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Abstract

Purpose: Maternal mortality ratio and morbidity remain high and one of the strategies to reduce maternal mortality ratio is the effective implementation of focused antenatal care. This study aimed to determine factors associated with adherence to focused antenatal care by nurses and midwives.

Methodology: The study adopted an analytical cross-sectional research design. It involved 55 nurses and midwives working at the antenatal clinic in the level 4 (sub-county referral) hospitals, level 3 (health centers), and level 2 (dispensaries) in selected health facilities at Imenti-South sub-county facilities of Meru County. A census was done on all nurses and midwives working at selected health facilities in the Imenti-South Sub-County of Meru County. Data was collected using an observational checklist and a researcher-administered questionnaire. Pre-testing of the data collection instruments was done at public health facilities in the Imenti-central Sub-county of Meru County. Analysis was carried out using SPSS version 27. Descriptive statistics i.e. mean, standard deviation, percentages, and frequencies were used to analyze data. Quantitative data is presented in the form of tables, charts, and graphs.

Findings: There were slightly more participants with good adherence to FANC guidelines (50.9%) than those with poor adherence (49.1%). Adherence was significantly associated with the level of the facility (χ^2 = 9.894, df=2 and p = 0.007) although it was not a significant predictor of adherence (p>0.05). There was a significant association between adherence and availability of resources (p= 0.012, COR= 4.364; CI = 95% 1.383,13.772).

Unique Contribution: The MCH unit in charge should ensure that departments have the necessary resources required to offer the ANC services. The county government in collaboration with the national government should ensure there are adequate resources in all the facilities required to offer ANC services.

Keywords: *Health Facility-Related Factors, Level of Adherence, Focused Antenatal Care, Nurses, Midwives*

JEL Codes: *I12, I10, I13, I18*

INTRODUCTION

Globally, maternal and neonatal health remains a pressing concern, with antenatal care (ANC) recognized as a cornerstone intervention for reducing preventable deaths. The World Health Organization (WHO) introduced the Focused Antenatal Care (FANC) model in 2001, emphasizing evidence-based, goal-oriented interventions delivered at scheduled contacts during pregnancy. In 2016, WHO revised the model to recommend eight contacts instead of the traditional four visits, with the aim of improving maternal and neonatal outcomes (WHO, 2016). Despite these efforts, maternal mortality continues to claim approximately 289,000 lives annually according to the Trends in Maternal Mortality 2000–2020 report, with stillbirths and neonatal deaths also persisting at high levels (WHO, 2019). Progress toward Sustainable Development Goal (SDG) targets, reducing maternal mortality to fewer than 70 deaths per 100,000 live births and neonatal mortality to fewer than 12 per 1,000 live births—remains slow and uneven.

Facility-related factors such as infrastructure, availability of resources, and staffing capacity have increasingly been identified as determinants of adherence to ANC guidelines, shaping the quality of care provided to mothers and newborns (Villar et al., 2021). In Sub-Saharan Africa, maternal mortality ratios remain disproportionately high, exceeding 550 deaths per 100,000 live births in many countries (UNICEF, 2022). Nurses and midwives are the primary providers of ANC services in the region, yet their ability to adhere to FANC guidelines is often constrained by systemic barriers. Studies in Ghana, Tanzania, and Burkina Faso reveal that healthcare providers frequently omit essential procedures due to inadequate resources, poor infrastructure, and high client loads (Sheffel et al., 2024; Bintabara et al., 2019). Similarly, research in Ethiopia and rural Tanzania has shown that limited availability of diagnostic tools, prophylactic drugs, and health education materials directly undermines adherence to ANC protocols, leading to suboptimal maternal and neonatal outcomes (Seyoum et al., 2021).

