

# Cross-Sectional Study to Assess the Extent of Knowledge on the Importance of Antenatal Care Among Pregnant and Postpartum Women at Aweil State Hospital, South Sudan, from June to September 2025

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## Abstract:

### ➤ *Background*

Antenatal care is a care provided to women during pregnancy, aiming to achieve the health of the baby and mother after birth. It involved early diagnosis, follow-up and prevention of health problems that may complicate pregnancy and childbirth. The World Health Organization (WHO) recommended at least eight antenatal contacts before delivery. South Sudan has the highest maternal mortality ratios, at 1,223 maternal deaths per 100,000 live births, with ANC attendance of 16%, as reported by the WHO.

### ➤ *The objectives*

- To assess knowledge of the importance of antenatal care and its association with ANC attendance.
- To determine other factors that hinder antenatal care visits, rather than ANC knowledge.
- To investigate cultural beliefs that hinder ANC visits among pregnant women.

### ➤ *Methodology:*

The study was conducted in Aweil State Hospital from July to September 2025. A descriptive cross-sectional study design was used. 125 mothers in the 2<sup>nd</sup> trimester and above, residents of Northern Bahr El Ghazal for the last 6 months were included. The data was collected using a structured questionnaire, and it was analysed using Excel, SPSS version 26 and STATA software.

### ➤ *Results:*

Respondents had very poor levels of knowledge about ANC benefits (78.4%, n=98), investigations and examinations (82.3%, n=102) and health education messages (86.4%, n=108). The Chi-square test showed no association between formal education and ANC knowledge, with a p-value =0.081. There were no cultural beliefs against the ANC.

### ➤ *Conclusion*

Knowledge deficit and high attendance among participants contradict findings in most of the literature that link knowledge of ANC to high ANC attendance; the knowledge gap on ANC needs to be reinforced during ANC contacts. However, a large-scale community-based cross-sectional study to address the selection bias inherent in this hospital-based study and to generate findings generalize to the larger population of South Sudan is strongly recommended.

*Keywords:* Antenatal Care, Knowledge, Contacts, Education.

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## I. INTRODUCTION

The World Health Organization recommends at least eight visits to antenatal clinics before birth (Alem et al., 2022). However, research has shown that in many LMICs, pregnancy outcomes and ANC coverage are poor among the poor, least educated, and rural women.

South Sudan is the youngest country and one of the countries with the highest maternal mortality ratios. The figures stand at 1,223 maternal deaths per 100,000 live births; these figures are far from the Sustainable Development Goal 3.1 target ratio, which is set at reducing maternal mortality by less than 70 maternal deaths per 100,000. While over 60 per cent of pregnant women attend at least one antenatal care visit (according to 2024 DHIS2 data), less than half complete the recommended eight visits, and only 15 per cent reach the WHO-recommended eight contacts. The eight contacts were adopted from the WHO 2016 model, which provides pregnant women with respectful, individualized, and person-centered care at every contact and ensures that each contact delivers effective, integrated, and clinically relevant practice that includes interventions and investigations.

Although the systemic failures are difficult to address with immediate effect, one important challenge has been observed among pregnant mothers; it has been unclear whether mothers understand the importance of antenatal services, as many are believed to have no formal education or have low levels of education in Aweil town and neighbouring counties. Antenatal health card is written and filled in English language, and health education messages are translated into local languages and delivered to mothers. It is not known whether these women truly understand the translated version in the same way as it is provided in writing. It is frequently observed in the last two years that women who have had a bad pregnancy outcome, including maternal mortality, have poor antenatal follow-up, and some admissions to the neonatal department are home deliveries not attended by skilled health personnel in Aweil hospital. It is undeniable that there exists an information gap about ANC. Whether the information gap is due to knowledge or difficult access to information, other socioeconomic reasons or cultural beliefs was the reason this research was undertaken. This research aimed to assess the extent of knowledge on the importance of antenatal care among pregnant and early post-partum mothers in Aweil State Hospital antenatal clinic and maternity ward. Descriptive cross-sectional study design was used to answer these research gaps; both qualitative and quantitative data were collected and analysed to come up with research findings.

### ➤ *AIMS and Objectives*

This study aims to assess the extent of knowledge on the importance of antenatal care among pregnant and post-partum mothers and how it affects antenatal care attendance.

The objectives

- To investigate the knowledge of antenatal care and its effect on antenatal care attendance

- To determine other factors that hinder antenatal care visits, rather than ANC knowledge.
- To investigate cultural beliefs that hinder ANC visits among pregnant women.

