KNOWLEDGE ATTITUDE AND PRACTICE OF COVID-19 PREVENTIVE MEASURES AMONG PREGNANT WOMEN ATTENDING ANTENATAL CLINICS IN KISUMU AND SIAYA COUNTIES

BY

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DECLARATION

This thesis is my original work and has not been presented for an award of a diploma or conferment of a degree in any other university or institution

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DEDICATION

This work is dedicated to my loving parents Mr. and Mrs. Ondieki for their prayers, encouragement and moral support.

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ABBREVIATIONS AND ACRONYMS

ANC	Antenatal Clinic
BMI	Body Mass Index
COVID-19	Coronavirus disease 2019
FGD	Focused group discussion
KAP	Knowledge Attitude and Practice
KII	Key informant Interview
HIV	Human immunodeficiency Virus
IPC	Infection prevention Control
MOH	Ministry of Health
RNA	Ribonucleic Acid
SARS	Severe Acute Respiratory Syndrome
SARS-CoV-2	Severe Acute Respiratory Syndrome Coronavirus -2
UK	United Kingdom
US	United States
WHO	World Health Organization

OPERATIONAL DEFINITION OF TERMS

Knowledge

Facts about COVID-19, its cause, transmission, symptoms, and preventive measures that the participant is aware of. The overall knowledge was categorized as good if the score was between 80 and 100%, moderate if the score was between 60 and 79%, and poor if the score was less than 60%

Attitude

A predetermined way of thinking about COVID-19 and the preventive measures. The overall attitude was categorized as good if the score was between 80 and 100%, moderate if the score was between 60 and 79%, and poor if the score was less than 60%

Practice

The actual application of COVID-19 prevention ideas. Practice scores >80 was considered adequate and <80 was considered inadequate.

ABSTRACT

Coronavirus (COVID-19) infection can lead to an increased risk of adverse pregnancy outcomes among pregnant women. To curb the spread of COVID-19, World health organization (WHO) recommended a series of preventive measures. However, the third wave persisted, and while the wave was tapering off, Kisumu and Siaya counties had a peak resurgence in the number of COVID-19 cases with a positivity rate of 28.4%. Knowledge, attitude and practice (KAP) studies are very useful in providing useful information about prevention and control measures. However, it was unknown whether pregnant women in Kisumu and Siaya counties, Kenya have a good knowledge, positive attitude toward COVID-19 preventive measures and taking precautions to avoid infection. This study determined the knowledge, attitude and practice of COVID-19 preventive measures among pregnant women attending antenatal clinics (ANC) in Kisumu and Siaya counties. The findings from this study will help provide information to guide in designing context specific information and education interventions to be provided during ANC visits. A concurrent mixed-methods study was conducted in Kisumu and Siaya Counties in western Kenya; a cross-section survey among 402 pregnant women attending ANC in 12 hospitals, four focused group discussions (FGDs) with 40 pregnant women and four key informants' interviews (KIIs) among maternal and child health (MCH) clinic nurses. Ballot method of Simple random sampling was used to recruit women for the cross-sectional survey. Purposive sampling was used to select pregnant women for FGDs and nurses for KIIs. Correlation test was used to determine the correlation between knowledge, attitude and practice and data was plotted using a matrix plot, the distribution of continuous variables assessed using histograms, and the Shapiro-Wilk normality test. Pearson's chi-square test was used to determine if there was a significant association between sociodemographic factors and knowledge, attitude and practices and multinomial logistics regression was used to determine predictors of knowledge, attitude and practice. Thematic analyses were used to describe qualitative findings. Of the 387 women interviewed, 98% (385/387) and 100% (387/387) had moderate and above scores in knowledge and attitude respectively and 23% had adequate practices. The matrix plot revealed a moderate correlation between knowledge and practice (R=0.3) and weak correlation between attitude and practice (R=0.2). Respondents age was significantly associated with knowledge (p=0.026) and attitude (p=0.042) and educational level was associated with knowledge, attitude and practice ($p<0.05$) in Pearson's Chi-square test. Respondents from households with 3-5 and 6-8 members were 2.11 and 2.58 times likely to have poor practices, whereas respondents with tertiary level of education were 0.48 times less likely to have poor practices in multinomial logistics regression. The cost of face masks, smell of soaps, sanitizers and limited space were identified as barriers to COVID-19 prevention practices. Although pregnant women were aware of COVID-19 preventive measures, this did not translate into adequate COVID-19 preventive practices. In Kenya, the government needs to implement measures to improve COVID-19 prevention practices, including COVID-19 vaccine uptake among pregnant women.

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CHAPTER ONE: INTRODUCTION

1.1. Introduction

Coronavirus (COVID-19) infection is a novel respiratory disease caused by a severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2).The infection was first identified in China in a city called Wuhan (Zhu *et al*., 2020) and was declared a pandemic on 11th March 2020 (Lee *et al*., 2021). The SARS-CoV-2 virus is the seventh coronavirus known to infect humans and has an period of between 2-14 days, but asymptomatic person can transmit the virus before signs and symptoms appear (Kuldeep *et al*., 2020).

Everyone is susceptible to SARS-CoV-2 infection but pregnant women are regarded particularly vulnerable (Ortiz-prado *et al*., 2020, Zhu *et al*., 2020) and when pregnant women become infected with COVID-19, they are more likely to be admitted and may end up in the intensive care unit than non-pregnant women (Zhu *et al*., 2020). In Kenya, there is limited data on the number of confirmed cases and deaths caused by COVID 19 among pregnant women. However, according to data from other countries, the vast majority of asymptomatic patients admitted to the labor ward tested positive for SARS-CoV-2..(Sutton *et al*., 2020). Furthermore, in a study conducted across 18 countries (Mohammed Mussa, 2020), of the participants who contracted the virus, some died during pregnancy and they were also more likely to have premature babies.