Kenya adopted the FANC model in 2003, yet maternal mortality remains high at 414 deaths per 100,000 live births (MOH, 2020). Evidence from counties such as Siaya and Migori indicates that adherence to FANC guidelines is inconsistent, with critical services like ultrasound, urine testing, and health education often omitted (Chweya et al., 2018; Afulani et al., 2019). Within Meru County, Imenti South Sub-County records a maternal mortality ratio of 262 and a neonatal mortality rate of 22, both above SDG targets (UNICEF, 2022). However, little is documented about how health facility-related factors such as resource adequacy, facility level, and working conditions influence adherence to FANC guidelines among nurses and midwives in this region. This study therefore seeks to bridge that gap by examining the relationship between facility characteristics and adherence to the WHO 2016 eight-contact FANC model in Imenti South.

Problem Statement

Kenya, as a United Nations member, is expected to progressively meet Sustainable Development Goal (SDG) 3.1, which seeks to reduce the global maternal mortality ratio (MMR) to below 70 per 100,000 live births, and SDG 3.2, which aims to lower neonatal mortality to fewer than 12 per 1,000 live births. Achieving these targets requires not only skilled healthcare providers but also well-resourced health facilities that enable adherence to Focused Antenatal Care (FANC) guidelines (WHO, 2016; MOH, 2020). Despite these expectations, maternal and neonatal mortality rates remain high in Sub-Saharan Africa, largely due to systemic barriers within health facilities. Kenya's MMR is estimated at 414 per 100,000 live

births, while Meru County's Imenti South Sub-County records an MMR of 262 per 100,000 live births and a neonatal mortality rate of 22 per 1,000 live births. These figures, far above the SDG thresholds, underscore the urgency of addressing persistent gaps in antenatal care quality.

Nurses and midwives, who are the primary providers of ANC in Kenya, are directly affected by these challenges. Their ability to adhere to FANC protocols is compromised when facilities lack basic resources such as diagnostic equipment, prophylactic drugs, and adequate space to accommodate clients (Van et al., 2020). Previous studies in Tanzania, Ghana, and Kenya have shown that poor facility conditions and resource constraints lead to partial or complete omission of critical ANC procedures, resulting in suboptimal maternal and neonatal outcomes (Duysburgh et al., 2013; Bintabara et al., 2019; Chweya et al., 2018; Afulani et al., 2019). However, little is documented about how health facility-related factors specifically influence adherence to FANC guidelines in Imenti South Sub-County. This gap in evidence is critical, as inadequate adherence has the potential to contribute to preventable maternal morbidities and neonatal complications. This study therefore sought to fill that gap by examining the relationship between facility characteristics—such as level of facility, availability of resources, and working conditions—and the level of adherence to FANC guidelines among nurses and midwives in Imenti South, Meru County.

Theoretical Framework

This study is grounded in Donabedian's Quality Model, which evaluates healthcare delivery through three dimensions: structure, process, and outcome (Donabedian, 1966). Structure refers to the physical and organizational characteristics of health facilities where focused antenatal care (FANC) is delivered. In the context of Imenti South Sub-County, this specifically includes the level of facility (dispensary, health center, or referral hospital) as a primary determinant of the resources available. Structural elements such as infrastructure, diagnostic equipment, prophylactic drugs, ANC guidelines, and the presence of trained nurse-midwives determine the facility's capacity to support adherence to FANC protocols.

Process encompasses the interactions between nurse-midwives and antenatal clients during service delivery. It involves whether providers consistently adhere to FANC guidelines by performing required procedures such as history taking, physical examinations, laboratory testing, supplementation, and health education. Facility-related factors such as workload, staffing levels, and availability of equipment directly influence the quality and completeness of these processes. Outcome in this study is measured by the level of adherence to FANC guidelines among nurses and midwives, which ultimately affects maternal and neonatal health indicators. Deficiencies in facility structures, such as inadequate resources or poor working conditions, compromise processes and lead to suboptimal outcomes. Thus, Donabedian's framework is particularly relevant for examining how structure (resources and facility level) influences process (adherence to FANC guidelines), which in turn shapes outcomes (maternal and neonatal health) in Imenti South Sub-County..

