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MALE AWARENESS OF ANTENATAL CARE SERVICES AND ASSOCIATED FACTORS IN LIVINGSTONE, ZAMBIA

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Abstract:
Male involvement in antenatal care (ANC) is increasingly recognized as a critical component of improving maternal and neonatal health outcomes. However, male awareness of ANC services and the factors influencing such awareness remain inadequately understood in many sub-Saharan African settings, including Zambia. This study aimed to assess male awareness of ANC services and to determine socio-demographic factors associated with male awareness in Livingstone District, Zambia. A cross-sectional analytical study was conducted among 120 men selected from workplaces in Livingstone District. Data were collected using a structured questionnaire and analysed using descriptive statistics, chi-square tests, and multivariate logistic regression. Statistical significance was set at $p < 0.05$. The findings revealed that 86% of respondents demonstrated awareness of ANC services. Bivariate analysis showed that awareness was significantly associated with age ($p = 0.004$), marital status ($p = 0.003$), and educational attainment ($p = 0.033$), while occupation was not significantly associated ($p = 0.250$). Men aged 31 years and above, married men, and those with secondary or higher education exhibited higher levels of awareness. However, multivariate logistic regression analysis indicated that none of the socio-demographic variables remained statistically significant predictors of awareness after adjusting for confounders: age (AOR = 1.79, 95% CI: 0.77–4.17, $p = 0.175$), marital status (AOR = 2.08, 95% CI: 0.67–6.43, $p = 0.203$), education (AOR = 1.43, 95% CI: 0.70–2.92, $p = 0.327$), and occupation (AOR = 1.02, 95% CI: 0.50–2.08, $p = 0.957$). Health care providers (61%) and female partners (26%) were the primary sources of ANC information. Although male awareness of ANC services was high, socio-demographic factors were not independent predictors after adjustment for confounding variables. These findings highlight the multifactorial nature of male awareness and underscore the need for comprehensive, multi-level interventions targeting younger, unmarried, and less-educated men. Strengthening health facility–

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based education and expanding community and workplace outreach strategies may further enhance male engagement in maternal health programs.

Keywords: antenatal care, male awareness, male involvement, maternal health, socio-demographic factors, Zambia

1. Introduction

This study examined male partners' awareness of antenatal care (ANC) services in Livingstone District, Zambia, with particular emphasis on the factors influencing such awareness. The study was guided by the research question: *What are the key determinants affecting male awareness of ANC services in Livingstone District?* A quantitative cross-sectional survey was conducted among 119 male participants to assess their demographic characteristics, level of awareness of ANC services, and perceptions related to ANC participation. Demographically, most respondents were aged 31 and above, with over 70% married, and the sample included a diverse representation of tribes, with 50% being Tonga-speaking. Key findings at a 95% confidence level and an alpha level of 0.05 revealed that 86% of respondents were aware of ANC, increasing awareness with age, education, and marital status. While a majority (82%) viewed male involvement positively, considering it an opportunity to gain knowledge.

The findings indicated a high overall level of awareness of ANC services among respondents, with the majority demonstrating knowledge of the purpose and importance of ANC. Awareness levels were observed to increase with age, educational attainment, and marital status. Most respondents expressed positive attitudes toward male involvement in ANC, viewing it as an opportunity to acquire knowledge relevant to maternal and child health. Awareness of HIV testing as an integral component of ANC was notably high, reflecting recognition of its role in informing men of their HIV status. Despite the generally high awareness, several factors were identified as barriers to enhancing male awareness of ANC services. Cultural beliefs, demanding work schedules, the predominantly female clinic environment, concerns about privacy, and a preference for male healthcare providers were reported as factors limiting male participation and, consequently, opportunities for increased awareness. These barriers were particularly pronounced among unemployed men and those with inflexible work commitments.

Overall, the study highlights that male awareness of ANC services is shaped by both individual and contextual factors. Enhancing awareness requires targeted strategies that address sociocultural norms, improve the inclusiveness of healthcare environments, and promote male-friendly service delivery. Strengthening education and addressing structural barriers are essential to fostering sustained male awareness and engagement in antenatal care, which is critical for improving maternal and child health outcomes.