According to Wei et al., 2021, COVID-19 infection could result in adverse pregnancy outcomes such as stillbirths, and infected pregnant women were at risk of preeclampsia. (Wei *et al*., 2021). In addition, cases of COVID-19-related complications have been reported, such as intrauterine fetal deaths and hydrops fetalis because of COVID-19 virus vertical transmission *(*Popescu *et al*., 2021). An analysis done among pregnant women in the United States with symptomatic COVID-19 discovered that pregnant women were likely to be require intensive care unit admission, mechanical ventilation and also intubation (Zambrano *et al.*, 2020). Evidence points also towards pregnant women having an increased risk of having preterm delivery,small for gestation babies, an increased risk of severe COVID-19 disease resulting in respiratory failure (Bouaziz *et al*., 2020 , Mehta *et al*., 2020). Furthermore, mothers with COVID-19 infection have an increased risk of postpartum infections, as well as neonatal pneumonia in their babies. (Khan *et al*., 2020, Zimmermann & Curtis, 2020, Parag Goyal, 2020). As a result, in order to reduce adverse pregnancy outcomes, we must protect pregnant women from the negative effects of COVID19..

1.2. Background information

The COVID-19 infection has no cure (Darragh Carroll, 2022) , so medical management is largely supportive (Ali & Alharbi, 2020). Several drugs have been tested including azithromycin, hydroxychloroquine, lopinavir-ritonavir and remdesivir, but none has been proven to be the cure for

COVID-19 (Masyeni *et al*., 2020, Cao *et al*., 2020). The WHO recommended a series of preventive measures to curb the spread of COVID-19, such as wearing a face mask, washing hands with soap and water and social distancing (WHO, 2020). However, the virus continued to spread around the world, putting a huge social and economic strain on the health-care system (Shadmi *et al*., 2020) with more than 500 million confirmed cases and more than 6 million deaths worldwide by March 18th, 2022 (WHO, 2022). In Africa, the risk of COVID-19 resurgence remained high with more than150 thousand deaths and 8 million cases, by March 18th, 2022 (WHO, 2022).

The first COVID-19 case in Kenya was reported on 13th March 2020 in Nairobi (MOH, 2020), the infection spread throughout the country, with more than 323,237 confirmed cases and 5,647 deaths by March 22nd, 2022 (WHO, 2022). Apart from COVID-19 economic consequences, its widespread transmission led to increased deaths of men, women, and children in the country. To prevent its further spread, the Kenyan government implemented several containment measures, including; the closure of international borders, schools and other learning institutions, places of worship, bars and restaurants, a ban on social gatherings and meetings, a dawn-to-dusk curfew, the mandatory wearing of masks in public places, physical distancing guidelines, even on public transportation, restrictions on movement into and out of counties with high infection rates and COVID-19 vaccination (Barasa *et al*., 2021). In addition, restrictions on large gatherings and a 7.00 pm to 4.00 am curfew in the country's western Lake Basin region was imposed after a spike in coronavirus infections on 18th June 2021 (Yusuf, 2022).The infection spread and increased in various parts of the country despite the precautionary measures and during the third wave, Kisumu and Siaya counties experienced a surge in COVID-19 cases with 5940 and 2739 confirmed cases, respectively by July 23rd 2021 (MOH, 2021).

In terms of health prevention, KAP is critical in public health." Inadequate knowledge may cause a delay in diagnosing highly infectious conditions like COVID-19, hence increasing infection dissemination (Dawson *et al*., 2019). Furthermore, people's KAP towards COVID-19 infection and prevention have a significant impact on their adherence to COVID-19 precautionary measures (Farhana & Mannan, 2020). According to a 2014 Ebola KAP study, gathering KAP information can be extremely important. The KAP survey provided critical information on the prevalence of Ebola transmission and prevention myths (Jalloh *et al*., 2018).

In Kenya, most studies that had assessed KAP towards COVID-19 preventive measures, involved the general population, youths and older age group and according to the findings of these studies, respondents exhibited high levels of knowledge, a positive attitude, and adequate preventive practices. (Karijo *et al*., 2021, Okoth Okaka & Omondi, 2022, Mwai *et al*., 2022), while research on pregnant women were conducted in other countries like Nigeria, (Anikwe *et al*., 2020) Ethiopia (Besho *et al*., 2021) and even

India (Kamal *et al*., 2020). Therefore, Questions about pregnant women's knowledge, attitudes, and practices toward COVID-19 preventive measures in Kenya were raised in response to these intervention efforts. The present study investigated KAP using a mixed-method study design towards COVID-19 preventive measures among pregnant women in western Kenya. The findings of this study will assist the government in developing new policies and improving on existing ones, to prevent the spread of COVID-19 infections especially among pregnant women in Kenya.

1.3. Statement of the Problem

Coronavirus infection (COVID-19) was rapidly spreading throughout the world, and it was declared a pandemic disease on March 11, 2020 (WHO, 2020). Kenya government implemented several preventive measures, including COVID-19 vaccination. Furthermore, restrictions on large gatherings and a 7.00 pm to 4.00 am curfew in the country's western Lake Basin region was imposed (Yusuf, 2022). However despite this proactive measures we had a surge in COVI-19 cases in Kisumu and Siaya counties accounting for almost over 40% of the countries reported cases with a positivity rate of 28.4% against the national positivity rate of 12.4% by July 23rd, 2021 (MOH, 2021), precipitated by the discovery of the Indian/delta variant (Brand *et al*., 2022). This was concerning because these two counties have a high prevalence of Human Immunodeficiency Virus (HIV) and malaria, and studies have shown that COVID-19 worsens the outcome of these two conditions (Tesoriero *et al*., 2021, Wilairatana *et al*., 2021). Therefore, greater emphasis should be placed on pregnant women in Kisumu and Siaya counties adhering to these preventive measures, which are heavily dependent on their knowledge, attitude, and practices regarding these preventive measures. (Papagiannis *et al.*, 2020). However, Kenya lacks sufficient information on KAP for COVID-19 preventive measures in pregnancy. Therefore, this study determined the KAP of COVID 19 infection prevention measures among pregnant women in Kisumu and Siaya Counties.