In 2020, the global MMR was 222 maternal deaths per 100,000 live births; this indicates very slow progress in achieving SDG target 3.1 of global MMR of less than 70 deaths per 100,000 live births by 2030. 99% of these deaths occur in LMIC countries, and most are preventable (Alibhai et al., 2022). Antenatal care remains one of the means to improve maternal outcomes; high-income countries have high coverage and utilization of antenatal care (Shora et al., 2015). Something that contravenes their low and middle-income counterparts. The inequalities in utilization is largely attributed to many factors and include education level, income level of the family, availability of adequate ANC centers, cultural beliefs among others. Good ANC utilization coverage has contributed to a reduction in maternal mortality ratios and infant mortality (Hollowell et al., 2011). In the South Sudan context in general and the context of Aweil in particular, the demographic characteristics are very much similar to the rest of Sub-Saharan African countries; however, South Sudan has the worst indicators for maternal mortality ratios, which stand at more than 1200 deaths per 100,000 live births as per the WHO South Sudan report, 2025. There is low literacy rate among the girls and women (Akashraj et al., 2020), on top of these socio-economic, political challenges and unemployment of the population. One study conducted in South Sudan to assess determinants of utilization of health facilities for birth purposes found low health facility birth (Tongun et al., 2019) in general. The available literature concentrated much on other factors that hinder optimal utilization of antenatal care services; the available evidence explored difficult access to health facilities, level of education, level of income and male partner's involvement in ANC. On the other hand, most of these studies were conducted in other countries rather than South Sudan. Evidence pointing out how knowledge effect utilization of antenatal care is limited in general, but no research has been done about the knowledge gap in Aweil as well as the northern Bahr el Ghazal state.

## II. RESEARCH METHODS AND MATERIALS

### ➤ *Study Approach*

The research was hospital-based and conducted in Aweil State Hospital Antenatal Care clinic. A mix of qualitative and quantitative methods was used to form quantitative variables and to use qualitative data to support, enhance and verify qualitative results. Another reason for selecting this approach is to provide more data in order to enhance the level of confidence (Smajic et al., 2022).

### ➤ *Study Design*

A descriptive cross-sectional study design was used because the research aims to answer the question of Antenatal care knowledge prevalence at a specific point from July to September 2025.

### ➤ *Study Location*

The research was conducted in Aweil State Hospital ANC clinic, located in Aweil State Hospital, Aweil Municipal Council in Northern Bahr El Ghazal State. Northern Bahr El Ghazal State borders Western Bahr El Ghazal to the west and South, Warrap State and Abyei administrative area to the East. It also has external boundaries with Sudan states; these include South Darfur to the North-west, East Darfur to the North and West Kordofan to the Northeast. The distance between Aweil and Juba is 634 Kilometers, straight line, but the driving distance is 878 Kilometres. Aweil State Hospital serves as a state referral hospital. County health facilities and some neighbouring states make referrals to Aweil State Hospital. Aweil State ANC clinic, located in urban settings in comparison to other ANC clinics in the states; it is prepared by some mothers in order to access other services such as lab investigations and obstetric U/S scans that are missing in other facilities. As such, Aweil State Hospital ANC receives mothers from all five counties in the state apart from those residing in Aweil Town, where the hospital is located. Its strategic location and capacity to see many mothers are the reasons why the investigator decided to choose it as a study site.

### ➤ *Study Population*

The population targeted in this research are pregnant women, postpartum mothers attending ANC clinics and maternity ward, respectively, in Aweil state Hospital, who were residents of Northern Bahr El Ghazal State for the last sixth (6) Months before the study. The research is limited to pregnant mothers and not to all women of reproductive age. However, postpartum mothers in their 1st week postpartum were included because they may provide vital information or experience during their ANC period.

General population characteristics are a mixture of rural and urban dwellers. They depend on small-scale businesses, unskilled labour, subsistence farming and cattle keeping. Like other African societies, the Northern Bahr El Ghazal population is patriarchal; Christianity, Islam and African traditional religions are practised in the state.

### ➤ *Inclusion and Exclusion Criteria.*

Pregnant mothers in their 2nd trimester and 1st week postpartum were included in the study. On the other hand, women who refused consent, those in 1st trimester and those who were more than one week in their postpartum period were excluded from the study. It is one time participation, and those who have already interviewed are excluded. These criteria of Inclusion and Exclusion were based on the research objectives and on ethical grounds.

### ➤ *Sample Size*

The sample size was calculated using Cochran's formula, where the proportion of antenatal attendance prevalence among pregnant women in South Sudan was used. It is given in previous studies as 16%. Confidence level was considered to be 95 % ( 1.96) and margin of error was taken as 0.5%

Using an infinite population, the first Cochran formula was used as follows;

$$n_0 = Z^2 \cdot P (1-P) / e^2$$

$n_0$  = sample size,  $Z$  = confident interval (1.96),  $P$  = proportion of attribute, taken as 16 % ( .016) and  $e$  = margin of error taken as 5 % ( 0.05).

To substitute in the values

$n_0 = 1.96^2 \cdot 0.16 (1-0.16) / 0.05^2$  first estimated sample size is 206.

1000 women attended the ANC clinic in Aweil State Hospital in the last six months before this study. The sample size was adjusted using the second Cochran formula for the calculation of the sample size of a known population. It was given as follows.

$$n = \frac{n_0}{1 + (n_0 - 1) / N}$$

$n$  = adjusted sample size

No initial calculated sample size

$N$  = population size

To substitute the values

$$n = \frac{206}{1 + (206 - 1) / 1000}$$

Sample size was 170 mothers; however, only 125 of the mothers participated in the study. The target sample size was not met because of logistical challenges and the unwillingness of some mothers to provide consent to participation.