2. Methodology

2.1 Research Design

A cross-sectional study design was employed to assess male awareness of ANC services and associated socio-demographic factors.

2.2 Research Setting

The study was conducted in Livingstone, a major urban center in Southern Province, Zambia. The city is a prominent tourist destination and commercial hub, with diverse ethnic and occupational groups.

2.3 Study Population

The study population comprised men above the age of 15 years residing in the Livingstone district.

2.4 Sample Size and Sampling Procedure

The sample size was calculated to be 120. Participants were recruited from workplaces and business areas within the city. Convenient sampling was used to select participants for the study. This meant that data was collected from men who were found in working places, business places and were willing to participate in the study

2.5 Data Collection

Data were collected using a semi-structured, interviewer-administered questionnaire. The questionnaire captured information on socio-demographic characteristics, awareness of ANC services, specific services known, and sources of information.

2.6 Variables

2.6.1 Dependent Variable

Awareness of ANC services.

2.6.2 Independent Variables

Age, marital status, education level, occupation, and other socio-demographic characteristics

2.7 Data Analysis

Data was analysed using SPSS version 24. Descriptive statistics were used to summarize the data. Chi-square tests were conducted to determine associations between awareness and socio-demographic variables. Multivariate logistic regression analysis was performed to identify independent predictors of awareness. Statistical significance was set at $p < 0.05$.

2.8 Ethical Consideration

Ethics clearance was obtained from the Mulungushi University, School of Medicine and Health Sciences Research Ethics Committee and the Zambia National Research Authority (ZNRA). Written permission to conduct the study was obtained from the Town Clerk of Livingstone Municipal Council, Provincial Medical Office (PMO) and District Health Management Team (DHMT).

The purpose and nature of the study were explained to the study respondents. Those who declined to participate were reassured that no privileges were going to be taken away from them. Those who agreed to take part in the study were asked to sign a consent form, and illiterate participants were asked to thumb-stamp the consent, which was written in Tonga and Lozi, since these two languages are the commonly spoken ones in Livingstone. Those who participated were not remunerated in any way. The participants were interviewed in the natural setting where they were not exposed to any physical or emotional danger or harm.

Confidentiality and anonymity were maintained for the respondents in that no names appeared on the questionnaires. Respondents were interviewed where there were no other people to ensure privacy. After each interview session, the researcher put all questionnaires under lock and key; no person other than the principal investigator was allowed to access the information

3. Results

The majority of respondents (64%) were aged 31 years and above. Most participants were married (70%), while approximately one-quarter were single, and a small proportion were widowed. Half of the respondents were Tonga, followed by Lozi and other ethnic groups. Nearly half of the respondents were businessmen, about one-quarter were formally employed, and a small proportion were unemployed. Approximately 38% had completed college or university education, while similar proportions had attained secondary or primary education. Overall, 86% of respondents demonstrated awareness of ANC services. Awareness was significantly associated with age ($p = 0.004$), marital status ($p = 0.003$), and education ($p = 0.033$), but not with occupation ($p = 0.250$). Older respondents, married men, and those with higher education levels were more likely to be aware of ANC services. Medical examinations were the most commonly identified ANC service (52%), followed by diagnostic services (14%). Awareness of treatment (7%), information and education (6%), counselling (4%), and family planning (1%) was considerably lower. Sixteen percent of respondents could not mention any ANC service. Health care providers were the primary source of ANC information for 61% of respondents, followed by female partners (26%), friends (10%), and workmates (2%). Only 1% reported no source of information. Multivariate logistic regression showed that age, marital status, education, and occupation were not independent predictors of awareness after adjustment. Age: AOR = 1.79 (95% CI: 0.77–4.17), $p = 0.175$, Marital status:

AOR = 2.08 (95% CI: 0.67–6.43), p = 0.203, Education: AOR = 1.43 (95% CI: 0.70–2.92), p = 0.327, Occupation: AOR = 1.02 (95% CI: 0.50–2.08), p = 0.957.

