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EFFECT OF ANTENATAL EDUCATION ON KNOWLEDGE AND UTILIZATION OF FACILITY BASED DELIVERY SERVICES AMONG PREGNANT WOMEN IN MPIKA DISTRICT, ZAMBIA

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Abstract:
Background: Facility based delivery services have been promoted to improve maternal and child health care in Zambia. Despite the efforts to expand health care services and promote institution based delivery services in the country by government through the Ministry of Health, an estimated 84% of births still take place at home (ZSA, 2018). This underutilization of maternal health care services by the women results in insignificant decline of maternal mortality ratio. In Mpika District the utilization of facility based delivery services is still low (76%) and home deliveries account for 24 percent (Mpika HIMS, 2022). Moreover, the pattern of utilization of delivery services is not known. The aim of this study therefore, was to determine the effect of antenatal education on the knowledge and utilization facility based delivery services among pregnant mothers in two health facilities in Mpika District. **Objective:** To ascertain the effect of antenatal education on knowledge and utilization of facility based delivery services among

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pregnant mothers in two health facilities in Mpika District. **Methods & Materials**: This study adopted a quasi-experimental design of two groups of pre and post intervention among mothers attending antenatal clinic in two health facilities in Mpika District. The study population consisted of 276 pregnant women in the second trimester for both the intervention (141) and control (135) groups. Data was collected using face to face interviews. The pre-intervention data collection was done in 5weeks and the post intervention data collection is yet to be concluded. **Pre-intervention results:** The respondents were pregnant women between 16 years up to 42 years with a significant proportion (8-11%) of teenagers (less than 18 years old) in both the control and intervention groups indicating a concern for teen pregnancies in rural areas. (Mean age: 24.5 years (SD: 5.2). The study findings also provide information that there were low levels of formal education among respondents (4-5%) and their husbands (4-12%). Primary education was the most common level of education among respondents (56-58%) and their husbands (41%). Secondary education was the second most common level among respondents (38-39%) and their husbands (48%). (Mean years of education: 6.5 years (SD: 2.1). The study findings showed that a significant proportion from both groups were single mothers (11%) or cohabiting (23-26%). The proportion of married respondents was significantly higher than the proportion of single respondents ($p < 0.001$). There were, 97% (269) who did not have formal work only 3% (10) had formal work from both groups. The proportion of unemployed respondents is significantly higher than the proportion of employed respondents ($p < 0.001$). Concerning number of children, the most of respondents from the two groups have had one or two children (30-37%). On the other hand, 33% of the respondents from the control group and 30% of the intervention group have had 3 children while 16% from both groups had 2 children each and 7% of the controls and 10% of the study participants had 4 and more children (Mean parity: 2.3 (SD: 1.5). Concerning knowledge on Danger Signs only 39% of respondents knew more than two danger signs experienced during labor is statistically significant ($p < 0.01$), indicating that a significant proportion of respondents had limited Knowledge on this topic. Vaginal bleeding and prolonged labor were the most commonly known danger signs, but knowledge on other signs was limited. The results also showed that 99% (274) of the respondents from both groups knew that an unexpected problem could occur during pregnancy and child birth. The study also indicates that 39% of the respondents from the control group and 33% from the intervention group did not have knowledge on any danger sign related to postpartum and 36% of the control group and 36% of the intervention group respondents knew vaginal bleeding as a danger sign while 28% (38) from the control group and 21% (29) from the intervention group had knowledge on more than two danger signs. The results further showed that 99% of the respondent from both groups knew that a woman can have complications if she does not attend antenatal clinic and all (276) the respondents from both groups knew that a woman can have complications if she decides to deliver from home. The current study also shows that 37% (63) of the control group respondents and 48% (68) of the intervention group attended antenatal clinic 3 times during the last pregnancy while the other 37% of the control group

and 35% from the intervention group only managed to attend ANC twice. Only 10% of the respondents from the control group and 11% (15) from the intervention group attended 4 or more visits with the other 5% attending once from each group. The study results showed that only 32% of the respondents from both groups started attending antenatal at the recommended stage of pregnancy thus; 1-3 months, whilst 68% of the respondents from both groups started antenatal clinic at 4-6 months. Concerning health education, a significant proportion of respondents from both groups (44%) attended only 1-2 health education sessions, indicating a potential knowledge gap in pregnancy and childbirth care ($p < 0.05$). Only a small percentage of respondents (5%) attended 5-6 health education sessions, suggesting that most women may not be receiving comprehensive education on pregnancy and childbirth care ($p < 0.01$). The study results also showed that husbands and significant others play a crucial role in disseminating information to pregnant women, with 53% of respondents relying on them for information on antenatal care ($p < 0.05$). Furthermore, there was a significant gap in health education on critical topics, with only 34% of respondents receiving information on birth preparedness and complication readiness, and only 10% receiving information on the importance of delivering at a hospital ($p < 0.05$). the study results also showed that the content of health education varies widely, with 40% of respondents receiving education on other topics rather than birth preparedness and complication readiness ($p < 0.05$). **Conclusion:** Health education during antenatal care improves knowledge and utilization of delivery facilities. Prioritizing health education, involving husbands/significant others, and tailoring content to address specific needs can improve maternal and neonatal health outcomes. **Recommendations**: Implement targeted health education programs during antenatal care, involve husbands/significant others, and tailor content to address specific needs and gaps in knowledge.

Keywords: knowledge, antenatal education, facility based delivery services

1. Introduction and Literature Review

Access to skilled care and facilities providing emergency obstetric care and newborn care is critical to reducing maternal mortality in Zambia. For instance, 42 % of women in Zambia still deliver at home under the supervision of unskilled birth attendants whereas neonatal and maternal mortality is estimated at 27/1,000 and 252/100,000 live births respectively (Zambia Statistics Agency, 2019). This is because delivering in a health facility provides an opportunity to receive high-impact obstetric, neonatal, and emergency care interventions, resulting in improved, maternal, and neonatal health outcomes (Karanja *et al.*, 2018).

Institutional delivery service is one of the key and proven interventions to reduce maternal deaths. It ensures safe birth, reduces both actual and potential complications and maternal deaths and increases the survival of most mothers and newborn (Gabrysch, and Campbell, 2011). Many adverse health outcomes are associated with non-utilization

of facility-based delivery services which may be due to behavioural risk factors. In Mpika District some behaviours by women such as use of African syntocinon, tobacco smoking, avoidance of certain foods basing on myths, alcohol drinking and home deliveries are common and are known to be key determinants of population health. Maternal survival is also related to maternal behaviour of delivery and childbirth (Campbell and Graham, 2006). Despite the availability of delivery services, many women in Mpika District still give birth at home following traditional belief and customs. A large prospective study in Mumbai slums found 'custom' as the most common reason for home birth (Das, Bapat, *et al*., 2010). In western Uganda, women continue to deliver at home even when experiencing pregnancy complications. They adhere to traditional birthing practices and believe that pregnancy is a test of endurance (Kyomuhendo, 2010). In Timor-Leste, previous experience of uncomplicated home birth has led many women to view birth as a normal non-medical event and choose home for subsequent deliveries. According to the stage theory of behaviour change, individuals pass through a series of stages before changing their behaviours. 'Precontemplation' and 'contemplation' are the initial stages in which individuals recognize the problem and assess 'pros' and 'cons' of the intended change before making preparation for actual action (Prochaska, Velicer, 2007).

In other words, behavioural change starts with recognition of the underpinning health problem. In the context of delivery service use, women and her family should be aware of the negative consequences and danger signs during pregnancy and childbirth. Recognition of potential problems is relevant because pregnancy and childbirth are often regarded as normal life events that do not require professional help (Agus, Shigeko, Porter, 2012).

2. Methodology

The methodology in this study was organized under the following headings: Research Paradigm, the research design, research setting; study population, sample selection, inclusion and exclusion criteria, sample size, data collection tools, data collection technique, validity and reliability, pre-test and ethical consideration. The aim of the study is to ascertain the effect of antenatal education on the knowledge and utilization facility based delivery services among pregnant mothers in two health facilities in Mpika District.

2.1 Research Philosophy/Paradigm

According to Proofed (2023), a research paradigm is a philosophical framework that the research is based on. It offers a pattern of beliefs and understandings from which the theories and practices of the research project operate. The three pillars of research paradigm are ontology, epistemology and methodology (Abbadia, 2022). Ontology answers the question what is reality. That is does a single reality exist within the research. Epistemology is the study of knowledge it answers the question how is it possible to know reality. Epistemology incorporates the validity parameters and methods of

acquiring knowledge. The methodological question is "how to go about discovering reality/answers." Research paradigm is important because they form the philosophical basis of a research project. Research paradigms influence how different schools of learning (such as the sciences versus humanities) undertake their research. Once a research paradigm has been determined, an appropriate methodology can be undertaken. Furthermore, knowledge of the philosophical foundation of the research increases its quality and improves performance of the data analysis.

Examples of common research paradigms are:

a) positivism believes that there is a single reality that is possible to measure and understand. Because of this they are likely to use quantitative methods in their research. Typically, positivists propose hypothesis that can be proved or disapproved using statistical data analysis. Positivism tends to investigate the existence of a relationship between two variables rather than the reason behind it,
b) constructivists believe that there is no single reality or truth but rather multiple realities. They devote themselves to understanding and interpreting the meaning attached to an action. For this reason, constructivist tend to use qualitative research methods such as interviews or case studies which focus on providing different perspectives. Constructivist aims to provide the answer to "why",
c) pragmatist believes that reality is continually interpreted and renegotiated against the backdrop of new and unpredicted situations. Because of this the philosophy they apply in research depends on the research question itself. Pragmatist often combine positivist and constructivist principles in the same research project, using both qualitative and quantitative methods to investigate different components of a research problem. They believe that the optimal research methods are those that most successfully answer the research question,
d) the positivism paradigm gives way to positivism paradigm, which is more concerned with the subjectivity of reality and departs from logical positivism objective perspective. Post positivism seeks objective answers by striving to recognize and deal with such biases in the ideas and knowledge developed by research.

Basing on the above explanation on research philosophies and paradigm this study was guided by the ontological philosophy with the utilization of the positivism paradigm as the quantitative research method. The perspective taken helped the researchers to investigate the existence of a relationship between two variables rather than the reason behind it i.e. health education and utilization of delivery services by antenatal mothers in Mpika District.

3. Research Design

This study adopted a quasi-experimental design of two groups of pre and post intervention among mothers attending antenatal clinic in two health facilities in Mpika

District. A quasi-experimental study is aimed at evaluating the interventions but do not use randomization.

3.1 Non-Equivalent Control Group Design Will Be Employed

In this design both the control group and an experimental group were to be compared. The groups were chosen and assigned out of convenience rather than through randomization.

The researchers determined the knowledge levels of antenatal mothers at the start of the program (pre intervention) and then again after the program (post intervention). One group (experimental group) was given specific health education on specific topics i.e. importance of utilizing facility delivery services, birth preparedness and complication readiness. The other group was exposed to the routine health education by the facility staff. The group who did not receive the specific health education was our control group. The two groups were compared at the start of the program and are to be compared at the end in respect of knowledge levels, utilization of facility based delivery services and pregnancy outcomes.