### ➤ *Sampling Techniques*

A simple random sampling technique was used; the principal investigator stood in the middle of the women attending ANC, and a pen was spun. The mother to whom the pen tip points toward is selected for the interview. The same procedure is repeated as long as there are willing mothers to be interviewed on that particular working day; a code is assigned to those identified for participation before the interview to avoid duplication and the involvement of those who were not selected. The reason for doing so is to minimise the selection bias.

### ➤ *Data Collection Techniques*

Data was collected using a structured questionnaire, developed by the investigator in English, which was later translated directly to participants in local languages well comprehended by participants. The questionnaire was developed in reference to guidelines published by Zouina Sarfraz (2020) titled questionnaire in cross sectional design. The questionnaire consisted of 20 questions, of which most are closed-ended and a few open-ended, divided into three sections. The first section consists of demographic data of the participants that include age, gender, Marital Status, employment status, source of household income and address.

The second section consists of obstetric history that includes gravidity, parity, number of ANC contacts, number of living children, and gestational age at the index visit. The 3rd part consists of knowledge of important to attending ANC and the source of ANC information.

The scoring criteria to assess knowledge were based on a scale of 5, with one item provided in the question, scoring 1 for a correct answer and 0 for a wrong answer. Knowledge level was graded based on an individual's score on a scale of 5 as poor knowledge, good knowledge and very good knowledge. 1-2 score equals poor Knowledge, 3-4 equal's good knowledge and 4-5 equal's very good knowledge. It takes 5 minutes on average to fill out the questionnaire.

➤ *Data Analysis*

After cleaning the data, statistical software was used to analyse the data. The software used is IBM-SPSS version 26, STATA 16 and Microsoft Excel sheet. These tools were selected because of their user-friendliness and the investigator's familiarity with their use. In addition, the results are automated, thus saving time required for manual analysis.

➤ *Validity and Reliability*

The validity and reliability of the data were ensured by pretesting the questionnaire on 10% of the target population 2 months before conducting the research; changes observed were made to the wording and meaning of questions. The questionnaire was administered; this allowed the participants to ask questions to clarify ambiguity in the understanding of questions and to help translate the questions into local languages. Collected data was checked on a daily basis to ensure liability by the principal investigator.

➤ *Ethical Consideration.*

Ethical approval was sought and provided by Aweil Hospital Ethical Committee; other ethical issues were respected throughout the research. Participation was voluntary, informed consent was provided, and participants were assured of no harm, anonymity of participants and confidentiality; this was ensured by removing all personal identifiers, protecting personal information and using it only for the purpose of this research. Additionally, the research document is scanned for possible accidental plagiarism, and the researcher affirmed by signing a declaration of none, use of artificial intelligence and plagiarism.

**III. FINDINGS / ANALYSIS /DISCUSSION**

➤ *Socio-Demographic Characteristics of Respondents*

The characteristics of the 125 mothers who were contacted are presented in this section. The research examined the age and marital status of the mother, the partner's employment status, household source of income, place of residence, and education of both the mother and the partner.

Most of the participants in the study were young. Most respondents were aged 15-20 years (35.2%, n=44) and 21-26 years (34.4%, n=43). 20% of the participants were 27-32 years old, and 9.5% percent belonged to the 33-38 years age group. None of the respondents fell in the 39-45 and 46-51 categories (Table 1).

• *Age of Respondents*

The age distribution of respondents was analysed, and the results are presented in Table 1 (N = 125).

Table 1 Age Distribution of Respondents (N = 125)

Category	Frequency	% of Valid	% of Total (N=125)
15-20	44	35.2	35.2
21-26	43	34.4	34.4
27-32	26	20.8	20.8
33-38	12	9.6	9.6
39-45	0	0.0	0.0
46-51	0	0.0	0.0
Total	125	100.0	100.0

Source: Survey Data (2025)

Young women overwhelmingly preferred using ANC services in their early reproductive ages. Nearly all respondents were married (98.4%, n = 123), and only 1.6% (n = 2) were separated. None of the respondents was single or divorced (Table 2). Marital status of respondents was examined, and the results are presented in Table 2 (N = 125).

Table 2 Marital Status of Respondents (N = 125)

Category	Frequency	% of Valid	% of Total (N=125)
Married	123	98.4	98.4
Single	0	0.0	0.0
Divorced	0	0.0	0.0
Separated	2	1.6	1.6
Total	125	100.0	100.0

Source: Survey Data (2025)

This showed that almost all women were married in the study. Most partners surveyed were unemployed, 68.0% (n = 85) were unemployed, and 32.0% (n = 40) were employed (Fig 1). Most of the households from the study population relied on limited economic opportunities that might have affected health services. Out of the 113 respondents who provided their income, most of them say that their household depends on the husband having a small business (61.1%, n =69). Some people depended on subsistence farming (20.4%,

n = 23) and women’s small businesses (18.6%, n = 21). Twelve respondents did not provide data on income sources (Table 3).