Table 1: Socio-demographic data

	Frequency	**Percentage (%)**
Age		
15 - 20	2	1.0
21 -25	14	12.0
26 - 30	27	23.0
31 and above	76	64.0
Marital status		
Single	30	25.0
Married	83	70.0
Separated	5	4.0
Widower	2	1.0
Tribe		
Tonga	59	50.0
Toka-leya	11	9.0
Lozi	22	18.0
Nyanja	8	7.0
Luvale	3	3.0
Namwanga	2	2.0
Bemba	11	9.0
Kaonde	2	2.0
Occupation		
Businessmen	66	55.0
Formally employed	38	32.0
Unemployed	15	13.0
Level of Education		
Primary	30	25.0
Secondary	44	37.0
College/University	45	38

Respondents with Primary education were categorized as having low education, and secondary as having moderate education, and those who attained College and University education were categorized as having high education

Most (64%) of the respondents interviewed were within the age group of 31 years and above. Almost three-quarters (70%) were married. Half of the respondents (50%) were Tongan, slightly above half (55%) of respondents were businessmen, and almost a quarter of the respondents (25%) had low education, while (38%) had high education.

3.1.1 Awareness of ANC Services

Figure 1 shows that the total number of respondents that were surveyed, a huge proportion (86%) of them knew ANC, while only (14%) did not know.

Figure 1: Awareness of ANC services

Table 2: Male Awareness of ANC by Age, Marital Status, Education, and Occupation (N = 120)

Variable	Category	Yes n (%)	No n (%)	Total n (%)	χ^2 (df)	p-value
Age (years)	15–25	9 (60.0%)	6 (40.0%)	15 (100%)	11.13 (2)	0.004
	26–30	23 (82.1%)	5 (17.9%)	28 (100%)		
	31+	71 (92.2%)	6 (7.8%)	77 (100%)		
Marital Status	Single	19 (63.3%)	11 (36.7%)	30 (100%)	13.74 (3)	0.003
	Married	78 (94.0%)	5 (6.0%)	83 (100%)		
	Separated	4 (80.0%)	1 (20.0%)	5 (100%)		
	Widower	2 (100%)	0 (0%)	2 (100%)		
Education	Primary	21 (70.0%)	9 (30.0%)	30 (100%)		
	Secondary	40 (88.9%)	5 (11.1%)	45 (100%)		
	College	25 (96.2%)	1 (3.8%)	26 (100%)		
	University	17 (89.5%)	2 (10.5%)	19 (100%)	8.73 (3)	0.033
Occupation	Businessman	55 (84.6%)	10 (15.4%)	65 (100%)		
	Formally employed	35 (89.7%)	4 (10.3%)	39 (100%)		
	Unemployed	12 (75.0%)	4 (25.0%)	16 (100%)	2.77 (2)	0.250

Awareness of ANC services increased with age, with the highest proportion of positive responses among respondents aged 31 years and above (92.2%). This association was statistically significant (χ^2 (2, N = 120) = 11.13, p = 0.004), indicating that older males are more likely to be aware of ANC services. Married males demonstrated the highest awareness (94.0%) while single males showed the lowest (63.3%). The association between marital status and ANC knowledge was significant (χ^2 (3, N = 120) = 13.74, p = 0.003), suggesting that marital engagement increases exposure to ANC information. Awareness also increased with higher educational attainment, with college-educated respondents showing the highest knowledge (96.2%) and primary-educated respondents the lowest (70.0%). Education was significantly associated with ANC knowledge (χ^2 (3, N = 120) = 8.73, p = 0.033), highlighting its role in understanding and engagement. Although formally employed respondents had the highest awareness (89.7%) and unemployed respondents the lowest (75.0%), the differences were not statistically

significant (χ^2 (2, N = 120) = 2.77, p = 0.250), suggesting that occupation is a less influential factor in male awareness of ANC services. These results indicate that age, marital status, and education are important determinants of male awareness of ANC services, whereas occupation does not significantly influence awareness in this sample. Interventions aimed at increasing male engagement in ANC should therefore prioritize younger, unmarried, and less-educated men, who are less likely to be aware of ANC services, to improve knowledge and participation in maternal health programs.