The study included 3 phases namely pre-intervention, intervention and post intervention. In the pre-intervention phase, research assistants were recruited and trained on how to collect data. These comprised of health workers who are nurses and midwives working in targeted health facilities. Health education materials such as posters and pamphlets were developed by the researchers. The researchers also visited the study areas to seek for permission to conduct the study. Baseline data was collected and analyzed at this stage. The intervention phase followed thereafter. The decision to decide on which health facilities should serve as the intervention and control group was determined by the maternal and child health services utilization outcomes as recorded by health facilities in Mpika District.

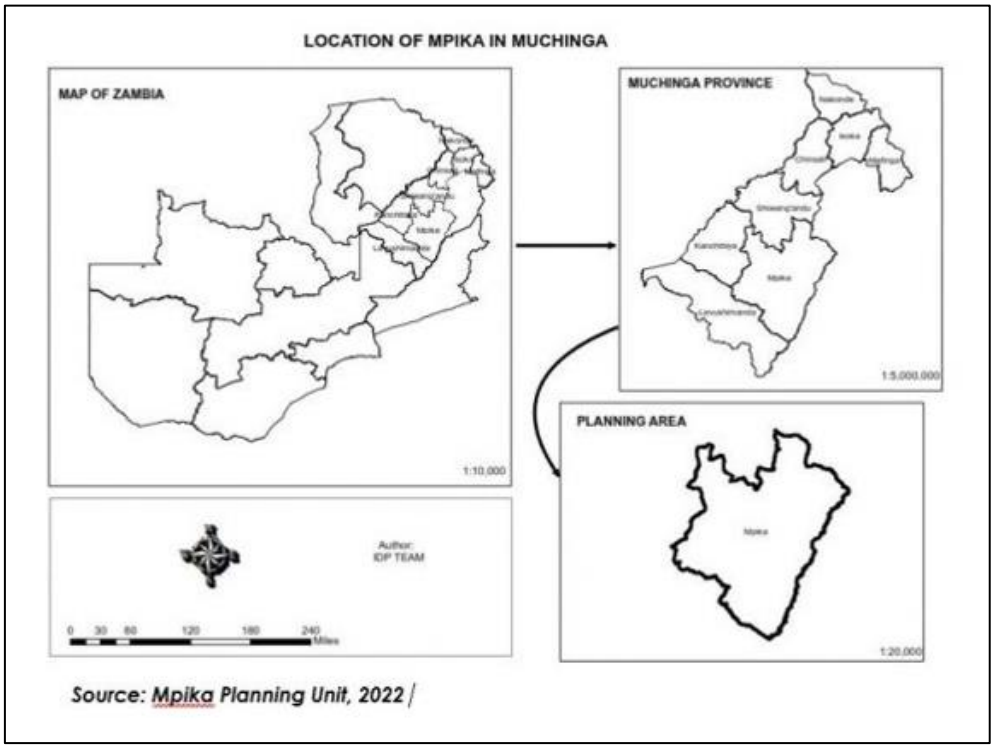
During the intervention phase, the respondents were divided into the intervention and control groups. The intervention group received specific health information on importance of utilizing facility delivery services, danger signs in pregnancy, birth preparedness and complication readiness and the control group received information on different topics by the health providers. The intervention was for 45 minutes' duration conducted four times during the antenatal period at 16, 24, 28 and 32 weeks. The post intervention phase was done by the researchers and the research assistants at 36 and 38 weeks of gestation using the same data collecting too used in the pretest phases.

4. Study Setting

The study was conducted in Mpika District at Kamwanya Health Centre and Chibansa Clinic. Mpika is one of the 8 Districts in Muchinga Province of the Republic of Zambia. Mpika was one of the largest District in Zambia with land size of 41,000 square kilometers not until in 2017 when Kanchibiya and Lavushimanda where created out of it and now the District stands land size 17,166.67 Square Kilometer.

The district shares boundary with Lavushimanda district in the South – west, Shiwang'andu district in the North, Kanchibiya in the North – West and Chama in North-East, Lundazi and Mambwe on the South – Eastern part.

Mpika is approximately 647 km away from Lusaka the capital city of Zambia, 177.7 km away from Chinsali the Provincial Headquarters of the Muchinga Province and 210 km from Kasama the provincial capital for Northern Province. The major roads that connect the district to the rest of the country and beyond is the Great North Road and Kasama is through M1. Most parts of Mpika are rural and most of the health facilities are hard to reach.



4.1 Study Population

The study population consisted of pregnant women in the second trimester for both the intervention and control groups. Controls were matched to the intervention group by age, parity and level of education.

4.2 Inclusion Criteria

All pregnant women who have had given birth at least once and in the second trimester of pregnancy were included.

4.3 Exclusion Criteria

Those who have had not given birth before, none residents who stay outside the study area, and those who refused to participate in the study were excluded.

4.4 Sample Selection

In this study, Proportionate sampling technique was employed. Proportionate sampling technique was applied in deciding the representative sample which was drawn from each facility because they did not contribute equal number to the total population. This method involved getting a proportional sample from the study and control groups which were representative basing on their characteristics.

4.5 Sample Size Calculation

The sample size was estimated using a formula by Kish and Leslie (1965) for cross-sectional studies which compared two independent samples (Intervention vs. control group).

$$n = \frac{P(1-P)Z^2}{d^2}$$

Where,
N = Number of respondents needed,
p = Estimated proportion of antenatal mothers accessing health facility services. In this study, 50% which is worst scenario was to be used since there is no study done on Effect of antenatal education on knowledge and utilization of facility based delivery services among pregnant women in Mpika District to our knowledge,
Z is 1.96 (the Z score corresponding to 95% confidence interval),
d = Maximum error the researcher is willing to allow = 0.05.

$$n = \frac{0.5(1-0.5)Z1.96^2}{0.05^2}$$

$$\text{n} = \frac{0.5(0.5)1.96^2}{0.05^2} = \frac{0.25X1.96^2}{0.05^2} = \frac{0.25X3.8416}{0.05^2} = \frac{0.9604}{0.0025}$$

n = 384.16

This study was to assume 384 as a minimum sample size. The sample size however consisted of 141 participants from the study group and 135 participants from the control group.

4.6 Data Collecting Tool

Semi structured interview questionnaire with both closed and open ended questions was developed by the researcher. The purpose of using such a variety of questions was to ensure that participants were free to answer in the manner appropriate to them. The semi-structured interview questionnaire was developed after thorough literature review in order to be able to adopt concepts from other recommended tools which have previously been used and approved by other researchers.

The structure of the interview schedule comprised two sections:

- **Section A**: designed to elicit information on the respondents' socio-demographic data
- **Section B**: knowledge of delivery services, danger signs and complication preparedness.
- **Section C:** utilization of health institutions,
- **Section D:** health education.

4.7 Validity

In this study, validity was ensured by employing strategies that dealt with threats to validity like appropriate selection of study design, random selection of study participants, and use of a pilot study to pre-test the research instruments**.**

4.7.1 Internal Validity

Construct and internal validity was ensured by carrying out extensive literature review which guided the designing of the data collection tool to ensure that only relevant questions pertaining to the study variables were included in the data collection tool. Adjusting for other variables during analysis ensured validity of findings.

4.7.2 External Validity

External validity was ensured with probability sampling procedures, enabling study participants (controls) and study units stand equal chances of being included in the study. As such, findings are generalizable to all the pregnant women in the district. In addition, the questionnaire was translated into the local language, translated back into English and same questions were be asked to each respondent in the same sequence.

4.8 Reliability

Reliability of the study was measured by testing the research tools before the main study during the pre-intervention stage which was done in a similar environment with similar characteristics. Reliability was also measured by using Cronbach's alpha to calculate the reliability coefficient. Indexes of internal consistency ranged from .00 to 1.00.

4.9 Data Collection

Data was collected using face to face interviews. Individual interviews were conducted in private rooms for a period of 30-45 minutes. The data collection was done in twelve (12) weeks and in three major phases of pre intervention, intervention, and post intervention sessions.

4.10 Data Analysis

Trained research assistants were used to collect data. Every questionnaire was cross – checked for completeness after the interview. After data collection, data was analyzed

using SPSS version 23 software. Before conducting the analysis data was sorted and coded before entering it into a password protected SPSS.

Descriptive analysis was done to calculate mean and standard deviation and proportions for categorical variables. Normality of continuous variables were tested statistically by the Shapiro will test and graphically by qq-plots. Categorical variables, numbers and percentages are to be reported then chi-square tests or fishers exact test were to be used to check associations. A confidence interval of 95% with margin errors of 5% (0.05) was used to determine statically significance. Less than 0.05 was regarded statistical significance. Linear Logistic Regression tests (univariate and multivariate analyses) was used to determine the factors associated with the dependent variable. Multivariate Logistic Regression was also used to control for confounding variables and to come up with independent contributing factors to utilization of delivery services. Significant level was set at 0.05% with 95% confidence interval.

4.11 Pilot Study

Pilot study was conducted in a setting with similar characteristics with the actual study setting. The sample for the pilot study consisted of 30 respondents with the same characteristics as the study sample at a different site. The pre-test informed the researcher whether the questions were understood in the same way by the respondents and if they are answerable and appropriate. This gave the researcher an idea of the time respondents took to answer the questionnaire and whether they understand the instructions, and if its format was suitable for the population (Parahoo, 2006: 305; 309).

4.12 Ethical Consideration

Ethical clearance was obtained from UNZABREC and the National Research Authority before conducting the study. Written permission to conduct the study was obtained from the Provincial and District Directors of the health facilities of the study sites. Permission was also sought from the sisters the in-charges of the two health facilities where the data was collected. A written informed consent was obtained from the study participants before.

5. Results

Table 1: Respondents' Socio-Demographic Data (n = 276)

	Control group	Intervention group	Frequency	Percentage (%)
Age (years)				
<18 years	11	10	21	8
19-24 years	42	48	90	33
25-36 years	46	48	94	34
37-42 years	36	35	71	25
Total	**135**	**141**	**276**	**100**
Education Level				
No formal Education	6	5	11	4

Primary Education	76	82	158	57
Secondary Education	52	53	105	38
Tertiary Education	1	1	2	1
Total	**135**	**141**	**276**	**100**
Marital Status				
Single	15	15	30	11
Married and Living Together	88	89	177	64
Married and Separated	1	1	2	1
Cohabiting	31	36	67	24
Total	**131**	**141**	**276**	**100**
Husband Education Level				
No Formal Education	5	7	12	4
Primary Education	55	58	113	41
Secondary Education	66	67	133	48
Tertiary Education	9	9	18	7
Total	**135**	**141**	**276**	**100**
Working Status				
Not Working	134	135	269	97
Working	1	6	7	3
Total	**135**	**141**	**276**	**100**
Number of Children				
No Child	18	12	30	11
1 Child	41	50	91	33
2 Children	22	23	45	16
3 Children	44	42	86	31
4 and More Children	10	14	24	9
Total	**135**	**141**	**276**	**100**

Table 1 shows that 8% (11) of the respondents from the control group were less than 18 years of age and 7% (10) of the respondents from the intervention group were aged less than 18 years of age. 31% (42) controls were aged between 19-24, while 34% (48) of the respondents from the intervention group were aged 19-24 years. The other 34% (46) were aged between 25-36 years and 34% of the respondents group were also aged between 25-36 years. The other 27% (36) controls and 25% study participants respectively were aged between 37-42 years. The table also provides information that 4% (6) controls and 4% (5) from the intervention group did not have formal education and 4% (12) had husbands without formal education, 56% (76) of the control group attended primary education and 58% of the intervention group had primary education. 41% (113) from the two groups had husbands who attended primary education. There were 39% (52) of the controls who had attained secondary school education and 38% (53) from the Intervention group had secondary education while 48% (133) had husbands with secondary education from both groups. 1% (2) attended tertiary education and 7% (18) had husbands who attained tertiary education. The table also shows that most (65%) of the control respondents were married and living with husbands and so were 63% of the Intervention group. Of the two groups 11% were single mothers and the other 23% (31) of the controls were cohabiting and 26% of the study participants were also cohabiting. There were, 97% (269) did not

have formal work while 3% (10) never had formal work. Concerning number of children, 30% of the control group participants had one child and 37% of the Intervention participants also had one child each. On the other hand, 33% of the controls and 30% of the Intervention participants had 3 children while 16% from both groups had 2 children each and 7% of the controls and 10% of the intervention group participants had 4 and more children.