1.4. Objectives

1.4.1. Broad objective

To establish the knowledge, attitudes, and practices of COVID 19 infection prevention measures among pregnant women in Kisumu and Siaya Counties.

1.4.2. Specific objectives

1) To establish knowledge level (transmission, symptoms, and preventive measures including COVID-19 vaccination) among pregnant women attending ANC in Kisumu and Siaya Counties selected health facilities

2) To establish the attitudes of pregnant women attending ANC in Kisumu and Siaya Counties selected health facilities towards COVID-19 preventive measures
3) To identify the practices of pregnant women attending ANC in Kisumu and Siaya Counties selected health facilities towards COVID-19 preventive measures
4) To establish the social demographic factors associated with knowledge attitude and practices of COVID-19 preventive measures among pregnant women attending antenatal clinics in Kisumu and Siaya counties selected health facilities.

1.5. Research questions

1) What is the COVID-19 knowledge level among pregnant women attending antenatal care in Kisumu and Siaya counties?
2) What are the attitudes of pregnant women attending ANC in Kisumu and Siaya Counties towards COVID-19 preventive measures?
3) What are the practices of pregnant women attending ANC in Kisumu and Siaya Counties towards COVID-19 preventive measures?
4) What factors are associated with knowledge attitude and practices of COVID-19 preventive measures among pregnant women attending antenatal clinics in Kisumu and Siaya counties?

1.6. Justification

The KAP surveys are critical in implementing public health measures in the community (Papagiannis *et al*., 2020). This study is important because it is based on the current emerging issue globally. The COVID-19 positivity rate was 12.4% as of 21st Jul 2021 with Kisumu and Siaya having an average positivity rate of 28.4% which was higher in comparison to WHO's recommended estimated rates of below 5%. This was an issue of concern despite continuous awareness creation on the prevention and control protocols to be followed. As pregnant women have an increased risk of adverse pregnancy outcomes and mortality as compared to the general population, preventing them from COVID19 infection should be prioritized. This is only possible if a woman has a good knowledge on the infection and is aware on how to avoid contracting the virus; greater emphasis should be placed on the use of the COVID-19 prevention measures among the population. However, the levels of knowledge, attitude, and practice of these preventive measures against COVID-19 infection among pregnant women in Kisumu and Siaya counties, were yet to be evaluated. Therefore, a KAP study was necessary to understand the pregnant women knowledge, attitude and practices toward COVID-19 preventive measures. The findings from the study will guide in

designing context-specific information and education interventions to be provided during antenatal clinic visits about COVID-19 preventive measures including COVID-19 vaccine uptake in pregnancy.

1.7. Significance of the study

Several people had died from COVID-19 pandemic in different countries. WHO recommended a series of preventive measures to prevent the spread of the infection, however, in Kenya's Kisumu and Siaya counties, the level of KAP of these COVID-19 infection prevention measures among pregnant women, were yet to be assessed. Therefore, this study determined the KAP of COVID-19 preventive measures among pregnant women attending ANC in Kisumu and Siaya counties. The study findings will guide in designing context-specific information and education interventions targeting to be provided during antenatal clinic visits to educate pregnant women especially the less educated and those from large families about the importance of adhering to COVID-19 preventive measures. Furthermore, the findings will aid in the development of new policies and guidelines, such as policies regarding soap and sanitizers in public places and the quality of cloth masks, as well as the strengthening of existing ones, to prevent COVID19 infections among Kenya's pregnant population.

1.8. Scope of the study

The study was conducted in 12 selected health facilities within Kisumu and Siaya Counties. The study targeted pregnant women attending ANC in these health facilities and assessed their knowledge attitude and practices on COVID-19 infection preventive measures.

1.9. Limitations of the study

The findings could not be generalized to the obstetric population in the study area because the current study was conducted in a hospital and only women attending antenatal care clinics at the designated facility were interviewed. However, the limitation was minimized by using a mixed method study design, this allowed us to get a robust information about pregnant women KAP, allowing our findings to be generalized.

CHAPTER TWO: LITERATURE REVIEW

2.1. Introduction

This chapter presents the literature that informs the study in order to understand the underlying theoretical principles that can guide a disciplined investigation into the relationships that exist between the variables of interest identified in the study. The literature on knowledge, attitude, and practices toward COVID-19, as well as sociodemographic factors associated with KAP among pregnant women attending ANC in Kisumu and Siaya Counties, is reviewed. At the end of the chapter, a conceptual model illustrating the likely relationship between the variables is constructed.

2.2. Knowledge of COVID-19

Knowledge on different health issues influences the consumer's attitudes, intentions and influences decisions (Tudoran *et al*., 2009). In addition, knowledge of the pandemic promotes protective behaviors thus preventing fatal consequences (Miller *et al.*, 2021) and informing outbreak responses.

Proper health care and effective health-related decision making about COVID-19 are based on knowledge on transmission, symptoms and preventive measures (Erfani *et al.*, 2020). COVID-19 in pregnancy is associated with fatality and various prenatal complications, therefore knowledge plays an important role in preventive measures (Dawson *et al*., 2019). According to a study on the knowledge and attitude of COVID-19 on pregnant women in Southwestern Iran, 70% of them had an acceptable level of knowledge with the highest knowledge score on modes of transmission, and the least knowledge score was observed on serious symptoms (Maharlouei *et al*., 2020). Having an acceptable level of knowledge in this population increases awareness of symptoms and access to health care. Additionally, from (Kamal *et al*., 2020) study in India, the majority of the pregnant women enrolled in the study were knowledgeable about COVID-19. A study conducted in Mexico (Irigoyen-Camacho *et al*., 2020) also found that the population associated with good preventive practices, such as social distancing, staying at home, and wearing a facemask, had higher levels of knowledge.