Figure 2: Awareness of ANC services offered to pregnant women

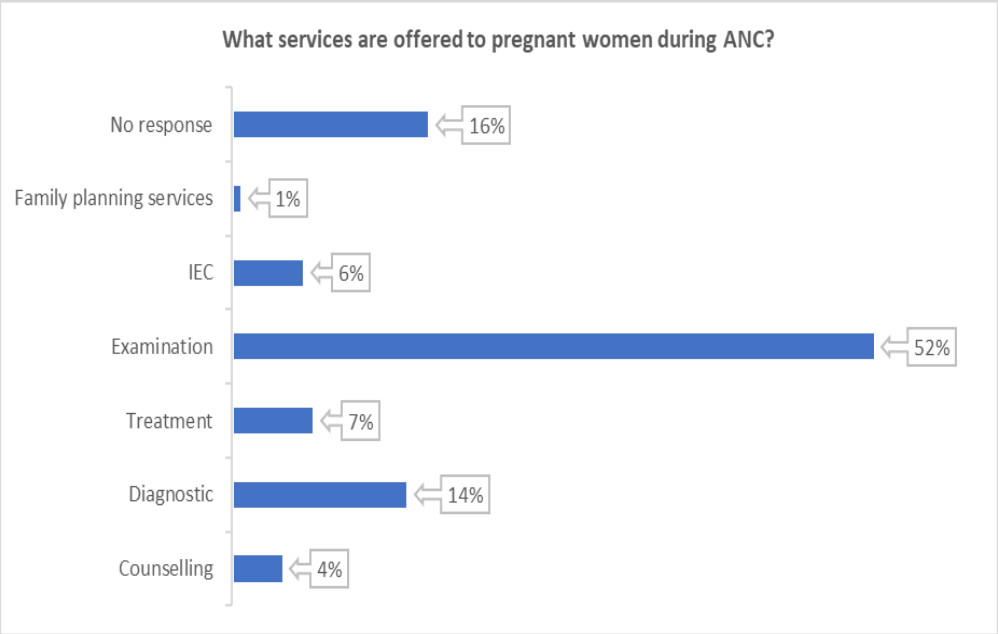

Figure 6 shows that male respondents were most aware of medical examinations (52%) offered during antenatal care (ANC), followed by diagnostic services (14%). This aligns with the earlier findings that awareness of ANC services is influenced by factors such as age, marital status, and education, with older, married, and more educated males demonstrating higher overall knowledge. While males have some understanding of ANC, their awareness appears concentrated on visible or tangible services, indicating gaps in knowledge of the full range of ANC interventions. In relation to the study objectives assessing male awareness of ANC services and identifying factors influencing this awareness, the results suggest that targeted educational interventions are needed to broaden male understanding, particularly among younger, unmarried, and less-educated men, to improve support for pregnant women and enhance participation in ANC programs.