Table 2: Response on Whether Respondent Received /Any MCH Services from the Health Facility (n = 276)

Whether Respondent Received Any MCH Services From The Health Facility			
	Yes	**No**	**Total**
Control group	135 (100%)	0 (0%)	135 (100%)
Intervention group	141 (100%)	0 (0%)	141 (100%)
Total	**276 (100%)**	**0**	**276 (100%)**

Table 2 shows that all Intervention participants 100% (141) and all respondents from the control group 100% (135%) have had received MCH services from the health facilities.

Figure 1: MCH Services Utilized by Respondent from the Health Facility (N = 276)

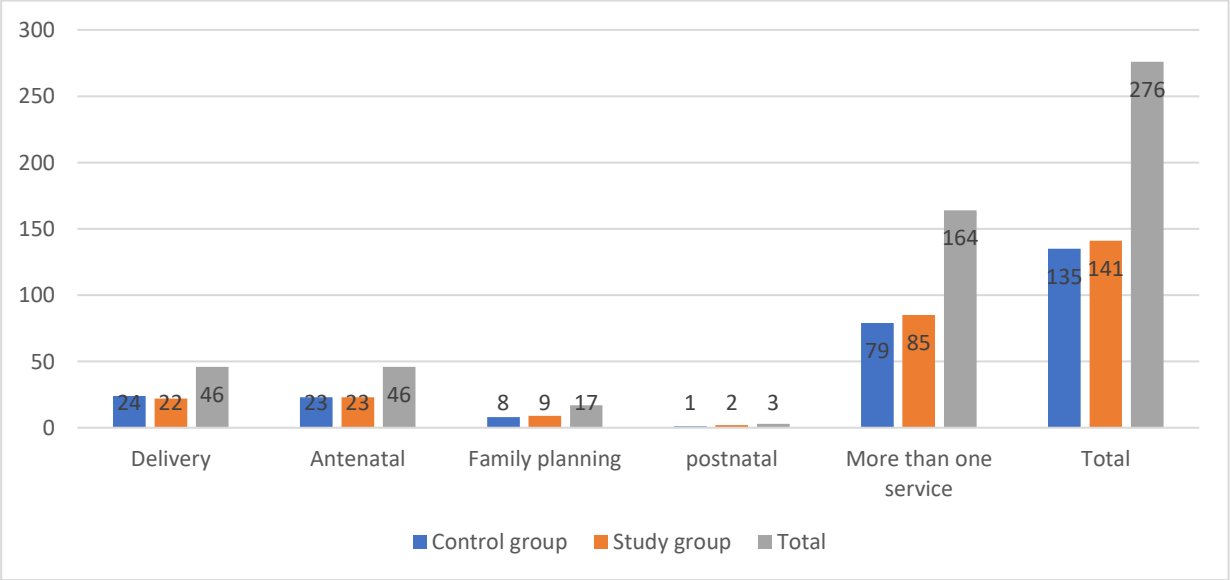


Figure 1 shows that 59% (79) of controls and 60% (85) of the intervention respondents have had accessed more than one MCH services. 17% (46) and also another 17% (46) from each group have had attended delivery and antenatal services only respectively. There were 6% (17) that were provided with family planning services while 1% (3) had accessed postnatal services only.

Figure 2: Responses on Whether Respondent Received IEC on Pregnancy and Delivery (n = 276)

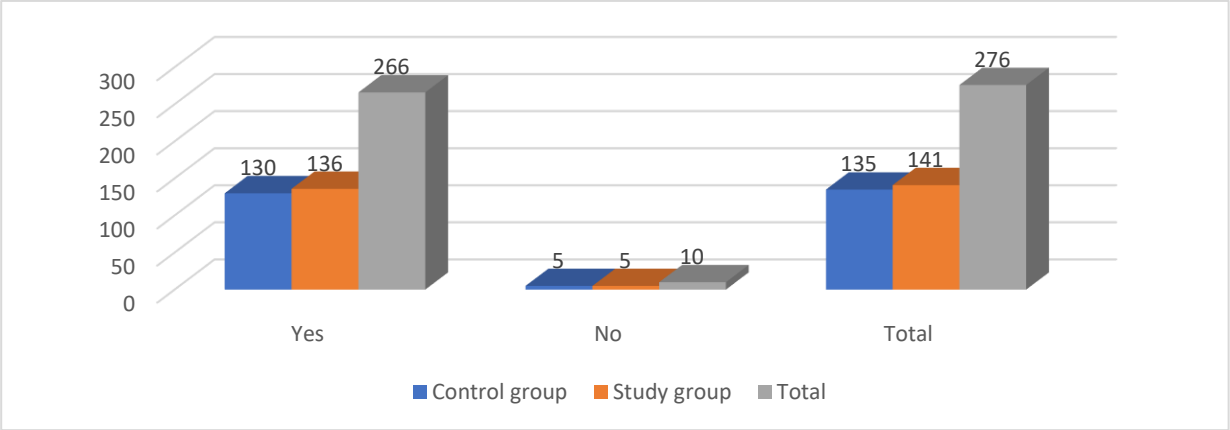


Figure 2 shows that 96% (130) of controls and 96% (136) of the intervention group respondents got information on pregnancy and delivery while 4% (10) did not.

Table 3: Responses on Whether Respondent Knew That Unexpected Problems Can Occur During Pregnancy & Childbirth (N = 276)

Whether Respondent Knew That Unexpected Problems Can Occur During Pregnancy & Labour			
	Yes	**No**	**Total**
Control group	134 (99%)	1 (1%)	135 (100%)
Intervention group	140 (99%)	1 (1%)	141 (100%)
Total	**274 (99%)**	**2 (1%)**	**276 (100%)**

Table 3 shows that 99% (274) respondents from both groups knew that an unexpected problem can occur during pregnancy and child birth, while 1% (2) did not know about unexpected problems during pregnancy and childbirth.

Figure 3: Responses on Intrapartum Danger Signs Known by Respondents (N = 276)

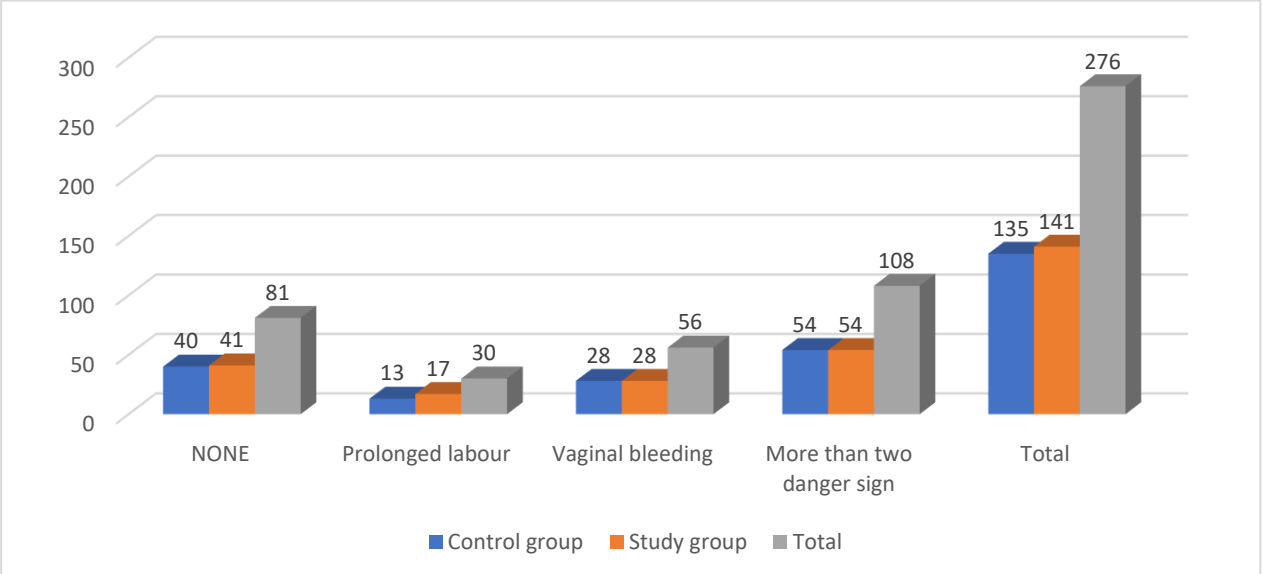


Figure 3 indicates that 39% (108) from the two groups had knowledge on more than two danger signs experienced during labour and others, 30% (40) of the controls and 30% (41) of the Intervention group did not have knowledge on any danger sign related to intrapartum. There were 20% (28) controls and 20% (28) intervention respondents that knew vaginal bleeding as a danger sign while 10% (13) controls and 12% (17) Intervention group respondents had knowledge that prolonged labour was a danger sign during intrapartum.

Figure 4: Responses on Postpartum Danger Signs Known by Respondent (N = 276)

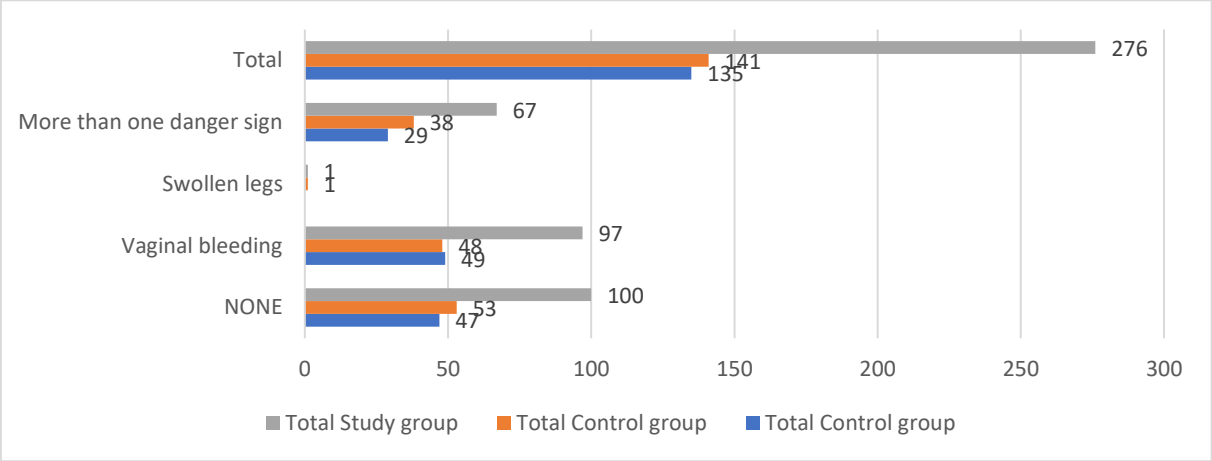


Figure 4 indicates that 39% (53) of the controls and 33% (47) of the study participants did not have knowledge on any danger sign related to postpartum and 36% (48) controls and 36% (49) study respondents knew vaginal bleeding as a danger sign while 28% (38) controls and 21% (29) study participants had knowledge on more than two danger signs.