Empirical Review

A study conducted in Saudi Arabia revealed that pregnant women often missed antenatal care clinics due to long waiting times, sometimes lasting the entire day, and the failure of healthcare providers to schedule return visits. These organizational barriers were attributed to high client loads and inadequate staffing, which directly affected adherence to ANC guidelines (Rabbani et al., 2021). This study highlights the importance of facility-level organization in enabling adherence. A systematic review and meta-analysis indicated that long waiting periods for ANC

were linked to shortages of skilled midwives and inadequate training opportunities. These organizational barriers compromised the quality of care and adherence to FANC protocols (Roozbeh et al., 2016). Similarly, a qualitative study in Canada identified shortages of healthcare providers as a major barrier to ANC delivery, underscoring the role of staffing levels in adherence (Heaman et al., 2015).

In Ghana, inadequate resources such as poor infrastructure, shortages of HIV and syphilis testing kits, and limited staff led to increased workloads and long waiting times, which hindered adherence to ANC guidelines (Baffour-Awuah et al., 2015). Comparable findings in Zimbabwe showed that shortages of drugs and essential equipment were major barriers to ANC utilization (Mutowo et al., 2021). In Ethiopia, Seyoum et al. (2021) reported that the absence of ANC guidelines, poor client-to-provider ratios, and limited infrastructure restricted providers' ability to deliver all components of ANC, thereby reducing adherence. In northwest Tanzania, barriers included shortages of supplies such as anti-malarial drugs, iron tablets, mosquito nets, and laboratory equipment, alongside inadequate provider expertise to conduct tests. These facility-related constraints undermined adherence to ANC guidelines (Konje et al., 2018). A study in Southern Tanzania found that healthcare providers spent less time with clients than WHO recommended, largely due to staff shortages, which limited adherence to FANC protocols (Both et al., 2016). Tewadros et al. (2021) similarly reported low adherence to national ANC guidelines during first visits, attributing this to inadequate training, mentorship, and organizational barriers.

Kenyan studies echo these findings. In Kisumu East District Hospital, poor infrastructure, inconsistent supply of drugs and laboratory equipment, and limited provider knowledge were identified as barriers to compliance with FANC guidelines (Ibworo et al., 2020). In Kisii and Kajiado counties, 94.5% of midwives had never been trained in obstetric ultrasound, and even that trained lacked equipment to apply their skills, further limiting adherence (Matiangi' et al., 2020). Staff shortages and long waiting times were also reported as barriers to ANC delivery, with providers working long hours under strained conditions (Kisiangani et al., 2020). Collectively, these studies demonstrate that health facility-related factors, including infrastructure, resource availability, staffing levels, and training opportunities, play a critical role in determining adherence to FANC guidelines. However, no study has conclusively examined these factors in Imenti South Sub-County, Meru County.

Despite this evidence, several research gaps remain. Most studies have focused on general facility constraints but have not systematically examined how different facility levels—dispensaries, health centers, and referral hospitals—shape adherence to FANC guidelines. There is limited evidence on how resource adequacy interacts with provider workload to affect adherence, particularly in rural Kenyan contexts. Few studies have explicitly linked adherence gaps to preventable maternal morbidities and neonatal complications, leaving a critical gap in understanding the direct health consequences of poor adherence. Training gaps, such as the lack of ultrasound skills, have been documented, but the effectiveness of continuous professional development and mentorship programs in improving adherence remains underexplored. Importantly, no study has conclusively examined these factors in Imenti South Sub-County, making localized evidence necessary to inform county-level health policy and resource allocation. This study therefore sought to fill these gaps by investigating how facility-level characteristics particularly facility level, resource adequacy, and working conditions, influence adherence to FANC guidelines among nurses and midwives in Imenti South, Meru County. This study therefore sought to fill this gap by investigating how facility-level

characteristics influence adherence to FANC guidelines among nurses and midwives in the region.