Figure 3: Sources of information on ANC services

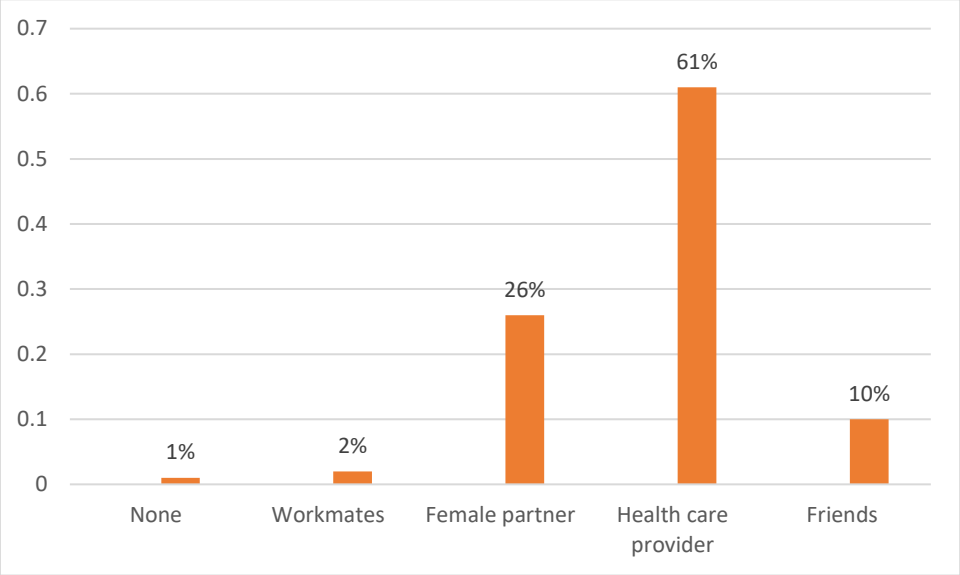

Figure 7 illustrates the sources of information on antenatal care (ANC) services among male respondents. The majority (61%) reported health care providers as their primary source, followed by female partners (26%), friends (10%), workmates (2%), and 1% who reported having no source of information. This finding indicates that formal health communication through providers is the main avenue for male awareness of ANC, while partners also play a significant role in transmitting knowledge. In relation to the study objectives, these results highlight the importance of health care providers in shaping male understanding, as well as the potential influence of female partners. The limited contribution of friends, workmates, and the small proportion with no source suggests that informal social networks have a smaller role, and that interventions aiming to improve male engagement should focus on strengthening provider-led education and encouraging partner involvement to enhance knowledge and support for pregnant women.

3. Discussion

3.1 Socio-demographic Characteristics of the Sample

The socio-demographic profile of the respondents, as presented in Table 1, indicates that the majority (64%) were aged 31 years and above. This predominance of older respondents may reflect their greater presence in workplaces, particularly in business areas, at the time of data collection. In contrast, younger men aged 15–20 years may still have been enrolled in college or university, which could explain their lower representation in the sample. Age was significantly associated with awareness of ANC services ($p = 0.004$).

With regard to marital status, most respondents were married (70%), while approximately one-quarter were single and a small proportion were widowed. This distribution may be attributed to the higher likelihood of married men being present in

workplaces during the period of data collection. In addition, cultural practices of remarriage may have reduced the proportion of widowed respondents within the study population. Marital status was significantly associated with awareness of ANC services ($p = 0.003$).

Ethnically, half of the respondents were Tonga, which likely reflects Livingstone's location in Southern Province, the traditional homeland of the Tonga people. Lozi respondents accounted for nearly one-quarter of the sample, possibly due to the proximity of Livingstone to Western Province, the homeland of the Lozi, which facilitates population movement between the two regions. Other ethnic groups, including Nyanja, Kaonde, Luvale, Bemba, Toka-Leya, and Namwanga, were less represented, a pattern that may reflect broader geographic settlement and migration trends.

In terms of occupation, nearly half of the respondents were businessmen, about one-quarter were formally employed, and a small proportion were unemployed. The high proportion of businessmen in Livingstone may be explained by the city's status as a major tourist hub, which offers numerous opportunities for trade with both local and international visitors. Furthermore, Livingstone's proximity to the borders of Botswana, Zimbabwe, and Namibia may facilitate cross-border commercial activities, thereby increasing the number of men engaged in business. Occupation was not significantly associated with awareness of ANC services ($p = 0.250$).

Regarding educational attainment, approximately 38% of respondents had completed college or university education, while similar proportions had attained secondary or primary education. This distribution suggests a growing recognition of the value of formal education within the population. Education was significantly associated with awareness of ANC services ($p = 0.033$).

However, in the present study, educational status was not observed to be a predictor of male accompaniment to antenatal care (ANC) visits. Similarly, male occupational status was not found to be associated with accompanying spouses to ANC. In contrast, female occupational status was identified as a factor influencing male partner accompaniment. Specifically, housewives were less likely to be accompanied by their male partners during ANC visits.

3.2 Awareness of Antenatal Care Services

The study revealed a high level of male awareness of ANC services, with 86% of respondents in figure 1 demonstrating knowledge. Figure 2 illustrates that awareness was significantly associated with age ($p = 0.004$), marital status ($p = 0.003$), and education ($p = 0.033$), whereas occupation was not significantly associated ($p = 0.250$). This finding aligns with studies conducted in India (Pruthi et al., 2016b) where respondents similarly demonstrated high awareness of ANC services. The elevated awareness observed in the present study may be attributed to government policies that promote male involvement in ANC. For example, in Kyela District, Mbeya, male attendance at ANC was significantly linked to awareness of ANC visiting dates (Kabanga et al., 2019). Likewise (Mwila, 2019)

in Zambia reported that men with higher knowledge of ANC were more likely to participate in ANC visits.