Table 4: Respondents Response on Whether a Woman Can Have Complications If She Does Not Attend Antenatal Clinic (N = 276)

Whether A Woman Can Have Complications If She Does Not Attend Antenatal Clinic			
	Yes	**No**	**Total**
Control group	133	2	135 (100%)
Study group	139	2	141 (100%)
Total	**272**	**4**	**276 (100%)**

Table 4 shows that 99% (272) of the respondents from the two groups knew that a woman can have complications if she does not attend antenatal clinic.

Table 5: Respondents Responses on Whether a Woman Can Have Complications If She Decides To Deliver From Home (N = 276)

Whether A Woman Can Have Complications If She Decides to Deliver from Home			
	Yes	**No**	**Total**
Control group	135	0	135 (100%)
Study group	141	0	141 (100%)
Total	**276**	**0**	**276 (100%)**

Table 5 shows that all (276) of the respondents knew that a woman can have complications if she decides to deliver from home.

5.1 Section C: Utilization of Facility Based Delivery Services

Table 6: Respondents Responses on Whether She Attended Antenatal Care during Last Pregnancy (N = 276)

Whether A Respondent Attended Antenatal Care During Last Delivery			
	Yes	**No**	**Total**
Control group	135	0	135 (100%)
Study group	141	0	141 (100%)
Total	**276**	**0**	**276 (100%)**

Table 6 shows that all the participants from both groups attended antenatal care during the last pregnancy.

Figure 5: Respondents Responses on Type of Health Facility Attended During Last Pregnancy (N = 276)

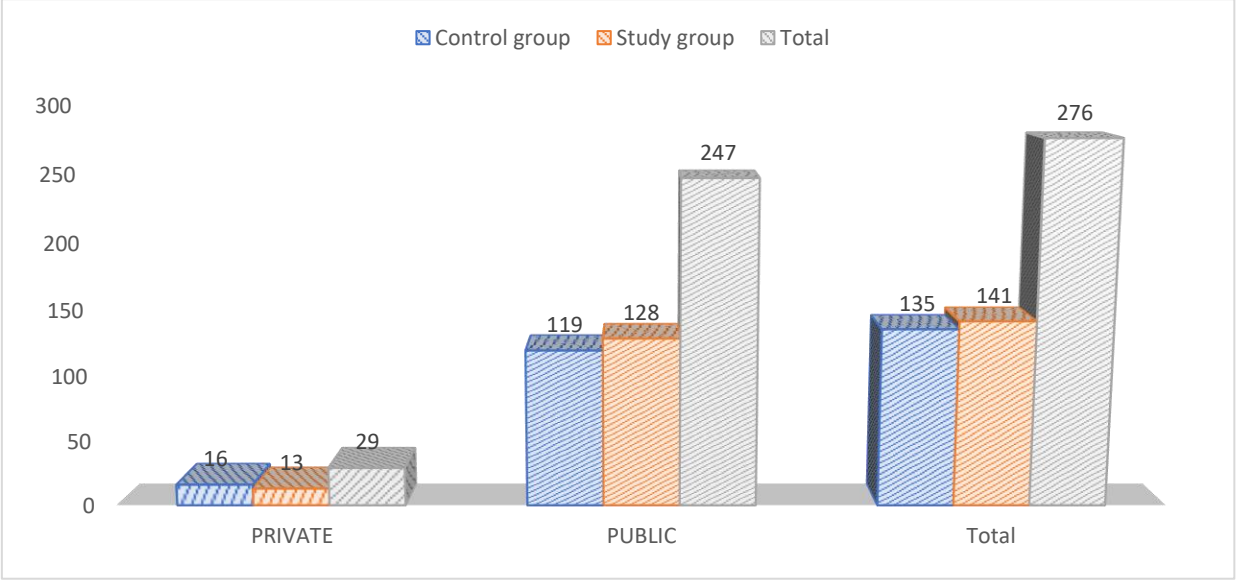


Figure 5 shows that majority (89%) of the participants from both groups attended antenatal clinic from public facilities whilst 11% attended antenatal from private facility.

Figure 6: Respondents Responses on Number of Antenatal Visits Attended During Last Pregnancy (N = 276)

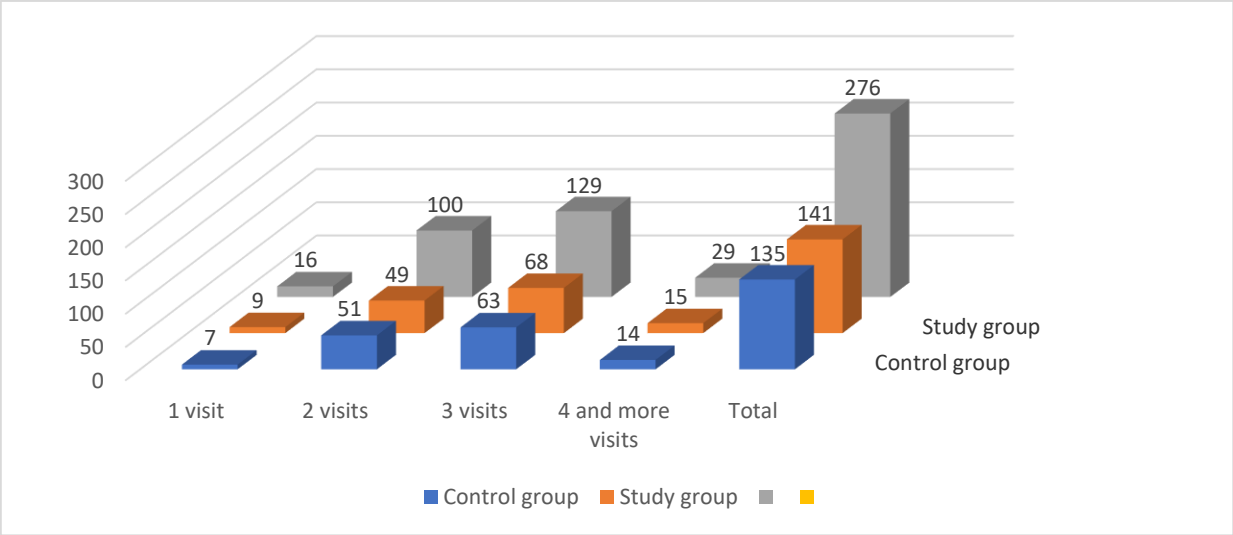


Figure 6 shows that 47% (63) controls and 48% of the intervention group participants attended antenatal clinic 3 times during their last pregnancy while the other 37% of the controls and 35% of the study participants only managed to make two ANC visits. Only 10% of the controls and 11% (15) of the respondents attended 4 or more visits with the other 5% attending once from each group.

Figure 7: Responses on When Respondent Started Attending Antenatal Care Clinic during the Last Pregnancy (n = 276)

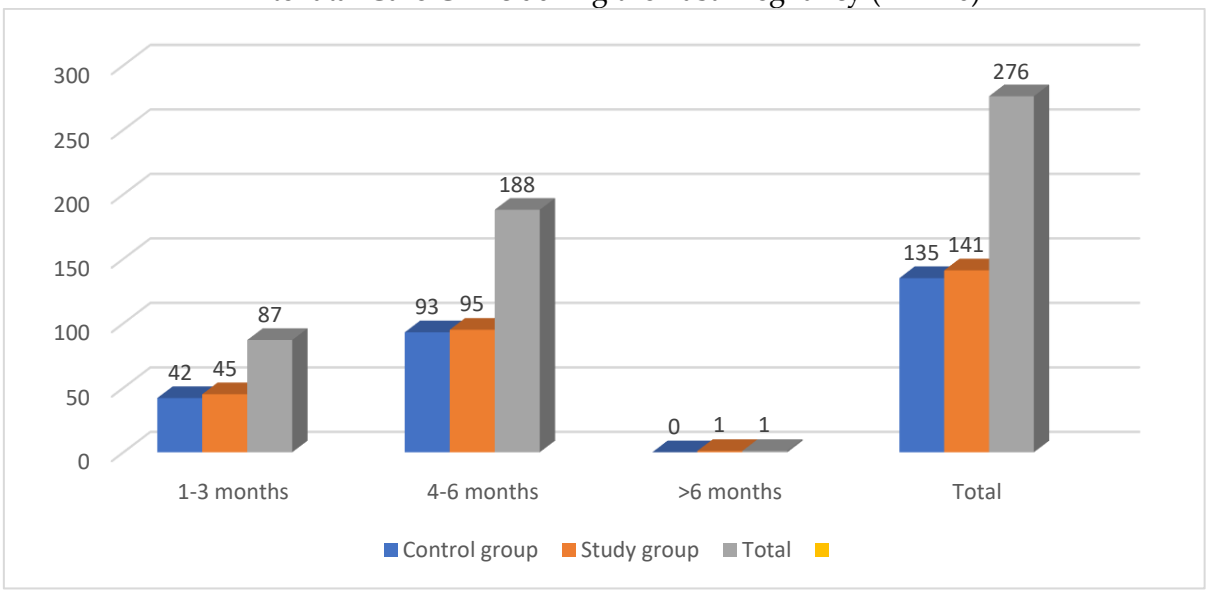


Figure 7 shows that only 31% (42) controls and 32% (45) of the participants group started attending antenatal clinic at the recommended times of 1-3 months whilst 69% (93) controls and 67% (95) study participants started antenatal clinic at 4-6 months.