According to a cross sectional survey conducted in Sub-Saharan Africa, pregnant women had adequate knowledge of COVID-19 (Nwagbara *et al*., 2021). In a study conducted in South Africa among pregnant women in primary health care, knowledge of the virus was found to be low at 44%. However, the study noted that pregnant women who had good knowledge were more likely to employ proper practices towards the virus (Hoque *et al*., 2021). Studies in the Southwest and Southeast parts of Nigeria revealed that there was good knowledge and awareness of COVID-19 symptoms and transmission attributed to mass communication campaigns (Anikwe *et al*., 2020). Knowledge levels of COVID-19 mainly on the

symptomatology of the disease were similarly good according to a study in south-south Nigeria. According to Nwafor et al. (2020), most of the Pregnant women had sufficient Knowledge of preventive measures against COVID-19 infection, furthermore, having at least a primary education was frequently associated with easier access to health information, according to the study. The positive knowledge levels in this setting were attributed to the massive enlightenment of the major symptoms through different channels of information (Allagoa *et al.*, 2020). Furthermore, according to a study on evaluation of knowledge on COVID-19 among pregnant women attending antenatal care in Ethiopia, the knowledge level of the pandemic in this population was good. This was in accordance with the mean score determined using 15 knowledge assessing questions. Moreover, education status and occupation status were some of the factors associated with the awareness of the pandemic. The study's high level of knowledge was explained by the study's urban setting, as well as the study's accessibility to mass media and social media exposure. (Degu *et al*., 2021). However, according to Fikadu and colleagues (Fikadu *et al.*, 2021) in Ethiopia, knowledge of the virus was low among pregnant women. Moreover, another study assessing the knowledge level on the pandemic in Ethiopia established that the status of knowledge on COVID-19 was not sufficient to combat the spread of the virus. Specifically, there were low knowledge levels of the virus's preventive measures and symptoms (Kebede *et al*., 2020). The conflicting findings in Ethiopia were attributed to the study settings and time. The studies which reported a low level of knowledge were conducted at the early stages of the pandemic and they were conducted in rural areas. Further, a study among pregnant women in Egypt revealed that the women had a high level of knowledge of COVID-19 symptoms and transmission *(*Adel *et al*., 2021).

Knowledge of disease and willingness to accept public health measures are important factors in determining public acceptance of public health measures. According to a study among pregnant women conducted in India, socio-demographic factors such as age and education level, influenced pregnant women's knowledge towards COVID-19 preventive measures (Kamal *et al*., 2020). Furthermore, in a study of 502 pregnant women in Ghana, pregnant women had adequate knowledge and good preventive practices. The study also discovered that having at least a primary education, living in a city, and receiving COVID-19 education at a health facility were all linked to adequate COVID-19 knowledge (Kumbeni *et al.*, 2021). As a result, intensifying education at the health facility is critical. According to a KAP study conducted among the Kenyan population (Muriuki *et al*., 2021), participant basic knowledge of COVID-19 was high. The study also found that age above 34 years, primary and secondary education level, and occupation were significantly associated with the level of knowledge score. A cross-sectional survey of pregnant women in seven countries including Kenya discovered that knowledge of COVID19 varied by country. More than half of the women in Zambia, Kenya, India, and Bangladesh had good knowledge of

COVID-19 symptoms, while the Democratic Republic of the Congo had the least knowledge level. This was consistent with findings in transmission modes and prevention knowledge (Naqvi *et al*., 2022). However, an assessment of the disease knowledge among pregnant women in Kenya remains limited. Therefore, this study determined the COVID-19 knowledge level (symptoms, transmission, persons with increased risk and prevention measures) among women attending antenatal clinics in Siaya and Kisumu counties.

2.3. Attitude towards COVID-19 preventive measures

Attitudes are important in health outcomes since it helps in motivating and changing behavior. The impact of attitudes on health behavior includes rational decision-making. A positive health attitude reflects an objective health status that is also positive. Highly optimistic people view their health more positively and hence tend to uphold the prevention strategies and cope more successfully with health problems. There is an association between positive health attitudes and desirable health-related consequences (Hildt-Ciupińska & Pawłowska-Cyprysiak, 2020). Globally, different studies have investigated the attitudes towards COVID-19 prevention strategies. In India, Kamal reported positive attitudes toward COVID-19 as the majority of the pregnant women agreed to isolation if they were infected with COVID-19 (Kamal *et al*., 2020). This was because of the major steps and measures taken by the country's government to prevent COVID-19. A study in Singapore on pregnant women attending ANC established that the women had positive attitudes towards the coronavirus prevention measures (Lee *et al*., 2020). In addition, a study in Bangkok (Kunno *et al*., 2022) overall, Participants had a positive attitude towards COVID-19, moreover, bachelor's degree and beyond and age between 31–35 years were some of the factors associated with positive attitude in this study. However a study in south Africa (Hoque *et al*., 2021) on Pregnant women KAP revealed that the majority of pregnant women had insufficient knowledge and attitude towards COVID-19 disease. This finding was linked to the participants' low educational level.

The COVID-19 infection prevention strategies were still low in study conducted in Sub-Saharan Africa, (Nwagbara *et al*., 2021) outlining that respondents had a negative attitudes toward COVID-19 prevention strategies hence recommending the need for more education on the importance of positive attitude. Further, the study noted that there is a gap in attitude and practice in the area and suggested that the interventions should not focus only on peoples knowledge but also their attitudes and practices to improve prevention. In West Africa, a study on attitudes toward coronavirus among 382 pregnant in South-South Nigeria, revealed that there were positive attitudes toward the disease's preventive measures (Adegoke *et al*., 2020). In addition, (Allagoa *et al*., 2020) Moreover, a study among pregnant women attending ANC at a tertiary hospital noted that the women had optimistic attitudes toward preventive strategies for the

disease. In a survey conducted in Bangladesh (Anwar *et al.*, 2020), more than half of the respondents had positive attitudes toward COVID-19 measures. The study went on to show that people's attitudes toward COVID-19 are determining factors in disease prevention and the decision to comply or not comply with all safety and preventive measures. However, One-fourth of the respondents had a negative attitude towards COVID-19 as they assumed that COVID-19 was a religious curse. This could be due to the strong influence of religious beliefs among the population of semi-conservative societal structure in Bangladesh (Absar, 2014).