Conversely, (Younas et al., 2020) reported that only 52% of male respondents demonstrated adequate knowledge of ANC, while (Muloongo et al., 2019) identified a lack of awareness regarding the importance of male participation in ANC, which negatively affected understanding of access and utilization of services.

Marital status also appears to influence awareness, as the majority of respondents in this study were married. Marriage facilitates communication between partners, thereby increasing men's exposure to ANC-related information. Spousal interaction has been shown to enhance men's understanding of maternal health needs and services, ultimately improving awareness (Mullany et al., 2006) This is consistent with the present study, where marital status was significantly associated with awareness ($p = 0.003$).

The observed discrepancies across studies may be partly explained by differences in educational attainment. In the present study, education was significantly associated with awareness ($p = 0.033$), with respondents possessing secondary or higher education being more informed. Similar findings were reported by (Byamugisha et al., 2010) in Mbale, Uganda, as well as by (Alemi et al., 2021; Warugongo et al., 2022), who observed that men with at least eight years of education were twice as likely to be involved in ANC compared to those with lower levels of education. These findings underscore the importance of education in promoting health-seeking behavior (I. Gupta & Mandal, 2021). Consistent with these results, studies conducted in various countries have demonstrated an increased likelihood of male involvement in maternal health care among those with formal education (Byamugisha et al., 2010; Shahjahan et al., 2013). However, contrasting evidence from Nepal and Bangladesh indicated that men with no or low levels of education had higher odds of active involvement in reproductive health issues (Bhatta, 2013).

Age was also found to influence awareness. Respondents aged 31 years and above exhibited the highest levels of knowledge, followed by those aged 21–25 years, while those aged 15–20 years were largely unaware. This association was statistically significant ($p = 0.004$). This pattern may be explained by the likelihood that older men have accompanied their partners to ANC during multiple pregnancies, whereas younger men may not yet have experienced fatherhood or marriage. These findings are consistent with those reported by (Warugongo et al., 2022), who observed that men older than 30 years were more knowledgeable and better understood their roles during pregnancy. Similarly, (Caleb-Varkey et al., 2004) reported that men who married after 21 years of age had higher maternal health knowledge compared to those who married earlier.

These findings highlight the importance of continued sensitization and information dissemination. Targeted awareness campaigns should focus particularly on younger, single individuals and those with lower levels of education in order to address existing knowledge gaps. Furthermore, involving health care providers and encouraging women to share ANC information with their partners may enhance male awareness and support for maternal health. This is supported by (Caleb-Varkey et al., 2004), who

reported that exposure to maternal health education was a key predictor of husband involvement. Additionally, younger men aged 21–25 years in the current study demonstrated lower awareness, often associated with shyness and misconceptions that ANC is exclusively for women. Similar age-related patterns have been reported by (Ditekemena et al., 2012), who found that younger men generally have limited knowledge of maternal health services.

The present findings also show that a substantial proportion of respondents engaged in business were aware of ANC services, with businessmen indicating knowledge. This suggests that men involved in business activities may have greater exposure to health information through wider social and economic networks. Such networks may serve as informal channels for the exchange of health-related information. These findings are consistent with studies that have identified occupation as a determinant of male awareness or involvement in ANC. For example, (Gibore & Gesase, 2021) reported that occupation was a significant determinant of male involvement in ANC in Central Tanzania. Similarly, (Muia et al., 2022) found that occupation was significantly associated with male partner involvement in ANC services in Kenya, although work-related commitments could limit participation. (Alemi et al., 2021) reported that men with formal occupations generally had higher education levels and better information about maternal health issues. However, in the present study, occupation was not significantly associated with awareness ($p = 0.250$).

Consistent with this, a study in Nepal found that men with formal occupations were more likely to accompany their partners to ANC visits (Bhatta, 2013). (Mwila, 2019) in Lusaka reported that economic status and knowledge levels were strongly associated with male involvement in ANC, with men of higher economic standing demonstrating greater knowledge and participation. Collectively, these findings suggest that economic activity and occupational engagement may enhance men's exposure to health information and decision-making processes related to maternal care.