Figure 8: Responses on Who Advised Participant to Start Attending Antenatal Care Clinic during the Current Pregnancy (n = 276)

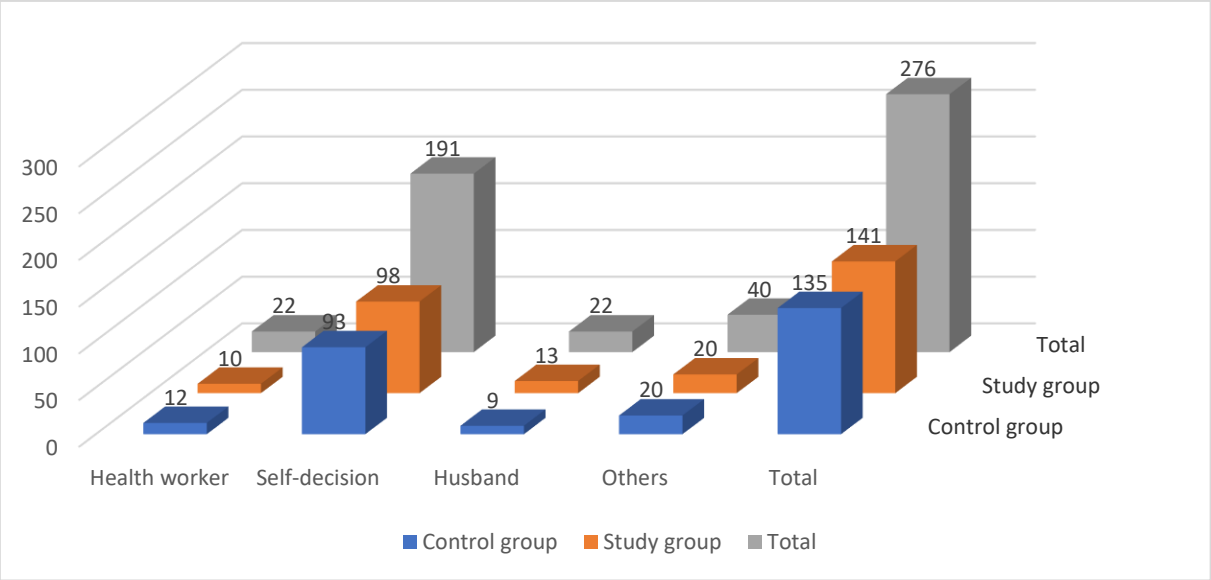


Figure 8 shows that most (69%) of the controls and 70% of the intervention group respondents decided on their on to start antenatal clinic and 9% (12) controls, 7% (10) intervention group participants were advised by health workers. On the other hand, 7% (9) of the control group and were advised by their husbands while 14% (40) from both groups got advice from other sources like SMAG, relatives and friends.

Figure 9: Responses on Where Respondent Delivered from During Last Pregnancy (N = 276)

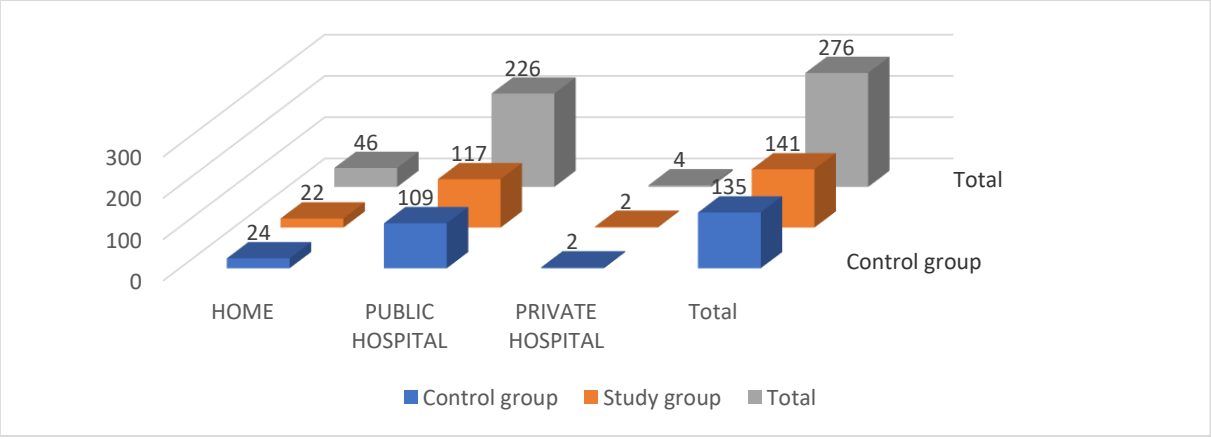


Figure 9 demonstrates that 18% (24) of the controls and 16% (22) of the study group delivered from home during their last pregnancy while majority (109) controls and majority (117 of the study group delivered from public hospitals and only 1% delivered from private hospital.

Figure 10: Responses on Where Respondent Intended To Deliver from During Current Pregnancy (N = 276)

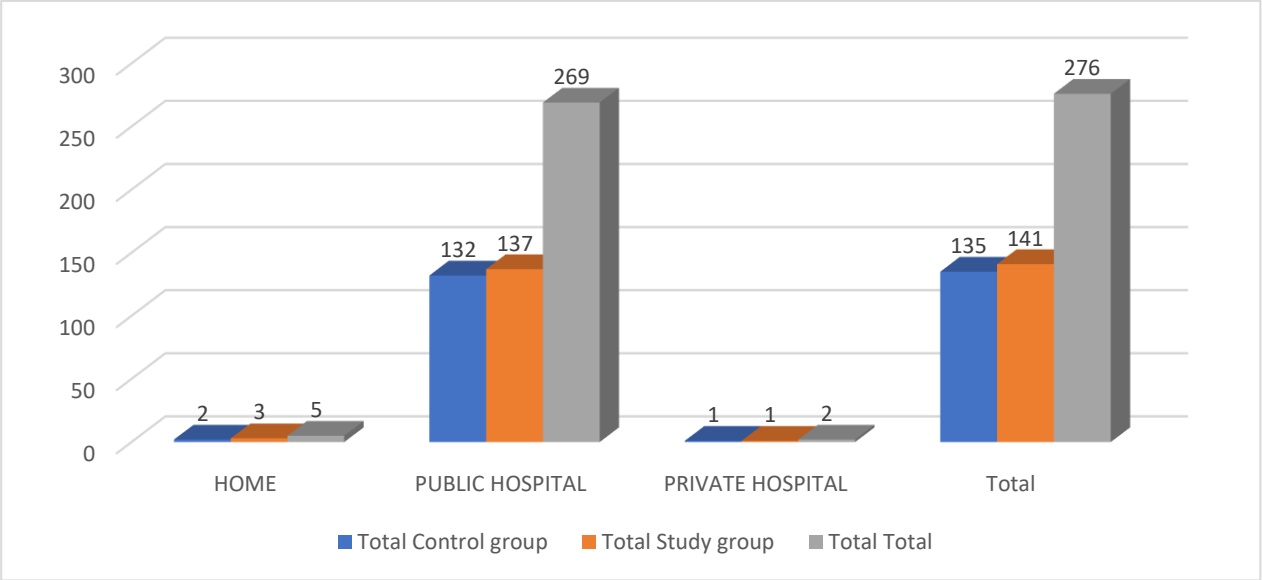


Figure 10 shows that 98% of the control group and 97% of intervention group respondents intended to deliver from public hospitals while 2% intended to deliver from home.

Figure 11: Respondents' Responses on Whom Conducted Deliver during the Last Pregnancy (n = 276)

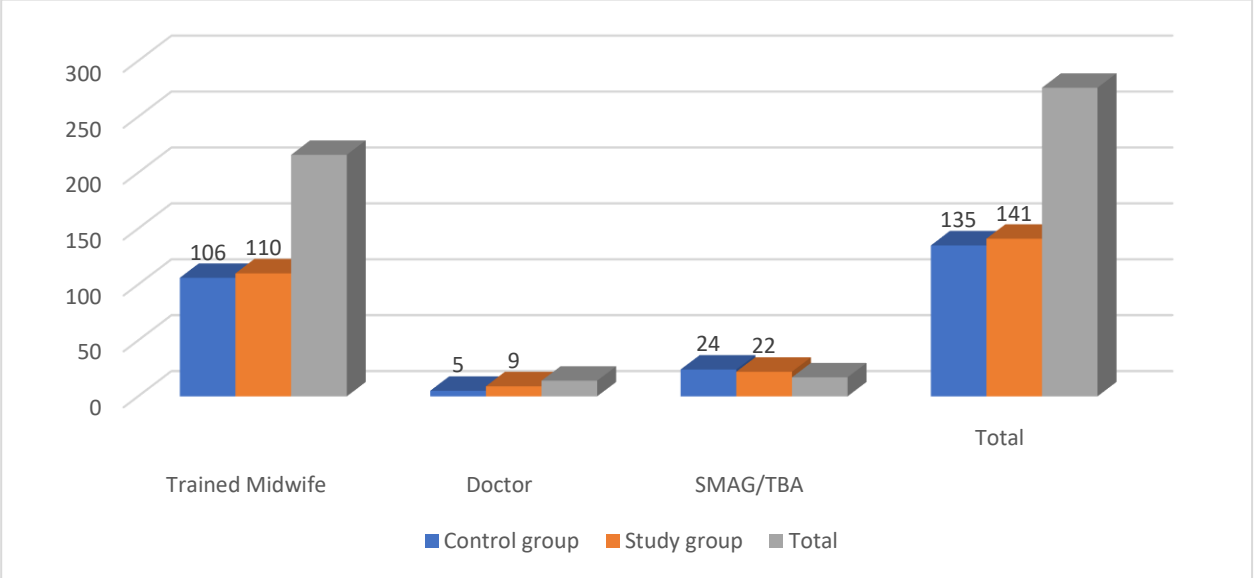


Figure 11 shows that 79% of the control group and 78% of the intervention group participants were delivered by trained midwives while 4% (10) control of the control group and 6% (9) of the intervention group participants were delivered by doctors and the other 18% controls, 16% (22) study participants were delivered by SMAGS/TBA.

Figure 12: Respondents' Response on What Can Prevent a Woman from Delivering from Health Facility

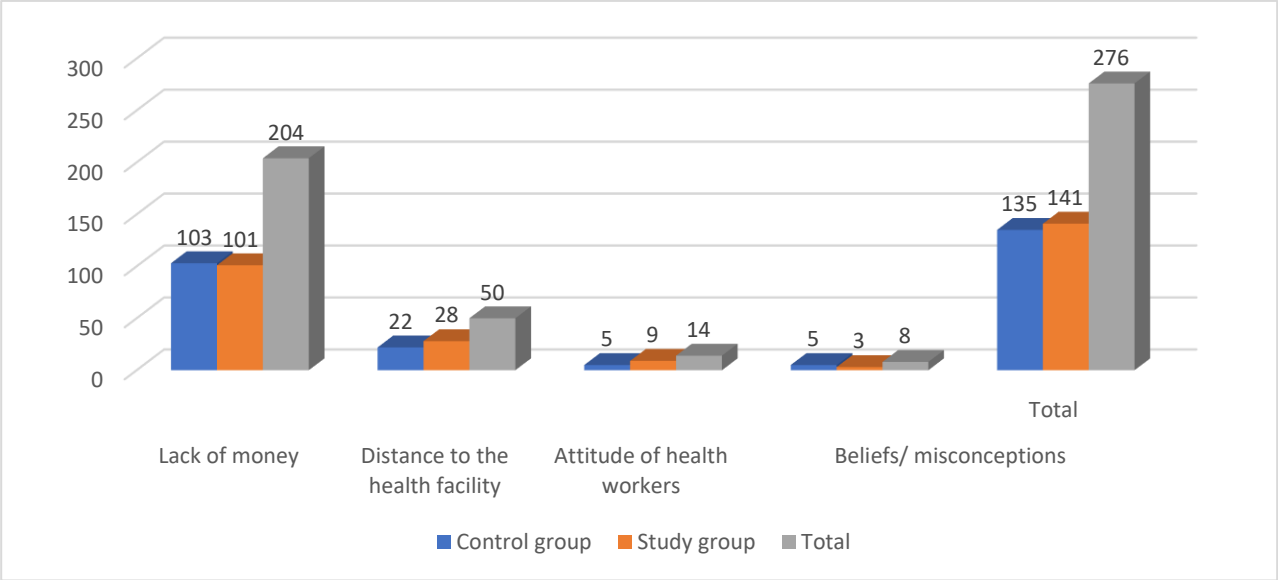


Figure 12 demonstrates that 76% of the control group and 71% of the intervention group participants felt that lack of money is what can prevent a woman from delivering from the health facility while 16% (22) control group and 20% intervention group said distance to the health facility is the factor. The other 4% (5%) of the control group and 6% (9) of the intervention group participants said attitude of health workers contribute to the problem and only 4% of the control group and 2% (3) of the intervention group participants said traditional beliefs and misconceptions can lead to the problem.