Conceptual Framework

The framework below shows the interrelationship between the independent variable (Health facility related factors) and the dependent variable (Nurses and Midwives' adherence to FANC).

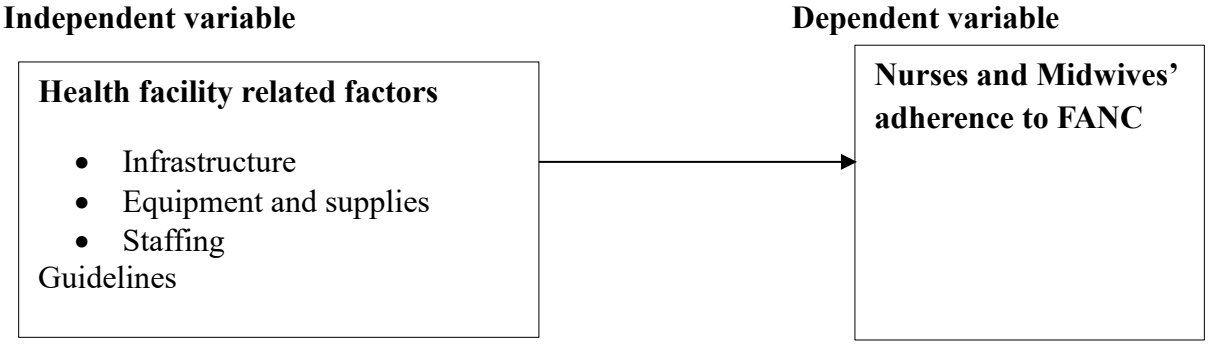

Figure 1: Conceptual Framework

METHODOLOGY

The study was conducted in Imenti South sub-county public health facilities. The Imenti-South sub-county was purposefully chosen since it has the highest number of public health facilities in Meru County. The sub-county has three (3) level 4 public health facilities (sub-county), Three (3) level 3 public health facilities (health centers), and thirty-three (31) level 2 public health facilities (dispensaries). The research adopted an analytical cross-sectional research design since it was appropriate for obtaining precise and clear information concerning nurses' and midwives' adherence to FANC guidelines. The study involved all the 55 nurses and midwives offering antenatal care services in public health facilities, in Imenti South, Meru County. Twelve (12) in sub-county health facilities, 12 in health centers, and 31 in dispensaries. Data was collected by the use of a structured, researcher-administered questionnaire and an observational checklist. To check out the reliability of the data collecting tools; questionnaire and observational checklist, a pre-testing was done. A total of 6 respondents were used. Reliability was ascertained using the test-retest method, 10 % of the sample size (6 respondents) was used. Using a 0.7 cut-off, Cronbach's alpha was utilized to evaluate the instrument's reliability. The reliability co-efficient was 0.88. Due to the instrument's 0.88 co-efficient exceeding the suggested 0.7 cut off, it was deemed reliable. To ensure validity, the researcher with the help of research supervisors scrutinized the questionnaire and observational checklist, and their feedback was incorporated. Analysis was carried out using SPSS version 27. Descriptive statistics i.e. mean, standard deviation, percentages, and frequencies were used to analyze data. Quantitative data is presented in the form of tables, charts, and graphs.

RESULTS

Health Facility Related Factors Associated with Nurses and Midwives' Adherence to Focused Antenatal Care Guidelines

The nurse's and midwives' working conditions were as shown in Table 1. The average number of nurses working in the ANC department was 1.75±1.456 SD with a range of 1 – 7. Most

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facilities were reviewing about 30 pregnant mothers per week. The respondents mainly worked for 8 hours a day.

Table 1: Nurse's Working Conditions

Variable	Number of nurses in ANC	Average number of pregnant mothers seen weekly	ANC working hours per day
Mean	1.75	29.62	8.02
Median	1.00	25.00	8.00
Std. Deviation	1.456	16.769	0.135
Minimum	1	10	8
Maximum	7	88	9

Regarding the availability of resources available within the facility to enhance the provision of ANC services, Figure 2 shows that HB testing reagents were missing in most of the facilities (60%).