Regarding specific ANC services known to men, Figure 2 shows that medical examinations were most frequently identified (52%), followed by diagnostic services (14%). Awareness of treatment (7%), information, education, and communication (6%), counselling (4%), and family planning (1%) was considerably lower. Additionally, 16% of respondents were unable to mention any ANC service, indicating a notable knowledge gap.

These findings suggest that male awareness tends to focus on the observable and routine clinical aspects of ANC, while preventive, educational, and supportive services remain less understood. Similar patterns have been reported in studies by (Caleb-Varkey et al., 2004; Pruthi et al., 2016a), In contrast, studies by (Shahjahan et al., 2013) in Bangladesh and (Mwila, 2019) in Zambia reported higher levels of comprehensive awareness of ANC components, including counselling and preventive services. Differences across studies may be attributed to variations in male involvement programs, health education strategies, and community outreach efforts. Furthermore, the finding that some respondents could not mention any ANC service is consistent with (I. Gupta

& Mandal, 2021), who reported limited knowledge of specific antenatal services among male partners. Such gaps have been linked to limited male-targeted health education, sociocultural perceptions of maternal health as a woman's responsibility, and insufficient communication between health providers and male partners.

Regarding sources of information, Figure 3 shows that health care providers were identified as the primary source of ANC information for the majority of respondents (61%), followed by female partners (26%), friends (10%), and workmates (2%). Only 1% reported having no source of information. These results indicate that formal health facility-based education remains the most influential channel for male awareness of ANC services. This finding is consistent with studies conducted in several low- and middle-income settings. (Caleb-Varkey et al., 2004; Pruthi et al., 2016b). All reported that health workers were the most trusted and frequently cited sources of ANC-related information among male partners. Similarly, (Tweheyo et al., 2010) found that men who were knowledgeable about ANC services primarily obtained their information from health workers. Female partners were the second most common source of information, highlighting the importance of interpersonal communication within households. This aligns with findings from (Mwila, 2019; Shahjahan et al., 2013) which showed that spousal communication significantly contributed to male awareness of antenatal care. Informal sources such as friends and workmates accounted for a smaller proportion of information channels, and knowledge obtained through these sources may be less accurate or comprehensive (Tweheyo et al., 2010), similarly observed that men relying on informal networks tended to have lower levels of accurate knowledge.

Multivariate logistic regression analysis was conducted to identify independent predictors of awareness of ANC services. Although age, marital status, education, and occupation showed positive associations with awareness, none reached statistical significance at the multivariate level. Older respondents had higher odds of awareness compared to younger men (AOR = 1.79, 95% CI: 0.77–4.17, p = 0.175), married men had higher odds than unmarried men (AOR = 2.08, 95% CI: 0.67–6.43, p = 0.203), and respondents with higher education had increased odds of awareness (AOR = 1.43, 95% CI: 0.70–2.92, p = 0.327). Occupation was not associated with awareness (AOR = 1.02, 95% CI: 0.50–2.08, p = 0.957). These findings suggest that while socio-demographic characteristics may influence awareness descriptively, their independent effects were not statistically significant after adjusting for confounding variables, highlighting the complex and multifactorial nature of male awareness of ANC services.

Overall, the findings emphasize the central role of health care providers as the primary source of information, with female partners serving as an important secondary channel. However, the limited contribution of workplace and peer networks suggests the need for additional male-targeted information strategies. Expanding community outreach, engaging men in forums, and promoting workplace health education initiatives may further strengthen male awareness and support for antenatal care.

3.3 Implications for Study Objectives

The primary objective of the study was to assess male awareness of antenatal care (ANC) services and determine the socio-demographic factors associated with such awareness. The findings demonstrate that overall male awareness of ANC services was high, with a substantial proportion of respondents reporting knowledge of ANC. This suggests that existing health education strategies and policies promoting male involvement in maternal health may be having a positive effect within the study setting.