5.2 Health Education

Figure 13: Respondents' Response on Number of Health Education Sessions Attended by the Respondent during the Previous Pregnancy

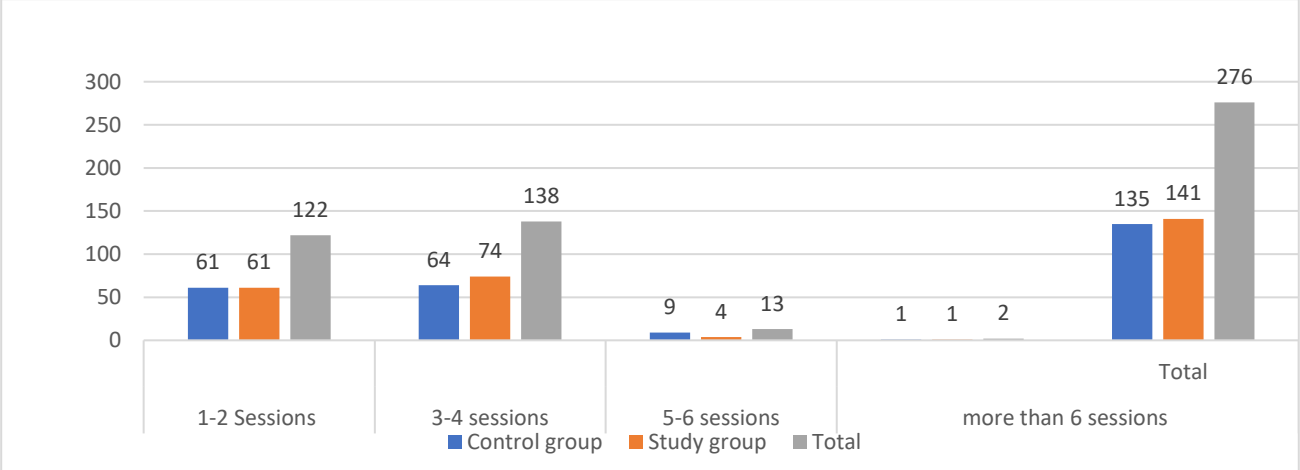


Figure 13 shows than less than half (45%) of the control group and 43% (61) of the intervention group respondents attended 1-2 sessions while 47% (64) of the control group

and 52% (74) of the intervention group participants attended 2-3 sessions. 7% (9) of the control group and 3% of the intervention group participants attended 5-6 sessions. Only 1% (2) attended more than 6 sessions during their last pregnancy.

Figure 14: Respondents' Response on Source of Information on Need to Start Attending Antenatal Clinic during Their Last Pregnancy

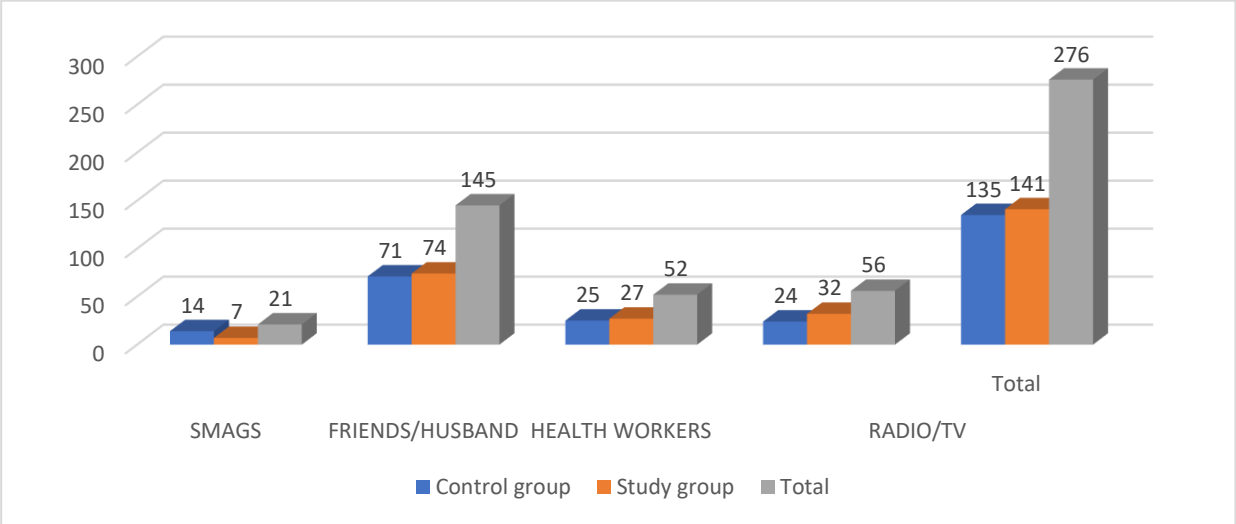


Figure 14 shows that slightly above half (53%) of the control group and 52% (74) of the intervention group participants got information from friends and husbands on the need to start attending antenatal clinic while 18% of the control group and 23% of the intervention group participants got information from radio and TV and the other 16% (56) from both groups got information from health workers.

Figure 15: Respondents' Response on Topics Educated on during Antenatal Sessions in Previous Pregnancy

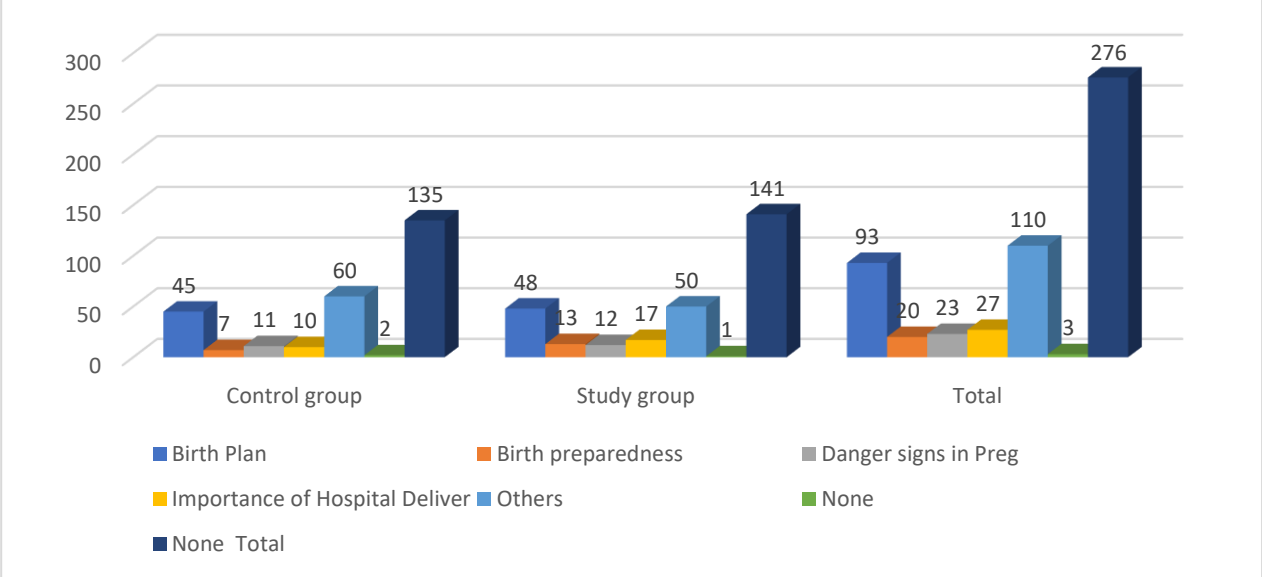


Figure 15 shows that most (44%) of the control group and 35% (50) of the intervention group respondents received antenatal education on other topics while 33% (45) study participants received information on Birth plan. On the other hand, only 7% (10) of the control group and 13% (17) of the intervention group participants received information on importance of delivering from the hospital and only 8%of the controls group 9% (12) of the intervention group participants received information on danger signs in pregnancy. The other 5% (7) participants from the controls group and 9% (13) of the participants from the intervention group received information on birth preparedness.

6. Discussion of Findings

6.1 Demographic Characteristics of Study Sample

The Demographic characteristics of the respondents which were relevant to the study and essential for interpretation included; age, education level of the respondent and the husband, marital status, work status and parity. The respondents were pregnant women between 16 years up to 42 years with a significant proportion (8-11%) of teenagers (less than 18 years old) in both the control and intervention groups indicating a concern for teen pregnancies in rural areas. 31% (42) of the control group participants were aged between 19-24, while 34% (48) of the respondents from the intervention group were aged 19-24 years. The other 34% (46) were aged between 25-36 years and 34% of the respondents from the intervention group were also aged between 25-36 years. The other 27% (36) of the control group and 25% the intervention group participants respectively were aged between 37-42 years (Mean age: 24.5 years (SD: 5.2). The mean age is significantly different from 30 years ($p < 0.001$), indicating that the respondents are relatively young. The similar age distribution between the control and intervention groups suggests that the groups are comparable in terms of age, which is an important factor in health education and healthcare utilization. The higher percentage of respondents in the 19-24 age range in the intervention group (34%) compared to the control group (31%) might suggest that the study group has a slightly higher proportion of younger women, who may be more likely to benefit from health education on delivery facilities. The findings agree with the finding of a study conducted in rural Kenya which found that 22% of adolescents had begun childbearing, highlighting the need for targeted interventions (Kenya National Bureau of Statistics (2015) but contradicts the findings of a study by Amo-Adjei *et al.* (2019 carried out in urban Ghana which found no significant association between adolescent pregnancy and healthcare utilization.

Overall, the age distribution data suggests that the study has a representative sample of women of childbearing age, and the comparison between the control and study groups is valid in terms of age. This sets the stage for analyzing the effects of health education on knowledge and utilization of delivery facilities, which is the main objective of the study.