• *Household Source of Income*

The household sources of income reported by respondents are presented in Table 3 (Valid N = 113, Overall N = 125).

Table 3 Household Source of Income (Valid N = 113, Overall N = 125)

Category	Frequency	% of Valid	% of Total (N=125)
Subsistence farming	23	20.4	18.4
Husband’s business	69	61.1	55.2
Women’s business	21	18.6	16.8
Total	113	100.0	90.4

Source: Survey Data (2025)

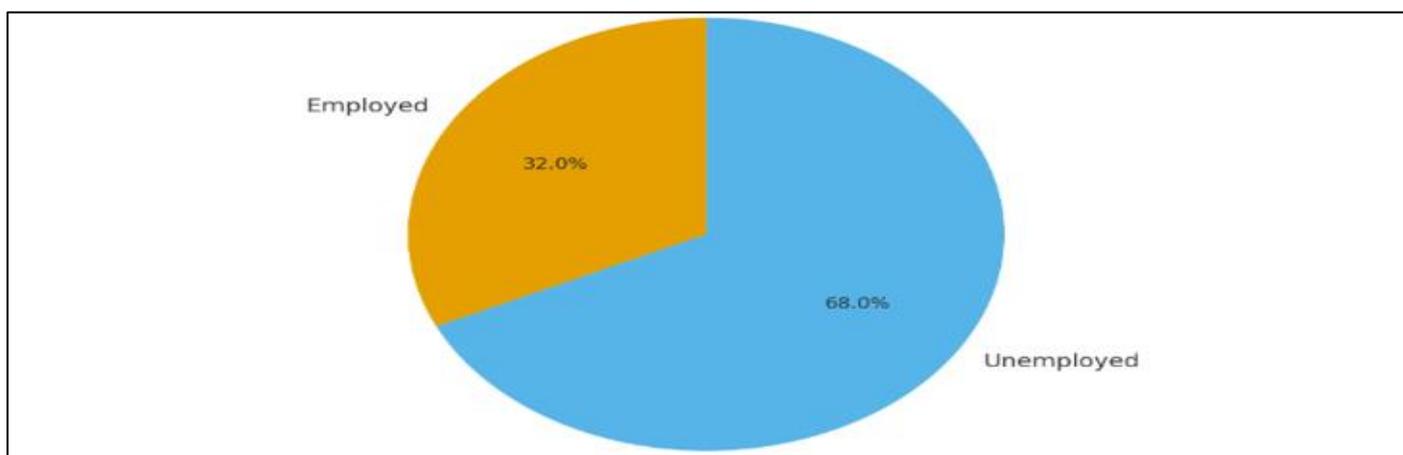


Fig 1 Shows Employment Status of Partners of the Participants

Most households relied on small-scale, often unstable economic activities, according to these findings. Concerning place of residence, the findings showed that 58.0% (n = 69) of the respondents live in Aweil Town, while 29.4% (n = 35) live in Aweil East. A smaller percentage of people lived in Aweil South (5.0%, n = 6), Aweil West (4.2%, n = 5), and Aweil North (3.4%, n = 4) (Fig 2).