In East Africa, a study in Northwest Ethiopia involving 430 pregnant women selected randomly established positive attitudes of the respondents. Notably, the study established that education status influences attitude towards COVID-19 (Degu *et al*., 2021). A study done among general population in Sudan (Mohamed *et al*., 2021) respondents had positive attitude towards COVID-19 which were influenced by age and education level. There were no studies in Kenya assessing pregnant women attitude towards COVID-19 preventive measures. Therefore, this study established attitudes concerning COVID-19 preventive measures in women attending antenatal clinics in Siaya and Kisumu counties.

2.4. Practices for COVID-19 preventive measures

The WHO recommends several preventive measures and strategies to prevent the spread of COVID-19. These include washing hands with soap and water, maintaining social distance , wearing face masks, and a high level of sanitization among other preventive measures (WHO, 2020). Transmission of the COVID-19 virus is less likely to occur outdoors where there is more air circulation compared to confined spaces. (CDC, 2021).

Several factors can influence adherence to COVID-19 preventive practices among pregnant women. A study in Singapore revealed older age and antending high risk clinic ANC as factors that are more likely to influence preventive practices among pregnant women towards COVID-19 (Lee *et al.*, 2020). Globally studies have investigated the prevention practices of pregnant women against coronavirus. For instance, a study in India noted good practice and related behavior among pregnant women towards prevention strategies (Rai *et al*., 2021). In addition, all pregnant women attending antenatal care reported hand washing. Good preventive practices were also reported in another study conducted in India (Kaur *et al.*, 2021) the study also revealed a Significant positive correlation between knowledge about type of disease and frequency of hand- washing and preventive measures being practiced by participants. In addition (Nayak *et al*., 2022), revealed that Almost all (98%) women had good practice of safety measures such as social distancing, wearing masks, and frequent handwashing. However, no association was observed between demographic variables and level of knowledge, attitude, or practice.

In South Africa, (Hoque *et al*., 2021) a study assessing COVID-19 preventive practices among pregnant women attending ANC at primary health care noted that, the prevention practices were significantly higher at 70% and this was attributed to the awareness of the regulatory measures. Several studies in West Africa evaluated the practices of pregnant women on COVID-19. A study in South East Nigeria established that pregnant women adopted proper preventive measures (Anikwe *et al*., 2020). Furthermore, (Allagoa *et al*., 2020) study in South Nigeria noted somewhat good practices among pregnant women in regards to prevention strategies. However, a study on assessment of the practices towards the disease in Nigeria revealed that the overall practices on preventive measures were poor (Nwafor *et al.*, 2020). Studies that reported poor practices toward COVID-19 prevention measures were conducted in rural residences and the participants had low educational attainment thus explaining the disparity in the findings.

Studies in East Africa also investigated the prevention practices of pregnant women. A study in Southwest Ethiopia revealed that the practices of pregnant women were not enough to combat the pandemic (Aboma & Gurmu, n.d.). Similarly, (Fikadu *et al*., 2021) study established that the adoption of preventive measures against COVID-19 was low. A similar study in Southwest Ethiopia also established only half of the pregnant women who attended ANC had good preventive practices, this was relatively lower compared to other settings (Wilson & Wilson, 2021). These findings are similar to a study in sub-Saharan Africa, which established that prevention practices for COVID-19 need to still be emphasized in the region (Nwagbara *et al*., 2021). In Kenya, no study had identified the practices of pregnant women towards COVID-19 preventive measures. Therefore, this study established COVID-19 preventive practices among pregnant women attending antenatal clinics in western Kenya, from Siaya, and Kisumu Counties.

2.5. Social demographic factors associated with KAP of COVID-19 preventive measures

When developing guidelines and recommendations for more effective disease prevention, it is critical to have a clear understanding of the social demographic factors associated with knowledge, attitude, and practices of COVID-19 preventive measures. A study on the knowledge and attitude of COVID-19 on pregnant women in Southwestern Iran (Maharlouei *et al*., 2020), identified a strong association between the participants' knowledge score and higher social economic status of the participants. Additionally, from (Kamal *et al*., 2020) a study in India, knowledge scores was associated with participant education level and place of residence, the study further reported an association between age and attitude, place of residence and education. However, there was no significant association between participant practices and education level and participant age group and knowledge. Similarly (Nayak *et al*., 2022), revealed no association between demographic variables and participants KAP.

A study conducted in Bangladesh on women's knowledge, attitude and perception in low- and middle-income countries (Anwar *et al.,* 2020) discovered that older less educated women were less likely to have a higher KAP than younger, more educated women. In a study conducted in South Africa among pregnant women in primary health care noted that, knowledge was positively correlated with the practice of COVID-19 as women who had good knowledge were more likely to employ proper practices towards the virus (Hoque *et al*., 2021).

According to (Nwafor *et al*. 2020), having at least a primary education was frequently associated with having good knowledge. Furthermore, having poor practices were associated with having more children, living in rural areas, and having jobs such as farm work, craftsperson, and trading. Furthermore, a study on pregnant women KAP conducted in Osun-state Nigeria (Adetoye *et al*., 2022) revealed that, living in rural areas, level of education, income and religion were associated with the participant's attitude toward experience of COVID-19 preventive measures. Furthermore, a study of 502 pregnant women in Ghana found that, living in a city, receiving COVID-19 education at a health facility and having at least a primary education were all associated with adequate COVID-19 knowledge (Kumbeni *et al*., 2021).