However, the analysis revealed that awareness was significantly associated with age, marital status, and education at the bivariate level, but none of these factors remained statistically significant in the multivariate model. This indicates that male awareness of ANC services is influenced by multiple interrelated factors rather than a single dominant predictor. It also suggests that interventions aimed at improving male awareness should adopt a comprehensive approach that addresses social, educational, and relational dynamics simultaneously.

The findings further showed that male knowledge was largely limited to observable clinical services such as medical examinations, with relatively low awareness of counselling, family planning, and health education components. This has important implications for program design, as it highlights the need to broaden the scope of information provided to men beyond routine clinical procedures.

Additionally, health care providers and female partners were identified as the primary sources of ANC information. This underscores the importance of strengthening facility-based education and promoting spousal communication as effective channels for enhancing male awareness. The limited role of peer and workplace networks suggests missed opportunities for reaching men through community and occupational settings.

3.4 Limitations

Despite the valuable insights provided by this study, several limitations should be acknowledged.

First, the study employed a cross-sectional design, which limits the ability to establish causal relationships between socio-demographic factors and awareness of ANC services. The associations observed can only be interpreted as correlations at a single point in time.

Second, the study relied on self-reported data, which may be subject to recall bias or social desirability bias. Respondents may have overstated their awareness or involvement in ANC services in order to provide socially acceptable responses.

Third, the sampling approach, which focused on men present in workplaces, may have introduced selection bias. Younger men, students, and those not engaged in formal or informal employment may have been underrepresented, potentially affecting the generalizability of the findings.

Fourth, the study was conducted in a single urban setting. As such, the findings may not fully reflect the experiences and awareness levels of men in rural or other socio-cultural contexts.

Finally, although several socio-demographic variables were examined, other potentially influential factors such as cultural beliefs, gender norms, health system barriers, and previous experiences with maternal health services were not explored in depth.

3.5 Recommendations

Based on the findings of the study, several recommendations are proposed for policy, practice, and future research.

3.5.1 Strengthen Male-targeted Health Education

Health programs should expand male-focused education on ANC, particularly emphasizing preventive, counselling, and family planning components, rather than focusing solely on clinical examinations.

3.5.2 Target Younger and Single Men

Awareness campaigns should specifically address younger and unmarried men, who demonstrated lower levels of awareness. This could be achieved through schools, colleges, youth programs, and community outreach initiatives.

3.5.3 Leverage Health Care Providers as Key Information Sources

Since health workers were the primary source of information, health facilities should incorporate structured male engagement strategies, such as couple-based education sessions and male-friendly ANC environments.

3.5.4 Promote Spousal Communication

Programs should encourage women to involve their partners in ANC discussions and visits, as female partners were identified as an important secondary source of information.

3.5.5 Utilize Workplaces and Community Networks

Given the high proportion of businessmen in the sample, workplace-based health education programs could serve as effective platforms for disseminating ANC information to men.

3.5.6 Conduct Further Research

Future studies should explore sociocultural, behavioral, and health system factors influencing male awareness and involvement in ANC. Longitudinal or mixed-methods studies may provide deeper insights into causal relationships and contextual influences.

3.6 Conclusion

The study demonstrated a generally high level of male awareness of antenatal care services, with significant associations observed between awareness and age, marital

status, and educational attainment at the bivariate level. However, none of these factors remained significant in the multivariate analysis, suggesting that male awareness is shaped by a complex interplay of socio-demographic and contextual influences.

Men's knowledge was largely centered on observable clinical aspects of ANC, with limited awareness of preventive and educational services. Health care providers and female partners were identified as the main sources of information, highlighting the importance of facility-based education and spousal communication.

Overall, the findings emphasize the need for comprehensive, male-focused education strategies that target younger men, expand awareness of the full scope of ANC services, and utilize both health facility and community-based channels. Strengthening male involvement in antenatal care has the potential to improve maternal health outcomes and promote shared responsibility in reproductive health.

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Authors' Contributions

Conceptualization: [Harriet Mulonda Simaubi]; Data collection: [Harriet Mulonda Simaubi]; Analysis: [Harriet Mulonda Simaubi]; Manuscript drafting: [Harriet Mulonda Simaubi]; Review and editing: [Jeane Ngala Banda].

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Conflicts of Interest Statement

The authors declare no conflicts of interest.

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