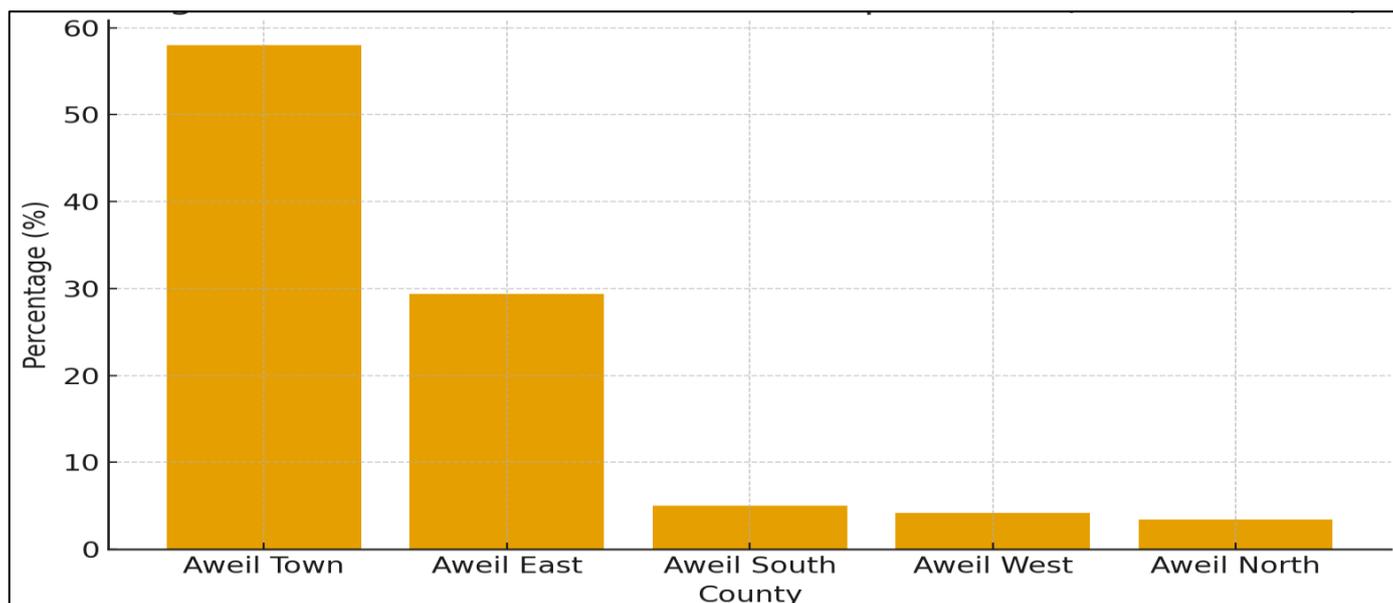


Fig 2 Show Place of Residence of Participants

This shows how the hospital is located in Aweil Town, so it is more accessible to people who live in Aweil Town compared to people who travel from other counties of Northern Bahr el Ghazal State. The findings on the education level of participants showed that almost half of the respondents had received primary education (48.0%, n=60), while 27.2% (n=34) had never been to school. Of the respondents, 24.0% (n = 30) had secondary education, while

only one woman (0.8%, n = 1) had a university education (table 4). Most of the respondents had low educational attainment.

• *Education Level of Respondents*

The education levels of mothers are presented in Table 4 (N = 125).

Table 4 Mother’s Education Level (N = 125)

Category	Frequency	% of Valid	% of Total (N=125)
No education	34	27.2	27.2
Primary	60	48.0	48.0
Secondary	30	24.0	24.0
University	1	0.8	0.8
Total	125	100.0	100.0

Source: Survey Data (2025)

The findings on the education level of husbands showed that most husbands were secondary educated (44.0%, n = 55), followed by primary education (24.8%, n = 31) and no education (23.2%, n = 29). Only a small proportion (8%, n = 10) were university educated. Husbands have higher educational levels than their wives do. More husbands have attained secondary and tertiary education than their wives have.

visit frequency in the past two pregnancies, and timing of first ANC visit as variables under study. The researcher used descriptive statistics to summarise distributions and comparisons between the prior and current pregnancy.

➤ *Obstetric History and ANC Attendance*

The obstetric history of respondents, as well as their attendance pattern in Antenatal care, is presented in this section. They included gravidity, parity, living children, ANC

The findings on Gravidity showed that most of the respondents were first-time pregnant (30.6%, n=38), followed by fourth-time pregnant (16.9%, n=21) and second-time pregnant (13.7%, n=17) respondents. The pregnancy categories G8 and G9 were rare and shared similar occurrence rates of 1.6% (n = 2). Many respondents were pregnant for the first time, but many also already had multiple pregnancies (Table 5).

Table 5 Distribution of Respondents by Gravidity (N = 124)

Gravidity	Frequency	Per cent (%)
G1	38	30.6
G2	17	13.7
G3	14	11.3
G4	21	16.9
G5	11	8.9
G6	10	8.1
G7	9	7.3
G8	2	1.6
G9	2	1.6
Total	124	100.0

Source: Survey data (2025)

On the contrary, the findings indicate that the highest percentage had one child (24.1%, n = 20), while three children had 21.7% (n = 18). A small proportion reported higher parities, e.g., P7 P8, which accounted for 2.4% (n = 2). Lower and moderate parity women have been included in the

study sample (Table 4.6). Most of the respondents stated that they had one living child (23.5%, n = 20) or three living children (23.5%, n = 20). Fewer respondents had more children, such as seven children (3.5%, n = 3) and eight children (1.2%, n = 1).

Table 6 Distribution of Respondents by Parity (N = 83)

Parity	Frequency	Per cent (%)
P1	20	24.1
P2	12	14.5
P3	18	21.7
P4	11	13.3
P5	9	10.8
P6	9	10.8

P7	2	2.4
P8	2	2.4
P9	0	0.0
Total	83	100.0

Source: Survey data (2025)

The ANC attendance in the previous 2 pregnancies indicated that the most frequently occurring ANC visits in previous pregnancies were four times (29.0%, n = 20) and six times (29.0%, n = 20). A small number of participants reported only one visit (5.8%, n = 4) or eight visits (1.4%, n = 1). Women who have been pregnant before vary in ANC attendance. On the other the ANC attendance in the current pregnancy results showed that the majority of respondents in

their present pregnancy had utilised ANC two times (25.0%, n = 28) or three times (24.1%, n = 27). A smaller percentage attended only once (18.8%, n = 21), and no respondents reached the eight-visit maximum (0.0%). Over half (52.8%, n = 66) of the respondents' first antenatal care (ANC) visit was in the first trimester. Many of them (40.8%, n = 51) started ANC in the second trimester, while 6.4% (n = 8) started in the third Trimester (table 7 and table 8)