A study conducted in Singapore reveled that, attendance at high-risk clinics, employment in front-line jobs and age ,were associated with pregnant women's attitudes and practices toward COVID-19 (Lee *et al*., 2020). In addition, a study in Bangkok (Kunno *et al*., 2022) revealed that bachelor's degree and beyond and age between 31–35 years were associated with positive attitude towards COVID-19. In addition, participants with higher income reported an increase in practice scores. A study in Northwest Ethiopia involving 430 pregnant women selected randomly established that education status influences attitude towards COVID-19 (Degu *et al*., 2021). A similar study done in Public Hospitals in Three Wollega Zones, (Besho *et al*., 2021) women who were younger were more likely to have adequate practices of COVID-19 preventive measures. Furthermore, married participants exhibited an increase of knowledge scores as compared to those participants who were not married.

A study done among general population in Sudan (Mohamed *et al*., 2021) respondents positive attitude towards COVID-19 were influenced by age and education level. A similar study conducted in Kenya found that age above 34 years and participants who had attained primary and secondary education level were significantly associated with the level of knowledge score. However, there is no study in Kenya that had identified the social demographic factors associated with knowledge, attitude and practices of COVID-19 preventive measures among pregnant women. Therefore, this study established the social demographic factors associated with knowledge, attitude and practices of COVID-19 preventive measures among pregnant women.

2.6. Conceptual Framework

The illustration below shows the relationship between the dependent (Socio-demographics) and independent variables (KAP). It shows the factors that affect the KAP among pregnant women, age, education level and number of people in a household. Age ,education have been shown to be associated with adequate KAP *(*Aduloju *et al*., 2021).

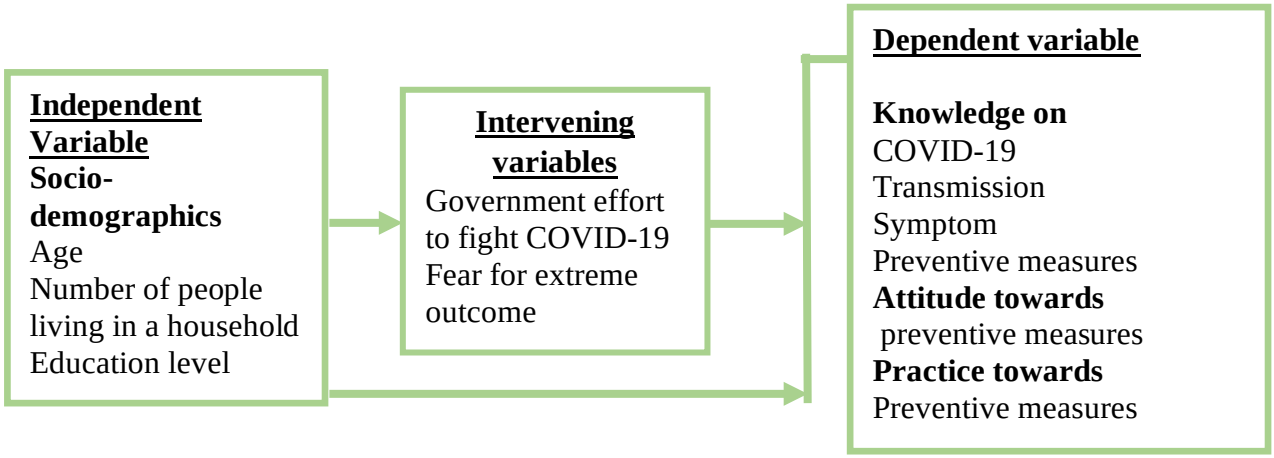

Figure 2-1: Conceptual model for the Study, Source: (Author., 2021)

CHAPTER THREE: MATERIALS AND METHODS

3.1. Introduction

This third chapter discusses the research methodology of study, which includes study design, study population, data collection methods, data analysis procedures, and ethical considerations for human subject protection.

3.2. Study design

A concurrent mixed-methods study was conducted among pregnant women attending antenatal clinics in Kisumu and Siaya Counties' selected facilities from December 2021 to January 2022. The approach combined rigorous quantitative analyses (descriptive cross-sectional survey) and qualitative methods (FGD and KIIs) which were conducted concurrently. Qualitative research is useful to explore how the population feels about a certain issue.

3.3. Study setting

The study was conducted in Kisumu and Siaya counties. Kisumu County is one of 47 counties in Kenya. Its headquarters is Kisumu city which is the third-largest city in Kenya. It has a population of 1,155,574 (*Kenya-National-Bureau-of-Statistics*, 2019). Kisumu county has seven sub-counties, and the study was conducted in one facility per sub-county. The health facilities included Lumumba Sub-County Hospital,

Nyalunya Health Center, Chulaimbo County Hospital, Masogo Sub-County Hospital, Katito Sub-County Hospital, Ahero County Hospital, and Kombewa County Referral Hospital in Kisumu County.

Siaya County is one of the counties in the southwest part of Kenya with a population of 993,184 (*Kenya-National-Bureau-of-Statistics*, 2019). The total area of the county is approximately 2,496.1 km^2. It has five sub-counties, and the study was conducted in one facility per sub-county. The health facilities included Rwambwa Sub-County hospital, Bondo County Referral Hospital, Yala Sub-County Hospital, Ongielo Model Health Center, and Ambira Sub-County Hospital.

The twelve health facilities in Kisumu and Siaya Counties were chosen as they are the main health centers where women attend for immunization, antenatal follow-up, and other reproductive health services.

3.4. Target population

The target population for this study was all pregnant women (953) that attended their routine visits to the twelve selected health facilities antenatal clinics in Kisumu and Siaya Counties.