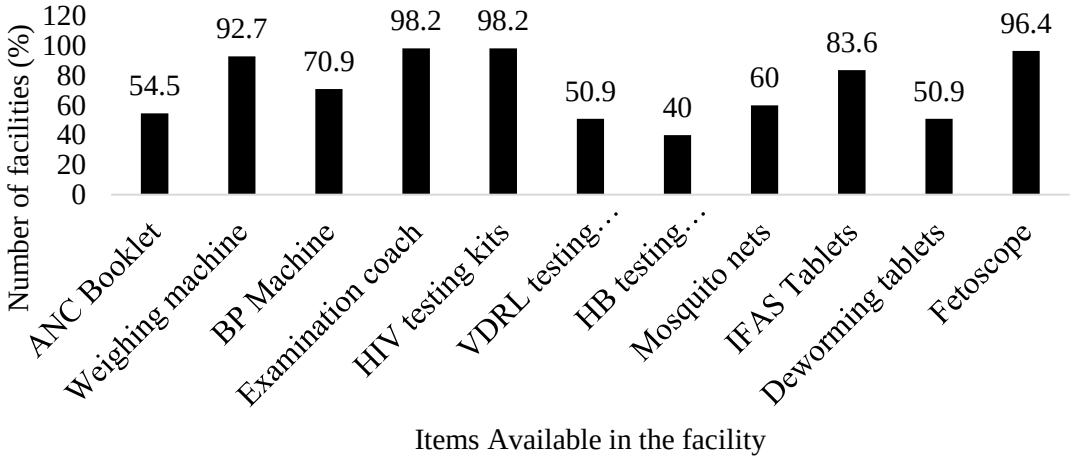

Figure 2: Availability of ANC Resources in the Facilities

The availability of resources was converted into percentages; the outcome is shown in table 2. The availability of hospital resources was classified into adequate or inadequate resources around the median. More than half of the facilities had adequate resources.

Table 2: Level of Availability of Hospital Resources

Variable	Frequency (%)
Availability score	
Mean(SD) - 72.40(±17.41)	
Median – 72.73	
Range – 36 – 100	
Availability level	
Inadequate resources	23 (41.8)
Adequate resources	32 (58.2)

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Adherence to FANC Guidelines

The nurses captured the pregnant mothers' history as shown in Figure 3. The most obtained history was bio-demographic data (21%) and past obstetric history (21%) whereas family history was the least obtained (8%).