Table 7 Timing of First ANC Visit During Pregnancy (N = 125)

Trimester	Frequency	Per cent (%)
1st Trimester	66	52.8
2nd Trimester	51	40.8
3rd Trimester	8	6.4
Total	125	100.0

Table 8 Frequency of ANC Visits in Previous Pregnancies (N = 69)

Number of Visits	Frequency	Percent (%)
One time	4	5.8
Two times	11	15.9
Three times	7	10.1
Four times	20	29.0
Five times	4	5.8
Six times	20	29.0
Seven times	2	2.9
Eight times	1	1.4
Total	69	100.0

Source: Survey Data (2025)

➤ *Knowledge on Antenatal Care (ANC)*

The result showed that antenatal cares are not well known among respondents. The study examined three things: what people knew about the benefits of ANC, what people knew about the recommended investigations and examinations, and what people knew about key health education messages. Descriptive statistics were used to summarize the findings.

• *Knowledge of ANC Benefits*

Respondents were asked to rate their knowledge of the benefits of ANC on a scale of 5, where 0-3 means poor knowledge, 3-4 means good knowledge and 4-5 means very good knowledge. The results are shown in Table 9 (N = 125).

Table 9 Knowledge on ANC Benefits (N = 125)

Category	Frequency	Percent (%)
Poor	98	78.4
Good	26	20.8
Very good	1	0.8
Total	125	100.0

Source: Survey Data (2025)

Results showed that many respondents had poor knowledge of ANC benefits (78.4%, n = 98). Only a small percentage of respondents had good knowledge (20.80%, n=26) and very good knowledge 0.80% (n=1). A definite knowledge gap is evident in the ANC.

• *Knowledge on ANC Investigations and Examinations*

The level of knowledge regarding routine investigations and examinations during ANC is presented in Table 10 (N = 124).

Table 10 Knowledge on ANC Investigations/Examinations (N = 124)

Category	Frequency	Per cent (%)
Poor	102	82.3
Good	17	13.7
Very good	5	4.0
Total	124	100.0

Source Survey Data (2025)

• Knowledge on ANC Health Education Messages

Respondents’ knowledge of ANC-related health education messages is presented in Table 11 (N = 125).

Table 11 Knowledge on ANC Health Education Messages (N = 125)

Category	Frequency	Percent (%)
Poor	108	86.4
Good	17	13.6
Very good	0	0.0
<b>Total</b>	<b>125</b>	<b>100.0</b>

Source: Survey Data (2025)

More than half of respondents (86.4%, n = 108) had poor knowledge of ANC health education messages. In the study, only 17 (13.6%) had good knowledge, and none had very good. This shows that gaps in the communication and understanding of the ANC health promotion content have been identified.

➤ Inferential Analysis of Factors Associated with ANC Attendance and Knowledge

This section presents the inferential analyses to check the association of selected socio-demographic and relational variables with ANC attendance and maternal knowledge.

Depending on the distribution as well as measurement of the variables, Chi-square/Fisher’s exact tests, non-parametric tests (Kruskal-Wallis and Mann-Whitney U) and binary logistic regression were used. The outcome variables in the study were adequacy of ANC attendance (<4 vs ≥4 visits) and ANC knowledge level (Poor vs Adequate [Good/Very good]).

• Education and ANC Knowledge

The association between maternal education and ANC knowledge was assessed using a Chi-square test. Results are presented in Table 12.

Table 12 Mother’s Education vs ANC Knowledge (N = 125)

Education Level	Poor (n, %)	Adequate* (n, %)	Total (n, %)
Educated (Primary/Secondary/University)	72 (79.1)	19 (20.9)	91 (100.0)
No Education	26 (76.5)	8 (23.5)	34 (100.0)
Total	98 (78.4)	27 (21.6)	125 (100.0)
Chi-square ( $\chi^2$ )	3.05	p = 0.081	Not significant

Source: Survey Data (2025). Adequate Knowledge = Good + Very Good.

Table 12 data showed that among educated women, 79.1% (n = 72) had poor knowledge, whereas it was 76.5% (n = 26) among those having no education. Women who are not educated have slightly higher knowledge (23.5%, n=8) compared to the educated women (20.9%, n=19). Chi-square test reveals no significant association between education and ANC knowledge ( $\chi^2 = 3.05$ , p = 0.081).

• Partner’s Support and ANC Knowledge

The relationship between partner’s support and ANC knowledge was examined using both the chi-square and Fisher’s exact test (2×2 table). Results are presented in Table 13.

Table 13 Partner’s Support vs ANC Knowledge (N = 125)

Partner Support	Poor (n, %)	Adequate (n, %)	Total (n, %)
Supportive	61 (79.2)	16 (20.8)	77 (100.0)
Non-supportive	37 (77.1)	11 (22.9)	48 (100.0)
Total	98 (78.4)	27 (21.6)	125 (100.0)
Chi-square ( $\chi^2$ )	0.64	p = 0.423	Not significant
Fisher’s exact	Odds Ratio = 0.88	p = 0.461	Not significant

Source: Survey Data (2025).

