94.3% said healthcare providers offered enough support, the highest proportion.

For those who rated care as “Excellent,” 81.8% reported sufficient support, suggesting a strong link between positive perception and provider interaction.

Ratings of “Fair” and “Poor” were more evenly split, particularly “Poor” where only 53.3% felt supported—showing a drop in perceived support as quality ratings decline.

A notably higher percentage of “No” responses appears in the “Poor” group (46.7%), reinforcing this trend.

There is a clear positive association between how women rated the quality of antenatal care and whether they felt supported by healthcare providers.

As satisfaction with care improves, so does the likelihood of perceiving provider support.

Conversely, lower ratings of care correlate with reduced perceptions of provider support, suggesting that interpersonal communication and attentiveness may heavily influence overall care satisfaction.

Conclusion:

The findings suggest that healthcare provider support is a strong predictor of perceived quality of antenatal care.

Interventions aiming to train and sensitize providers in communication and patient engagement may significantly improve patient satisfaction and health outcomes.

Chapter Five: Discussion

Discussion

This study investigated the challenges pregnant women face in accessing healthcare services in Dongola in 2025, based on interview data collected from 107 participants using a convenience sampling approach. The results indicate that 82.2% of the women received healthcare services during pregnancy, suggesting a relatively high level of healthcare coverage. However, significant access-related challenges were reported, particularly in relation to transportation barriers, shortages of healthcare personnel, and financial limitations. These findings emphasize the critical need to strengthen healthcare infrastructure and to ensure adequate allocation of human and financial resources to maternal health services in the region.

Importantly, the study identified statistically significant correlations between the age of the respondents and the specific challenges they encountered. This suggests that different age groups may experience unique barriers to care and would benefit from age-sensitive interventions. Tailored strategies should therefore be developed to address the nuanced needs of pregnant women across various age brackets.

The logistic regression model demonstrated a predictive accuracy of 84.1% for regular attendance at antenatal healthcare appointments, underscoring the importance of sustained follow-up during pregnancy. This highlights the need for policies and interventions that promote consistent engagement with maternal healthcare services.

Overall, the findings call for the implementation of multifaceted strategies to address the diverse and interlinked barriers that hinder pregnant women's access to healthcare. Efforts should focus on expanding service availability, ensuring adequate staffing, and providing financial and transportation support to enhance maternal health outcomes in Dongola.

Chapter Six: Conclusion and Recommendations

6.1. Conclusion:

The findings from the antenatal care section of this study offer a nuanced understanding of maternal health service utilization and perceived quality of care among participants.

6.1.1. Antenatal Care Utilization

A significant majority of participants (82.2%) reported attending antenatal care (ANC) during their most recent pregnancy, indicating a commendable level of engagement with maternal health services. This suggests positive access and awareness among the study population. Notably, nearly 46% of respondents attended regular monthly antenatal check-ups, while a smaller proportion (12.1%) did not attend at all. However, a substantial percentage (approximately 42%) reported irregular visits, either occasionally or rarely, highlighting inconsistencies in service utilization that may stem from logistical, financial, or knowledge barriers.

6.1.2. Factors Influencing Antenatal Care Access

The cross-tabulations revealed that transport and financial issues significantly impacted antenatal care attendance, particularly among younger women (under 30). The chi-square analysis showed a statistically significant association between age and financial problems ($p < 0.001$), confirming that younger patients face greater economic constraints that may affect their ability to access regular care. Transportation difficulties were also more prevalent among the youngest age groups, suggesting geographic or infrastructure challenges.

6.1.3. Perceived Quality of Care and Provider Support

Most participants rated the quality of antenatal care as "Good" (49.5%) or "Excellent" (20.6%), with fewer rating it as "Fair" (15.9%) or "Poor" (14.0%). A key finding from the crosstab between quality ratings and perceptions of healthcare provider support was that 94.3% of those rating care as "Good" felt supported,

whereas only 53.3% of those rating it "Poor" felt the same. This positive correlation underscores the significant influence of provider behavior, communication, and attentiveness on patient satisfaction.

6.1.4. Overall Interpretation and Implications

While antenatal care uptake is generally high, the study reveals notable gaps in consistency of care and satisfaction, particularly among younger women and those facing socio-economic challenges. The quality of antenatal care is closely tied to the perceived support from healthcare providers, emphasizing the importance of not just access but also the manner in which care is delivered.

6.2. Recommendations:

6.2.1. *Enhance Support for Younger and Low-Income Mothers*: Provide transportation assistance and financial aid or subsidized care to facilitate regular ANC attendance.

6.2.2. *Strengthen Provider-Patient Communication*: Implement empathy training for healthcare providers and adopt patient-centered communication protocols to improve perceived support and satisfaction.

6.2.3. *Increase Outreach and Education*: Target areas with inconsistent ANC attendance to emphasize the importance of regular care and address knowledge gaps.