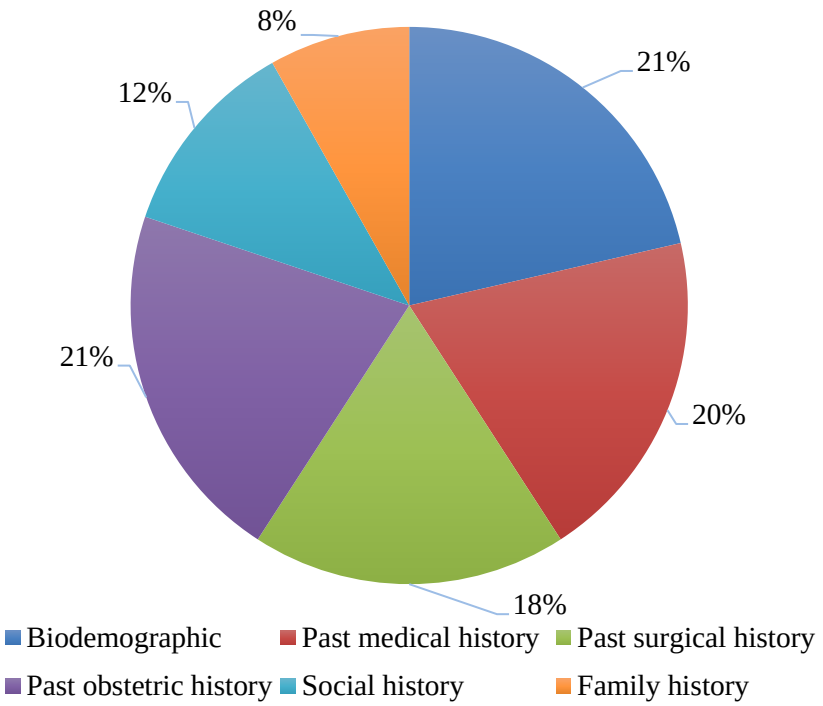

Figure 3: Respondent's Adherence to History Taking

The nurses were also observed carrying out the physical examination on the pregnant women. The outcome of areas observed are as shown in figure 4. Almost all of the respondents did an abdominal examination (92.7%) while breast examination was the least done (14.5%).

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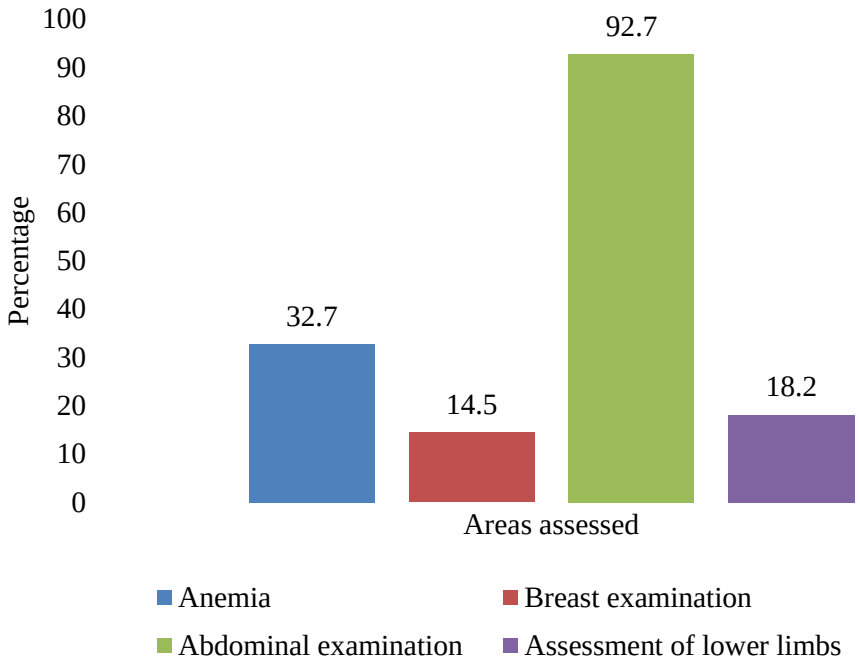

Figure 4: Nurse's Adherence to Physical Examination

Some of the health messages that nurses shared with the pregnant women are illustrated in figure 5. The most frequently shared health message was nutrition in pregnancy (37%). However, prevention of malaria in pregnancy was the least shared health message (13%).