The study findings also provide information that there were low levels of formal education among respondents (4-5%) and their husbands (4-12%). Primary education is

the most common level of education among respondents (56-58%) and their husbands (41%). Secondary education is the second most common level among respondents (38-39%) and their husbands (48%). Tertiary education is low among respondents (1%) and their husbands (7%). (Mean years of education: 6.5 years (SD: 2.1). The mean years of education is significantly different from 8 years ($p < 0.01$), indicating that the respondents have relatively low levels of education. These findings indicate high illiteracy levels in rural areas, which can impact decision-making, including health-seeking behaviors. These findings agree with Oladapo *et al*. (2018) research findings in Nigeria which revealed that women with higher education levels were more likely to utilize maternal healthcare services. However, the findings are contrary to Moyer *et al*. (2019) research findings in Tanzania that showed that education level did not significantly impact maternal healthcare utilization. According to Onah, 2019, literacy among women in many developing countries is low, and there are sociocultural beliefs and practices with adverse effects on pregnancy and birth occurring even among educated women.

The study findings showed that a significant proportion from both groups were single mothers (11%) or cohabiting (23-26%). The proportion of married respondents was significantly higher than the proportion of single respondents ($p < 0.001$). The marital status of the respondent has a significant influence on decision making especially when it comes to health seeking behaviours as married women may be required to seek permission from husbands to access MCH or delivery services. This maybe a different scenario for the unmarried or cohabiting women who in this case accounts for a small percentage (11%). Arigundade *et al*. (2021) study in Nigeria also showed a significant association between health facility delivery and marital status, education and divorcees with respondents who registered early (first trimester) for antenatal clinic being found to be higher users of delivery services at health facility. In addition, a study in India conducted by Singh *et al*. (2018) found that married women were more likely to access institutional delivery care than unmarried women. However, a Ugandan study by Kabakyenga *et al*. (2019) found no significant difference in healthcare utilization between married and unmarried women.

There were, 97% (269) who did not have formal work only 3% (10) had formal work from both groups. The proportion of unemployed respondents is significantly higher than the proportion of employed respondents ($p < 0.001$). The study findings highlight the fact that in rural areas majority of women are not in formal employment which can affect their income and socio-economic status. These findings are in agreement with Rahman *et al.* (2019) findings in rural Bangladesh that found that women from lower socioeconomic backgrounds had lower rates of facility-based delivery. The current study findings are also supported by Silubanje *et al*. (2015) whose aim was to explore women's experiences and beliefs concerning utilization of maternity waiting homes in rural Zambia that reported that factors such as women's lack of decision making autonomy, prevalent gender inequalities and low socio economic status prevent women from utilizing these services delivery services. Moreover, non-availability of funds to buy the requirements for the baby and mother to use during labour at the clinic also affected

utilization hospital delivery. However, it contradicts with a study by Li *et al*. (2020) conducted in rural China that found that socioeconomic status did not significantly impact healthcare utilization.

Concerning number of children, most of respondents from both groups have had one or two children (30-37%. On the other hand, 33% of the respondents from the control group and 30% of the form the intervention group have had 3 children while 16% from both groups had 2 children each and 7% of the controls and 10% of the study participants had 4 and more children (mean parity: 2.3 (SD: 1.5). The mean parity is significantly different from 3 ($p < 0.01$), indicating that the respondents have relatively low parity. Parity has an influence on the utilization of health facilities for maternal health services as those with no child or one child maybe eager to access hospital services than those with many children (Table 1). These findings are in agreement with the research findings in Ethiopia in a study conducted by Worku *et al*. (2020) that found that women with fewer children were more likely to use institutional delivery services but contradicts Maina *et al*. (2019) findings in Kenya that showed no significant association between parity and healthcare utilization.

These demographic characteristics highlight the challenges and vulnerabilities of the study population, including teen pregnancies, low education levels, limited access to formal employment, and potential gender inequalities. These factors may impact the utilization of delivery facilities and the effectiveness of health education interventions. The high percentage of teenagers in the study highlights the need for targeted interventions to address early pregnancies and improve access to reproductive health services. The low levels of formal education among respondents and their husbands underscore the importance of education in improving health literacy and decision-making. The significant proportion of married women and the potential influence of husbands on healthcare decisions emphasize the need to engage men in health education and promotion. The high percentage of respondents without formal work and low socioeconomic status highlights the need to address systemic barriers to healthcare access. The findings on parity suggest that women with fewer children may be more likely to access hospital services, emphasizing the importance of targeted interventions for high-parity women.

6.2 Respondents' Knowledge on Maternal and Child Health Services, Danger Signs and Complications of Childbirth

Section B of the questionnaire had open and closed ended questions that aided in determining the knowledge levels of pregnant women on Maternal and Child Health Services, Danger Signs and Complications of Childbirth.

The study results showed that all (100%) respondents from both groups had received MCH services from the health facilities indicating high awareness and utilization of these services statistically significant ($p < 0.001$), indicating that all respondents had access to these services (Table 2). These findings are in agreement with a study in rural Tanzania found that 98% of women had received antenatal care from a skilled provider (Tanzania

National Bureau of Statistics (2016). Nonetheless, these findings contradict the findings from a study in Uganda which showed that only 60% of women had received antenatal care from a skilled provider (Uganda Bureau of Statistics (2016). The results also showed that 59% (79) of the respondents from the control group and 60% (85) from the intervention group had accessed more than one MCH services suggesting selective use of services is statistically significant ($p < 0.01$), indicating that more than half of the respondents utilized all the services. About 17% (46) and also another 17% (46) of the respondents from both groups had attended delivery and antenatal services only respectively. There were 6% (17) that were provided with family planning services while 1% (3) had accessed postnatal services only (Figure 1). Postnatal services were the least accessed (1%), which is a concern as it is a critical service for preventing maternal and neonatal mortalities.

The findings further show that 96% (130) of the respondents from the control group and 96% (136) from the intervention group got information on pregnancy indicating good knowledge in this area is statistically significant ($p < 0.001$), indicating that almost all respondents received information on this topic. However, 4% did not receive such information, which may indicate a gap in healthcare provider counseling (Figure 2). These findings are in contrast with a study in Mozambique found that only 70% of women had received information on pregnancy and childbirth from a healthcare provider. Concerning knowledge on Danger Signs only 39% of respondents knew more than two danger signs experienced during labor is statistically significant ($p < 0.01$), indicating that a significant proportion of respondents had limited knowledge on this topic, indicating a need for improved education on this topic. 30% did not know any danger signs related to intrapartum is statistically significant ($p < 0.01$), indicating that a significant proportion of respondents lacked knowledge on this topic., which is a concern as it may lead to delayed seeking of care. Vaginal bleeding and prolonged labor were the most commonly known danger signs, but knowledge on other signs was limited.

The results also show that 99% (274) of the respondents from both groups knew that an unexpected problem could occur during pregnancy and child birth, while 1% (2) did not know that unexpected problems could occur during pregnancy and childbirth (Table 3). However, despite having such knowledge and getting such information some women ended up delivering from home.

The study also indicates that 39% (53) of the respondents from the control group and 33% (47) from the intervention group did not have knowledge on any danger sign related to postpartum and 36% (48) of the control group and 36% (49) of the intervention group respondents knew vaginal bleeding as a danger sign while 28% (38) from the control group and 21% (29) from the intervention group had knowledge on more than two danger signs (Figure 4). These findings are in agreement with study in Ethiopia found that 35% of women knew at least one danger sign during pregnancy, similar to the finding that 39% of respondents knew more than two danger signs experienced during labor and others (Ethiopia Federal Ministry of Health, 2017). Another study in Ghana found that 25% of women knew at least one danger sign during childbirth, similar to the

finding that 20% of respondents knew vaginal bleeding and prolonged labor as danger signs (Ghana Statistical Service, 2017). However, the findings contradict a study in Sierra Leone that found that only 20% of women knew at least one danger sign during pregnancy (Sierra Leone Statistics Sierra Leone (2014). Considering that some women did not know of any danger sign that may happen during pregnancy and delivery, there is a likelihood that some may decide to deliver from home and fail to utilize health facilities.

The results further showed that 99% of the respondents from both groups knew that a woman can have complications if she does not attend antenatal clinic and all (276) the respondents from both groups knew that a woman can have complications if she decides to deliver from home (Table 5). The findings suggest that knowledge on MCH services and pregnancy and childbirth is high, but there are gaps in knowledge on danger signs and selective use of services. The study highlights the importance of counseling and education on danger signs and the need for improved access to postnatal services. The findings support the idea that knowledge on maternal health influences the utilization of skilled birth attendants and health facilities. Overall, the findings suggest that the respondents have a moderate level of knowledge on MCH services and pregnancy and childbirth, but a low level of knowledge on danger signs. The findings highlight the need for improved education and counseling on danger signs and the importance of postnatal care.

The above findings on knowledge on MCH Services are consistent with a study conducted in rural Kenya that found that 95% of women had received antenatal care from a skilled provider, similar to the finding that 100% of respondents received MCH services from health facilities (Kenya Demographic and Health Survey, 2014). The findings also agree with a study in Nigeria found that 61% of women had accessed all four antenatal care visits, similar to the finding that 59% of respondents accessed all MCH services (Nigeria Demographic and Health Survey 2013). Another study in India found that 93% of women had received information on pregnancy and childbirth from a healthcare provider, similar to the finding that 96% of respondents received information on pregnancy and delivery (India National Family Health Survey, 2015-16).

These findings are in agreement with Karkee *et al*. (2018) findings which showed that maternal health knowledge influenced the utilization of skilled birth attendant. In particular, women who acknowledged that unexpected problems could occur during birth and pregnancy were more likely to deliver at a health facility than those who were unaware of the possible consequences. Similarly, women who knew any antepartum danger signs, any intrapartum danger signs, and any postpartum danger signs tended to deliver at a health facility. The study suggests that convincing and counseling pregnant women of the health consequences of pregnancy and childbirth would increase their utilization of delivery services.

6.3 Utilization of Facility Based Delivery Services by the Respondents

Evidence has suggested that maternal use of skilled birth attendant is a most important factor in reducing maternal mortality because of more than three quarters of maternal

deaths occurring during child birth or within twenty-four hours after delivery due to hemorrhage, hypertension, ruptured uterus and sepsis (WHO, 2013). The study revealed information that all (100%) of the respondents from both groups attended antenatal care during the last pregnancy (Table 6). This signifies high coverage of antenatal care services among women in rural areas. The current study also shows that 37% (63) of the control group respondents and 48% (68) of the intervention group attended antenatal clinic 3 times during the last pregnancy while the other 37% of the control group and 35% from the intervention group only managed to attend ANC twice. Only 10% of the respondents from the control group and 11% (15) from the intervention group attended 4 or more visits with the other 5% attending once from each group (Figure 6). The results imply that most women attend antenatal clinic less than the recommended 8 times and more during pregnancy. This may be attributed to several factors such as; long distance to the health facility, transport, decision making abilities and many others. The study results showed that only 32% of the respondents from both groups started attending antenatal at the recommended stage of pregnancy thus; 1-3 months, whilst 68% of the respondents from both groups started antenatal clinic at 4-6 months (Figure 7). These findings are in agreement with a study in rural Kenya that found that 95% of women had received antenatal care from a skilled provider, similar to the finding that 100% of respondents received MCH services from health facilities (Kenya Demographic and Health Survey 2014). Similar findings were also reported in a study in Nigeria found that 61% of women had accessed all four antenatal care visits, similar to the finding that 59% of respondents accessed all MCH services (Nigeria Demographic and Health Survey 2013). The findings suggest that while there is high coverage of antenatal care services, there is still a gap in the timing of initiation of antenatal care and the utilization of facility-based delivery services. The study highlights the need for targeted interventions, including community mobilization, health education, and male involvement, to increase the uptake of supervised delivery services. The findings also suggest that addressing financial and geographical barriers, as well as improving the attitude of health workers, could increase the utilization of facility-based delivery services.