3.5. Data Collection

3.5.1. Quantitative data

A pretested interviewer questionnaire with both structured and semi structured questions was used to collect quantitative data based on the specific objectives using simple, clear, and precise language understandable to the respondents. All the safety precautions of the COVID-19 pandemic were adhered to. The questionnaire had 4 parts: sociodemographic information, knowledge, attitudes, and practice related characteristics. Each questionnaire took 10-15 minutes to complete. Knowledge questions mainly focused on COVID-19, etiology, transmission and preventive measures whereas attitude and practice questions focused on preventive measures. Knowledge had 34 questions, attitude 8 questions and practice 13 questions. The knowledge scores were computed by allocating one point for each correct question and zero points for incorrect questions and other responses. This had a maximum of 34 points for each correct response. Attitude questions were computed by allocating one point to yes answers, not sure or don't know assigned zero. This had a maximum of 8 points. In addition, practice responses were assigned one if response was yes and zero if response was either no or sometimes with a maximum of 13 points. The overall knowledge and attitude scores were categorized, using Bloom's cut-off point, as good if the score was between 80 and 100%, moderate if the score was between 60 and 79%, and poor if the score was less than 60% adopted from (Elshammaa *et al*., 2022) a knowledge, attitude, and practice study. Whereas practice scores >80 were considered adequate and <80 were considered inadequate

3.5.2. Qualitative data

Open-ended semi-structured guides were used to collect qualitative data. An interview guide was used to provide overall guidance on the topics and issues to be covered during the FGDs and KIIs. We conducted four FGDs and four KIIs concurrently with individual interviews. The FGDs consisted of 12 participants (one of which served as the moderator). FGD participants were individuals who did not take part in the questionnaire survey wherein KIIs were conducted with hospital nurses in charge of maternal and child health clinic of the facilities selected for FGDs. They were chosen because they regularly interact with pregnant women and have a better understanding on their KAP.

3.6. Validity and reliability of data collection instruments

Validity refers to the extent to which an instrument can measure what it ought to measure, therefore. A pilot study was performed on a 10 per cent sample of cases at Nyangande Sub-County hospital to test for validity of the questionnaire. No modification was required, based on the results of the pilot study. The validity of the questionnaires guide was based on expert opinion. Reliability is the degree to which an assessment tool produces stable and consistent results (Phelan & Wren, 2006). The reliability of the instrument was tested using the test-retest method. The questionnaire was administered twice within two weeks after which the reliability coefficient of 0.88 was obtained from the pilot.

3.7. Sample size determination

The sample size for this survey was estimated by using the Leslie Kish formula for a single proportion as follows:

$$n = \frac{Z^2 \times p\, q}{d^2}$$

Where:

n = desired sample size

z = standard deviation of required confident level given as 1.96

p = Proportion of 60.9 % of women practice preventive measures informed from a study done in Nigeria on knowledge and practice of preventive measures against COVID-19 infection among pregnant women in a low-resource African setting (Nwafor et al., 2020).

d = maximum tolerance error which is 95% with an error of 5% which equals 0.05

The sample size was 366 then added 10% allowance for a non-response rate, and the final sample size was 402 pregnant women.

3.8. Eligibility criteria

All women attending ANC were eligible to participate in the study.

3.9. Sampling technique

Considering the prevalence and the incidence of COVID-19 in Kisumu and Siaya counties, a total of 12 health facilities were purposively selected 7 from Kisumu County and 5 from Siaya County (One health facility per sub-county with the highest number of first ANC attendance). The average monthly first ANC attendance per health facility was calculated from an average of all monthly ANC attendances for each respective facility for the period 1st January to 31st December 2020. The sample size in each health facility was then weighted according to the proportion of pregnant women attending the first ANC compared to total ANC attendances overall for all health facilities selected for the study, table 3-1**.**

$$\frac{\text{Total number of pregnant women at a health facility}}{\text{Total number of pregnant women in all facilities (953)}} \times \text{sample size (402)}$$

Table 3-1: Sample size for each facility

No.	Name of Sub-County	Name of the facility	Average first ANC	sample size
Kisumu county				
1	Kisumu Central sub-county	Lumumba sub-county hospital	199	84
2	Kisumu East Sub- County	Nyalunya Health Center	32	13
3	Kisumu West Sub-County	Chulaimbo County Hospital	71	30
4	Muhoroni Sub-County	Masogo Sub-County Hospital	39	16
5	Nyakach Sub-County	Katito Sub-County Hospital	51	21
6	Nyando Sub-County	Ahero County Refferal Hospital	105	44
7	Seme Sub-County	Kombewa County Referral Hospital	65	27
Siaya county				
1	Alego Sub-County	Rwambwa Sub County Hospital	57	25
2	Bondo Sub-County	Bondo County Hospital	146	62
3	Gem Sub-County	Yala Sub-County Hospital	59	25
4	Rarieda Sub-County	Ongielo Model Health Centre	40	17
5	Ugunja Sub-County	Ambira Sub-County Hospital	89	38
Total			**953**	**402**

Simple random sampling (ballot method) was used to select the study population; after discussing the study with the pregnant women, they were asked to pick a card marked “Not Join or Join”. The pregnant women who picked a card marked “Join” were given a written informed consent to read with the help of our trained study nurses and recruited to the study if they agreed to join then interviewed using our pre-tested study questionnaire. The ANC mothers who picked “Not Join” were explained to the reason they could not join the study and they were all receptive.

Four facilities for FGDs and KIIs were purposively sampled, first selecting one high volume facility from each county, and then selecting one low volume facility from each county in rural settings to balance the selection of high-volume facilities that were urban based. To ensure fair distribution, the facilities that were adjacent were dropped, and the next low volume facility in rural setup or high-volume facility in urban setup was chosen. Participants chosen to join FGDs were selected purposively from women attending ANC visit during the day the FGD was scheduled to occur. Those who consented to participate in the study were included.