According to Table 4.25, the distribution of knowledge did not differ based on the partner’s support. Among women with supportive partners, 20.8% (n = 16) had an adequate level of knowledge, while 22.9% (n = 11) had non-supportive partners. According to both Chi-square (p=0.423) and Fisher’s exact test (p=0.461), there was no association.

- *Education and ANC Attendance (Kruskal-Wallis Test)*  
The Kruskal-Wallis test was employed to assess differences in the mean number of ANC visits by education level. Results are shown in Table 14.

Table 14 Kruskal-Wallis Test of ANC Visits by Education (N = 112)

Group	N	Mean Rank of Visits	Median Visits
Educated	81	57.4	3
No education	31	54.2	3
Test Statistic ( $\chi^2$ )	-	0.88	p = 0.349

Source: Survey data (2025).

There were no significant differences in the frequency of ANC visits by maternal education ( $\chi^2 = 0.88$ , p = 0.349). Both groups attended ANC at least 3 times during pregnancy, showing that education did not influence ANC utilisation.

- *Partner’s Support and ANC Attendance (Mann-Whitney U Test)*  
The Mann-Whitney U test was conducted to compare the mean number of ANC visits between women with supportive versus non-supportive partners. Results are presented in Table 15.

Table 15 Mann-Whitney U Test of ANC Visits by Partner Support (N = 112)

Partner Support	N	Mean Rank of Visits	Median Visits
Supportive	70	57.9	3
Non-supportive	42	55.8	3
Mann-Whitney U	-	1741.0	p = 0.367

Source: Survey data (2025).

The number of ANC visits of women with a supportive partner and non-supportive partner (U=1741, p=0.367) was not statistically significantly different. Both groups had three visits as their median, suggesting that the partner’s support status did not influence the frequency of attendance for ANC.

- *Logistic Regression: Predictors of ANC Knowledge*  
Binary logistic regression was performed to identify predictors of ANC knowledge (Poor = 0; Adequate = 1). Independent variables included education, income, partner’s support, and decision-making. Results are presented in Table 16.

Table 16 Logistic Regression Predicting Adequate ANC Knowledge (N = 125)

Predictor	Odds Ratio (OR)	95% CI (Lower–Upper)	p-value
Education (Educated vs None)	1.21	0.65 – 2.25	0.402
Partner Support (Supportive vs Non)	0.89	0.45 – 1.75	0.431
Income (Non-farming vs Farming)	1.34	0.66 – 2.72	0.372
Decision (Woman vs Others)	1.08	0.53 – 2.20	0.467
Model Summary	Pseudo R <sup>2</sup> = 0.12	LR $\chi^2$ = 5.23	p = 0.078

Source: Survey Data (2025).

The regression model showed that none of the predictor variables was significant. Women’s education and non-farming households were positively associated with women’s knowledge regarding the adequacy of ANC, but not statistically significant (p > 0.05). The model’s explanatory capability was not up to the mark.

#### IV. DISCUSSION

The results were interpreted with reference to the three study objectives, combining the current study’s findings with relevant literature to draw meaningful conclusions about antenatal care among women attending Aweil State Hospital and provide context for the maternal health situation in South Sudan.

- *Objective One: The Knowledge of Antenatal Care and its Effect on Antenatal Care Attendance.*

One of the most striking findings of the study is that respondents had very poor levels of knowledge. Most women had poor knowledge about ANC benefits (78.4%, n=98), investigations and examinations (82.3%, n=102), and health education messages (86.4%, n=108). The knowledge gap is in keeping with that of other low-resourced settings. A study by Kawungezi et al. (2015) found that although women attended ANC, the specific knowledge of its purpose/components was alarmingly low among them. A paradox arose, however, when this lack of knowledge was compared to attendance. Even with a lack of knowledge, attendance in the sample of this study was minimally acceptable, with all 125 responses in the inferential analysis group getting four or more visits. This finding is consistent

with (Ogunba & Abiodun, 2017) in Nigeria, who also found no statistically significant relationship between women's knowledge levels and their rates of ANC attendance.

Aweil's paradox—high attendance—low knowledge—is at odds with a large literature where utilisation is chiefly determined by knowledge. (Afaya et al., 2020) reported a statistically sound and positive correlation between good knowledge and accomplishment of the WHO-recommended ANC visits in a rural Ghana study. A multi-country analysis of Demographic and Health Survey data showed that women's awareness of the recommended visit schedule was a significant predictor of adequate attendance (Yaya et al., 2017). The findings from Aweil were different. The Chi-square test showed no association between even formal education and ANC knowledge, with a p-value = 0.081. This means that the motivation to attend ANC in this particular case is something else; this information points out that people should not rely on attendance only, but should focus on how mothers understand the reason for attending antenatal care, and to understand the most important element of prevention and safe delivery. The research's own statistics indicate that local radio and Community Health Workers are the main sources of information, suggesting that the mobilisation of the community and social norms are likely a stronger influence on behaviour than health literacy.