The study's findings are consistent with other studies that have shown that antenatal care attendance is high, but the uptake of facility-based delivery services is lower. The findings also agree with studies that have identified financial and geographical barriers, as well as lack of knowledge and poor attitude of health workers, as factors that hinder the utilization of facility-based delivery services. This indicates that women commence antental clinic very late risking both themselves and the unborn babies to dangers and complications of pregnancy such as; anemia, infections, genetical disorders, hypertensive disorders during pregnancy and many others. This could be due to the cultural beliefs which surround being known by others to be pregnant, distance to the health facility and transport. According to Mathole (2004), the use of ANC early in the pregnancy is professionally considered important to ensure that appropriate ANC is arranged and, therefore, good quality and quantity of information with education are delivered to improve pregnancy outcomes. A study conducted by Arigundade *et al.*

(2021) in Nigeria found that women were not compliant with the recommended time of the first visit of pregnancy. Instead, most women made their first visit after 21 weeks or when the pregnancy started showing. The listed reasons included shame for having too many pregnancies or being over 40 years old and pregnant. Women also mentioned service-related reasons; for example, negative attitudes of service providers and poor quality of care. Evidence show that multiparous women and older women preferred fewer visits as a result of the experience they had during previous pregnancies (Arigundade *et al*., 2021). Similarly, a study by Zanbaba *et al*. (2021) showed that most of the respondents' had knowledge of maternal health services and good knowledge of maternal health services were found to have a statistically significant association with facility based delivery utilization. Another Ethiopian study by Demissie, Worku, and Berhane (2022) showed that having knowledge of obstetric complications, attending > 4 antenatal care visits, birth order and the use of free ambulance service also showed significant association with health facility delivery. The findings of this study shows a gap and agrees with A Ghanaian study by Ganle *et al*. (2019) on factors influencing the use of supervised delivery services in Garu-Tempane district of Ghana which revealed that antenatal care attendance among the respondents was very high (90.4%) but the prevalence of supervised births was 68% and more than a quarter of the postpartum women delivered their babies at home without skilled birth attendant. Thus it can be concluded that there is a need for targeted interventions including community mobilization, health education and male involvement to help generate local demand for and uptake of supervised deliveries services.

According to the study results there were more than half 69% of the respondents from both groups who made their own decisions to commence attending antenatal clinic, while 8% from both groups were advised by health workers and 8% were advised by their husbands. The results further showed that 14% got advice from other sources like SMAG, relatives and friends (Figure 8). The results imply that some women have the ability to make decisions on commencement of antenatal clinic attendance which contributes positively to timely identification and prevention of complications of pregnancy. This also promotes adequate monitoring of the health of the mother and baby throughout pregnancy. It also enhances sense of responsibility in the women in relation to their own health. A good statistics of women were advised by others which comprises of the people they stay within the community or at home such as SMAG implying that they trust and have confidence in individuals that live or reside with them in the community thus a good indicator for reinforcement of community midwifery care.

In relation to where respondents from both groups delivered from during their previous pregnancies, the study results indicated that most 82% of the respondents delivered from health facility while 18% delivered from home during their last pregnancy (Figure 9). The results showed that women's utilization of health delivery services is above average. These findings are supported by the findings of a study carried out in Ethiopia by Zanbaba *et al.,* (2021) that found that 82% of women who gave birth in the past 2 years used facility-based delivery services. Similarly, the findings are also in

agreement with a study in Ghana that showed that 85% of women who attended antenatal care delivered at a health facility (Ganle *et al*., 2019). Moreover, another study in Tanzania found that women who received antenatal care were more likely to deliver at a health facility (Sendo *et al*., 2018). However, the findings of this study are contrary to a study in Nigeria found that showed that only 42% of women delivered at a health facility, despite attending antenatal care (Okechi *et al*., 2020). The findings of this study are also different from a study in India that found that only 55% of women who attended antenatal care delivered at a health facility (Kumar *et al*., 2022). Although there is still a risk of a number of women delivering from home without a skilled health worker contributing to maternal and chi*l*d mortality. Some women feel safe and cared for when they deliver from their own environment by their own relatives or community members.

The results also showed that majority (98%) from the control group and 97% of intervention group participants intended to deliver from public hospitals while 2% intended to deliver from home (Figure 10). This shows that despite knowing the dangers of home deliveries, some women still opt for them. Concerning reasons as to why some women fail to utilize health facilities for delivery, the results demonstrates that 76% of the control group and 71% of the intervention group participants felt that lack of money is what can prevent a woman from delivering from the health facility while 16% from the control group and 20% from intervention group said distance to the health facility is the factor. The other 4% of the control group and 6% of the intervention group participants said attitude of health workers contribute to the problem and only 4% of the control group and 2% of the intervention group participants said traditional beliefs and misconceptions can lead to the problem (Figure 12). The findings of this study agree with a study by Mwangi *et al*., (2019) in Kenya that found that distance to the health facility and lack of transportation were significant barriers to facility-based delivery.

The findings of this study on utilization of facility based delivery services also supports Zanbaba *et al.* (2021) who assessed utilization of facility based delivery services and associated factors among mothers who gave birth in the past 2yrs. His findings were that 82% of the women used the health facilities to give birth in the past 2 years. The findings also agree with Kebede *et al*. (2016) which revealed that living at a distance < 5km from the nearby health facility showed a significant association with institutional delivery service utilization. The study findings are also in agreement with Sendo et al, 2018 which revealed that perceived benefits of home delivery, knowledge deficit about health facility based delivery, poor access to health care facilities and inadequate resources were related to low uptake of facility based delivery services. Further, an Indian study by Kumar and Mandava (2022) on factors that affect institutional delivery reported that women belonging to poor households' backward social groups and rural areas have significantly fewer odds of undergoing an institutional delivery.

6.4 Respondent's Responses on Whether They Received Health Education on Danger Signs and Complications of Pregnancy

Antenatal care (ANC) is a careful, systematic assessment and follow-up of pregnant women that includes education, counseling, screening, and treatment to assure the best possible health of the mother and her fetus (Di Mario, Basevi, Gori, Spettoli, 2020). The aim of health education during antenatal is to provide advice, education, reassurance, and support, to address and treat the minor problems of pregnancy, and to provide effective screening during the pregnancy. Exploring current practices in this regard revealed the need for more organized educational activities to ensure high quality and clients' satisfaction (Al-Ateeq, 2015).

Concerning health education, a significant proportion of respondents from both groups (44%) attended only 1-2 health education sessions, indicating a potential knowledge gap in pregnancy and childbirth care ($p < 0.05$). Only a small percentage of respondents (5%) attended 5-6 health education sessions, suggesting that most women may not be receiving comprehensive education on pregnancy and childbirth care ($p < 0.01$). (Figure 13). The study results also showed that husbands and significant others play a crucial role in disseminating information to pregnant women, with 53% of respondents relying on them for information on antenatal care ($p < 0.05$). (Figure 14). Furthermore, there was a significant gap in health education on critical topics, with only 34% of respondents receiving information on birth preparedness and complication readiness, and only 10% receiving information on the importance of delivering at a hospital ($p < 0.05$). the study results also showed that the content of health education varies widely, with 40% of respondents receiving education on other topics rather than birth preparedness and complication readiness ($p < 0.05$). (Figure 15).

These findings suggest that there is a need for more comprehensive and targeted health education for pregnant women, particularly on critical topics such as birth preparedness and complication readiness, and the importance of delivering at a hospital. Additionally, husbands and significant others can play a crucial role in supporting pregnant women's access to health education. According to Carroli *et al*., 2011, health education during the antenatal period can reduce pregnancy and delivery complications but if women opt not to attend health education, the opposite can happen.

The above findings are supported by the findings from a study in Tanzania that found that health education during antenatal care significantly improved knowledge and awareness of pregnancy and childbirth complications among pregnant women (Mubyazi *et al*., 2019). The study findings also agree with a study in India that found that comprehensive health education during antenatal care reduced the incidence of low birth weight and neonatal mortality (Varghese *et al*., 2019). Similarly, a Nigerian study found that health education during antenatal care improved the utilization of skilled delivery services among pregnant women (Okechi *et al*., 2020) whereas a study in Ethiopia found that health education during antenatal care had no significant effect on the knowledge and practices of pregnant women regarding pregnancy and childbirth complications (Tekle *et al*., 2020). Nonetheless, the above findings contradict the findings of a study in

Kenya that found that despite receiving health education during antenatal care, many pregnant women still had poor knowledge and awareness of pregnancy and childbirth complications (Mwangi *et al*., 2020). Pettifor *et al*., (2019) study in South Africa also contradicts the findings of this study in that its findings concluded that health education during antenatal care had limited impact on the behavior and practices of pregnant women regarding healthy pregnancy and childbirth.

Overall, the findings highlight the importance of health education during antenatal care in improving maternal and neonatal health outcomes. However, there is a need for standardized and evidence-based health education programs that address the specific needs of pregnant women and their families. Additionally, the involvement of husbands and significant others in health education programs can improve the uptake of skilled delivery services and ultimately reduce maternal and neonatal mortality.

7. Summary

In summary, the study findings show that majority of respondents were young, with a mean age of 24.5 years, and had low levels of formal education. There was a high percentage of teenagers in the study, highlighting the need for targeted interventions to address early pregnancies.

The study also showed that majority of respondents from both groups were married, and their husbands played a crucial role in decision-making, including healthcare decisions. There was a high percentage of respondents without formal work, and low socioeconomic status, which can affect their income and access to healthcare.

Besides, majority of respondents had received maternal and child health services, but there were gaps in knowledge on danger signs and complications of childbirth. The study highlights the need for improved education and counseling on danger signs, particularly among young and unmarried women. The study further suggests that convincing and counseling pregnant women of the health consequences of pregnancy and childbirth would increase their utilization of delivery services.

Overall, the study emphasizes the importance of targeted interventions, including community mobilization, health education, and male involvement, to increase the uptake of supervised delivery services and improve maternal and child health outcomes.

8. Conclusion

Based on the above findings, it can be concluded that health education during antenatal care is a critical factor in improving knowledge and utilization of delivery facilities among pregnant women. While demographic factors such as age, education, and residence influence the uptake of skilled delivery services, health education can bridge the knowledge gaps and improve the utilization of delivery facilities. Therefore, it is essential to prioritize health education during antenatal care, involve husbands and significant others in the education process, and tailor the content to address the specific

needs of pregnant women. By doing so, we can reduce maternal and neonatal mortality and improve the overall health outcomes of mothers and babies.

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Author's Contribution
PB conceptualized the study, collected and analyzed data and drafted the manuscript. CMN supervised proposal development and the research process, participated in drafting and proofreading the manuscript. MKM supervised proposal development and the research process. All authors read and approved the final manuscript.

Conflict of Interest Statement
The authors declare that they have no competing financial or personal interests that influenced the study.

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