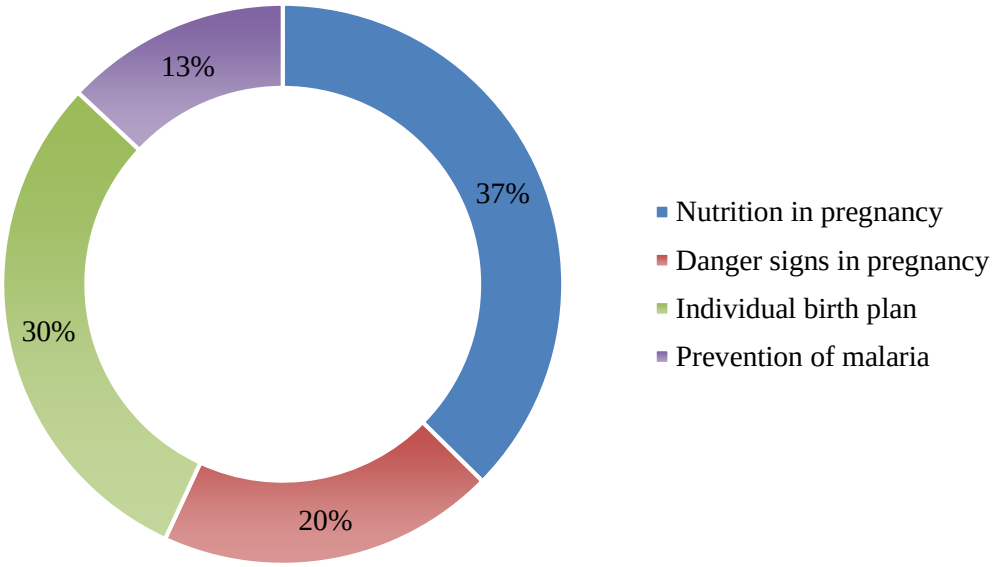

Figure 5: Health Messages Shared by Nurse-Midwives

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Provision of IFAS was as shown in Figure 6. Majority of the nurses administered IFAS to the pregnant women (90.9%).

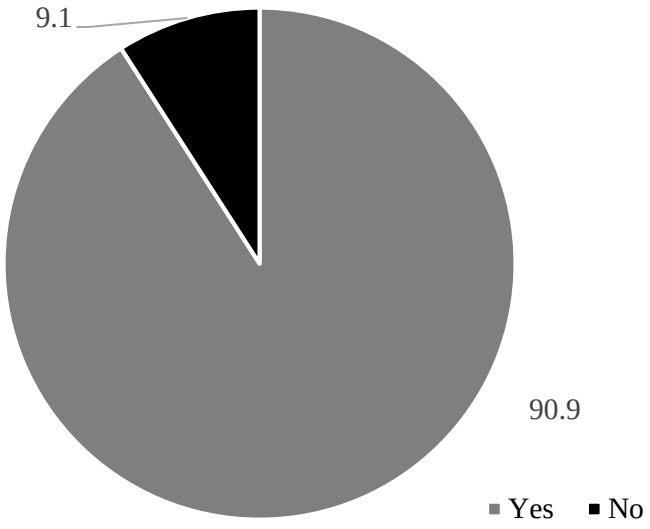

Figure 6: Provision of IFAS to the Mothers

The majority of the nurses administered the deworming tablets and TT as depicted in Table 3.3; 22(58.2%) and 54(98.2%) respectively.

Table 3: Administration of Deworming Tablets and TT

Variable	Frequency (%)
Administration of TT	
Yes	54 (98.2)
No	1(1.8)
Deworming tablets	
Yes	23(58.2)
No	32(41.8)

The nurses were observed on the tests that they recommended to the mothers. The tests were recommended as demonstrated in figure 7. The highly recommended test was HIV (98.2%) while the least was routine ultrasound (27.3%).