➤ *Objective Two: Other Factors that Hinder Antenatal Care Visits, Rather than ANC Knowledge*

Based on a picture of the socio-demographic profile of the respondents emerges. Factors most associated with heavy barriers: partner high unemployment 68.0% and low maternal education (24.8% secondary/university educated). According to a systematic review of "sub-Saharan Africa" published by Okedo-Alex et al. (2019), the evidence contradicts this claim. Higher maternal education and family income are two of the strongest predictors of ANC utilisation. Although participants have four or more visits, very few have completed eight antenatal contacts as per the WHO 2016 recommendation. In addition, research conducted in Jordan by (Hijazi et al. (2018) found that lower economic and educational status were important barriers to going for the recommended eight or more ANC visits. Since this hospital-based sample has shown a high rate of attendance despite well-documented barriers, this evidence signifies that those able to gain access to the hospital offer a high motivation level. However, it is important to point out that this does not take into account the members of the far wider community who could have been turned away by such factors. Area of residence, as distance to the facility comes to play, as seen in this current research, the attendance from counties other than Aweil town, where the hospital is located, was low.

The data in the current study showed there was a high level of female agency, large minority of partners (38.4%) were reported as non-supportive. The outcome of the Mann-Whitney U test revealed no statistically significant difference in the number of ANC visits by women with a supportive partner versus those with a non-supportive partner (U=1741.0, p=0.367). It is especially important here compared to studies, which say male involvement is an

important enabler. A study conducted in Northern Uganda by Tweheyo et al. (2010) found that when male partners attended the antenatal clinic (ANC), there was an improvement in maternal health practices.

➤ *Objective Three: Cultural Beliefs that Hinder ANC Visits Among Pregnant Women.*

All 125 respondents indicated that no such beliefs exist in their community. This is highly encouraging and remarkable. It indicates a cultural milieu that is very open to modern maternal health care. In many other contexts, culture represents a massive barrier. By contrast, this result suggests the opposite of some existing literature that supports cultural beliefs as a barrier to ANC utilisation. An example of this is the qualitative study performed by (Roberts et al., 2017) in Malawi which elaborates on the fact that traditional beliefs and the respected role of traditional healers may discourage women from using facility-based ANC. In the same way, a study conducted in Ethiopia by (Kea et al., 2018) found that the trust in traditional birth attendants and beliefs about pregnancy as a natural phenomenon were key impediments. Recently, Nesane & Mulaudzi (2024) conducted research in South Africa that cites cultural norms that characterize pregnancy as solely a female domain, which may impede male involvement and thus the formal ANC attendance.

## V. CONCLUSION AND RECOMMENDATION

The study population showed a profound and pervasive lack of knowledge of basic benefits and essential procedures, as well as health education messages regarding antenatal care, in spite of high attendance at the facility. There is a huge gap in the quality and effectiveness of health education given during ANC visits. Though the data was collected in the current pregnancy, the data of previous pregnancies showed that the majority of women achieved at least four visits as per the former WHO recommendation, though very few have achieved the eight ANC contacts as per the WHO 2016 recommendation. Even with low knowledge of ANC benefits, most mothers respect the early attendance to ANC, especially in the first 12 weeks of gestational age. In this study cohort, socio-economic factors, decision-making autonomy and partner support did not significantly predict attendance or knowledge. In contrast to existing research, low maternal education, partner unemployment, and lack of partner support did not significantly hinder ANC attendance among women in this study. However, these variables failed to predict who had better knowledge. Thus, the knowledge deficit is a systemic issue affecting all women across all backgrounds and groups. The study showed that respondents do not see cultural values and beliefs as an impediment to seeking modern antenatal care.

➤ *Recommendations*

In light of the conclusions, the following recommendations are proposed to improve the effectiveness of ANC services in Aweil and similar contexts:

- Strengthen the Quality and Impact of Health Education during ANC Visits.
- Develop and Implement Targeted Male Partner

Involvement Programs.

- Expand and Resource MOH Outreach Through Proven Channels.
- Acknowledge and Address Underlying Socio-Economic Barriers for the Broader Community.

➤ *Research Limitations*

This study has provided valuable insights, but has some limitations as follows.

- As hospital based study, there are possibilities of selection bias because its findings cannot be generalised to the larger population of South Sudan.
- The estimated sample size was not reached; this could be a limitation in getting the 95% level of confidence and the margin of error of 5% proposed.
- There is a need for a longitudinal study to follow a cohort of pregnant women from their first ANC visit through the postpartum period. This would help determine whether better knowledge directly results in improved health outcomes (i.e., fewer complications, increased skilled attendance at birth, better neonatal health).
- This research did not explore family dynamics surrounding ANC utilisation since it did not involve other members of the family in the interviews to understand the level of support and involvement in ensuring optimal utilisation of ANC services

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➤ *Conflict of Interest*

The author declares no conflict of interest.

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