6.2.4. *Monitor and Evaluate Provider Performance*: Ensure that quality care encompasses both clinical effectiveness and emotional support, and regularly assess provider performance to maintain high standards.

By addressing these areas, healthcare systems can improve antenatal care utilization, quality, and patient satisfaction, ultimately enhancing maternal and fetal health outcomes.

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Appendices:

**Napata College
Medical Program
Community Medicine Department**

Study Questionnaire on:

**The Impact of Armed Conflict on Antenatal Care Services
in Dongola – 2025 Crisis**

Section 1: Demographic and Obstetric Information

1. Age by year:

☐ Under 20

☐ 20–29

☐ 30–39

☐ 40–49

☐ 50 and above

☐ Other (please specify): _____

2. Level of Education:

☐ No formal education

☐ Primary

☐ Secondary

☐ Bachelor's

3. Occupation:

☐ Housewife

☐ Student

☐ Employed (Government)

☐ Employed (Private Sector)

☐ Healthcare Worker

☐ Unemployed

☐ Other (please specify): _____

4. Gravidity/Parity (+ for miscarriages/abortions):

☐ G1P0+1

☐ G2P1+0

☐ G3P2+1

☐ G4P3+0

☐ G5P4+ or more

☐ Other: ____

5. Type of Delivery (Most recent):

☐ Vaginal

☐ Assisted vaginal (forceps/vacuum)

☐ Cesarean (elective)

☐ Cesarean (emergency)

6. Date of Last Menstrual Period (LMP): _____

7. Menstrual Cycle Regularity:

☐ Regular

☐ Irregular

8. Antenatal Follow-up During This Pregnancy:

☐ Yes

☐ No

9. Folic Acid Intake During Pregnancy:

☐ Yes

☐ No

10. Iron Supplementation:

☐ Yes

☐ No

11. Other Supplements:

Omega-3: ☐ Yes ☐ No

Calcium: ☐ Yes ☐ No

Other (please specify): _____

12. Pregnancy Planning:

☐ Planned

☐ Unplanned

13. Tetanus Vaccination:

☐ Yes

☐ No

Section 2: Impact of Conflict on Maternal Health and Support Services

14. Did you receive any psychological support or counselling during your pregnancy amidst the conflict?

☐ Yes

☐ No

15. Were you given any guidance or information on how to cope with the impacts of the conflict on your pregnancy?

☐ Yes

☐ No

16. Have you noticed any significant difference in healthcare provision before and after the conflict began?

☐ Yes

☐ No

If yes, please explain: _____

17. Do you feel that the government or humanitarian organizations provided enough support in terms of healthcare services during the conflict?

☐ Yes

☐ No

If no, what additional support do you think is needed? _____

Section 3: Antenatal Care Access and Experience During the 2024 Conflict

18. Where are you currently receiving antenatal care?

☐ Government hospital

☐ Private clinic

☐ Traditional birth attendant

☐ Not receiving any care

☐ Other: _____

19. How frequently were you able to attend antenatal check-ups during the conflict?

☐ Regularly (monthly)

☐ Occasionally (missed some)

☐ Rarely (1–2 visits)

☐ Not at all

20. Main challenges faced in accessing antenatal care: (Select all that apply)

☐ Transportation issues

☐ Financial problems

☐ Shortage of medical staff

☐ Lack of medical supplies

☐ Insecurity/conflict

☐ Other: _____

21. Did you experience delays in receiving care?

☐ Yes

☐ No

22. If yes, what was the main reason?

☐ Lack of facilities

☐ Conflict-related issues

☐ Financial problems

☐ Other: _____

23. How do you rate the quality of antenatal care during the conflict?

☐ Excellent

☐ Good

☐ Fair

☐ Poor

24. Were essential services available (e.g., ultrasound, vaccines, nutrition)

☐ Yes

☐ No

25. Did healthcare providers offer enough support and guidance?

☐ Yes

☐ No

26. In your words, how did the conflict affect your access to antenatal care?

Thank you



كلية نبتة

NAPATA COLLEGE



بسم الله الرحمن الرحيم

التاريخ: 2025/4/10م

السيد / المدير الطبي – لمستشفى النساء والتوليد بدنفلا

بعد التحية والاحترام

الموضوع: جمع بيانات لبحث التخرج لطلبة برنامج الطب

بالإشارة للموضوع أعلاه نرجو منكم مساعدة طلاب المستوى الخامس برنامج الطب بكلية نبتة
لجمع بيانات لبحث التخرج الذي بعنوان تأثير الحرب على متابعة الحمل.
ولكم منا جزيل الشكر والتقدير .

مقدم الطلب عن كلية نبتة

بروف/ عبداللطيف عشميق

منسق برنامج الطب بكلية نبتة

لاستفسار
أو توقيع -

- الأقسام المعنية
- المصادر
- المراكز
- الإحصاء
- المختبر
- المختبر
- المختبر