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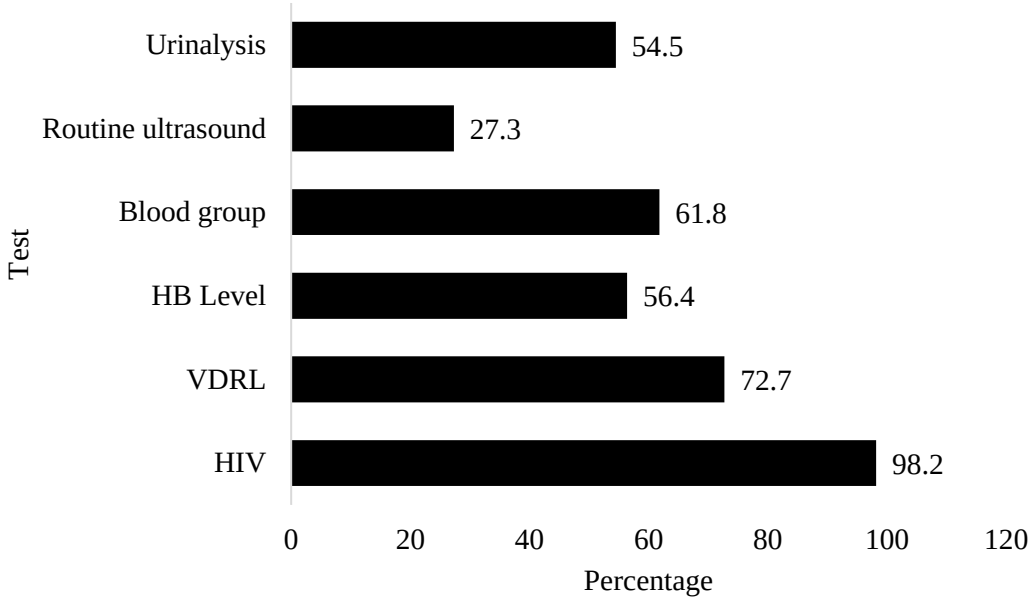

Figure 7: Antenatal Tests Recommended to the Pregnant Women

Adherence to FANC guidelines was determined by adding all the components observed while the nurses were offering services. The adherence score was determined and classified into poor and good adherence around the median. Table 4 shows the adherence scores and level.

Table 1: Nurses' Adherence to FANC Guidelines

Variable	Frequency (%)
Adherence score	
Mean(SD) - 53.04	
Median – 52.17	
Range – 26 – 83	
Level of adherence	
Poor adherence	27(49.1)
Good adherence	28 (50.9)

Relationship between Adherence and Health Facility Factors

There was no significant relationship between adherence and the number of nurses and midwives, and pregnant mothers reviewed per week and number of working hours per day ($p>0.05$) as indicated in Table 5.

Table 5: Linear Regression Analysis between Adherence to FANC Guidelines and Nurses' Working Environment

Variable	N	COR(95%CI)	AOR(95%CI)	*p*-value
Number of nurses	55	-0.41(-3.293-2.442)	-0.045(-3.414-2.474)	0.750
Number of pregnant mothers per week	55	0.903(-0.234-0.264)	0.015(-0.240-0.268)	0.914
Number of working hours per day	55	0.032(-27.424-34.509)	0.036(-27749-35.884)	0.798

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There was a significant relationship between adherence and the availability of hospital resources. Table 6 shows that the nurses in facilities with inadequate resources were 4.364 times more likely to have poor adherence to the FANC guidelines (p= 0.012, COR= 4.364; CI = 95% 1.383,13.772).

Table 6: A Logistic Regress Analysis showing Association between Adherence and Availability of Hospital Resources

	Variables	n (%)	Poor adherence COR (95 % CI)	P value
Good adherence	Availability of hospital resources			
	Inadequate resources	23 (41.8)	4.364(1.383 – 13.772)	0.012*
	Adequate resources	32 (58.2)	1	

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary

The current study found that adherence to FANC guidelines was significantly associated with the level of health facility and the availability of hospital resources. The finding that resource adequacy strongly influenced adherence aligns with studies in Kenya, sub-Saharan Africa, and Senegal, which consistently showed that shortages of supplies, infrastructure, and equipment hindered compliance with ANC guidelines.

Conclusion

Adherence to FANC guidelines among nurses and midwives in Imenti South Sub-county in Meru County was associated with level of facility and availability of resources. However, the only predictor to adherence was the availability of resources.

Recommendations

The MCH unit in charge should ensure that departments have the necessary resources required to offer the ANC services. The county government in collaboration with the national government should ensure there are adequate resources in all the facilities required to offer ANC services. Similar studies should be conducted within and outside Kenya to update existing literature on this subject.

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