Table 3-2: *Sampling frame for qualitative studies*

No.	**Name of Sub-County**	**Name of the facility**	**Average first ANC**	**Selected facilities**
Kisumu county				
1	Kisumu Central sub-county	Lumumba sub-county hospital	199	Yes
2	Kisumu East Sub- County	Nyalunya Health Center	32	
3	Kisumu West Sub-County	Chulaimbo County Hospital	71	
4	Muhoroni Sub-County	Masogo Sub-County Hospital	39	
5	Nyakach Sub-County	Katito Sub-County Hospital	51	Yes
6	Nyando Sub-County	Ahero County Referral Hospital	105	
7	Seme Sub-County	Kombewa County Referral Hospital	65	
Siaya county				
1	Alego Sub-County	Rwambwa Sub County Hospital	57	
2	Bondo Sub-County	Bondo County Hospital	146	Yes
3	Gem Sub-County	Yala Sub-County Hospital	59	Yes
4	Rarieda Sub-County	Ongielo Model Health Centre	40	
5	Ugunja Sub-County	Ambira Sub-County Hospital	89	
Total			**953**	**402**

3.10. Quantitative data management and analysis

The quality of quantitative data was assured and analysis was done using R. Descriptive statistics were used to describe the data. The distribution of continuous variables was assessed using histograms, and the Shapiro-Wilk normality test. Correlation between knowledge attitude and practice was confirmed using a matrix plot. The strength of correlations was interpreted as 0 = no relationship, 0.10–0.29 = low relationship, 0.30–0.49 = moderate relationship, and 0.50–1.00 = high relationship. For establishing any association between social-demographic characteristics and knowledge, attitude and practices about COVID-19 preventive measures, a chi-square test was performed. Multinomial logistics regression was used to determine predictors of knowledge, attitude and practice. The inference was made using a 95% confidence interval and a p-value <0.05. For qualitative, FGDs and KIIs were transcribed from *Dholuo or Kiswahili* to English. A thematic framework was developed in line with the set objectives with a reflection of a strong knowledge basis regarding the knowledge level, attitude, and practices of COVID-19 prevention measures. The thematic framework was used to create a Codebook in Nvivo 11. Transcripts were coded, and the data interpretation process involved running of queries, plotting of charts, and reporting of findings using Nvivo 11.

3.11. Ethical considerations

Board of postgraduate studies at Jaramogi Oginga Odinga University of Science and Technology authorized the study. Ethical clearance was obtained from Jaramogi Oginga Odinga Teaching, and Referral Hospital Ethics Review Committee (IERC/JOOTRH/538/21) and National Commission for Science Technology and Innovation (NACOSTI) (License No: NACOSTI/P/21/14088) permit was also obtained. Administrative approval was sought from Kisumu and Siaya Counties. Participation into the study was voluntary. Participants were required to give informed consent to participate. Signed informed consent was obtained from each study participant after explaining the purpose of the study. Upon signing, the participant retained a copy of the signed consent form. Data collected and patient-identifiable information (such as name and address) were stored in password-protected databases. All identifiers from any data collected for this study were removed and access to any identifying data limited to the study principal investigator.

3.12. Data dissemination

The findings of the study shall be disseminated in scientific conferences, and in journals or newspapers.

CHAPTER FOUR: RESULTS

4.1. Introduction

This chapter presents the findings obtained from research participants via questionnaires, FGDs, and KIIs. In quantitative study, a total of 402 questionnaires were distributed to antenatal attendees, with 387 correctly completed and used for analysis. This represented a 96% response rate. In qualitative study, we conducted four focus groups discussions with 40 pregnant women and four key informant interviews with MCH nurses.

4.2. Sociodemographic characteristics of respondents

Almost two-thirds of the respondents were in the age category of 21-30years (62%; 240/387) with more than half of the household (57.1%;221/387) having between 3 to 5 members. An estimated (22.5%; 87/387) of the participants had attained a tertiary level of education,table 4-1.

Table 4-1: Socio-demographic characteristics of respondents

Characteristics (N=387)	**Total (%)**
Age category in years	
10-20	69(17.8)
21-30	240(62)
31-40	73(18.9)
Above 40	51(1.3)
Number of people living in the household	
less than 3	10(2.6)
3 to 5	221(57.1)
6 to 8	98(25.3)
9 to 12	58(15)
Level of education	
None/primary level	136(35.1)
Secondary	164(42.4)
Tertiary level	87(22.5)

4.3. Knowledge assessment

Nearly all the participants had good knowledge towards COVID-19 infection (99.5%; 386/387). Three hundred and ten respondents knew the causative organism of COVID-19 being of viral origin (80.5%; 310/387) and that one can get COVID-19 infection through shaking hands (92.5%; 358/387). This finding was also identified in the FGD and KIIs as Majority of the pregnant mothers were aware that COVID-19

existed, and the mode of transmission was through touching surfaces that had the virus and droplets from coughs as mentioned in the quote below:

"Yes, they know it can be transmitted when an infected person may cough without protecting herself, without a mask and you touch a surface, and you don't clean yourself." KII

A sizable number of participants thought that there is cure for COVID-19 (39%; 150/387). A larger number of women agreed that fever (95.1%; 368/387), coughing (92.2%; 357/387) and sore throat (78.3%; 303/387) were symptoms of COVID-19. Two hundred and eleven respondents (57%; 211/387) correctly explained the steps in handwashing. In addition, almost all the participants knew that Wearing a facemask (98.4%; 381/387) social distancing (99.5%; 385/387) and frequent handwashing was important to avoid getting infected (99.7%; 150/387) with COVID-19. Similarly, in the FGD and KIIs the pregnant women knew that prevention was mainly through social distancing, maintaining hygiene especially through hand washing and proper wearing of the face mask.

In terms of vaccination majority of the respondents (99.5%; 371/387) knew that there was COVID-19 vaccine, table 4-2. However, in FGD many of the pregnant mothers felt like the vaccine is being forced on them and they had limited knowledge on its effect on their unborn baby. This was supported by the quote below:

"They are aware that government hospitals provide vaccines to pregnant women, but they do not know when the vaccine is administered, so they ask such questions." KII

Respondents' sources of information, as mentioned in the focused group discussion, were primarily the mainstream media and social media; other sources included political and church gatherings and funerals. Furthermore, as mentioned in the quote below, one of the key informants added that pregnant women get information through health talks at the health facility and internet searches.

"They mostly get COVID-19 information through mass media, radios, and televisions, and most of them right now have smartphones, so they google and when they come to the clinic they interact with the nurses and also ask the nurses on duty." KII

Table 4-1: Knowledge of respondents about COVID-19 preventive measures

Knowledge items	**Total (%) Correct**	**Knowledge items**	**Total (%) Correct**
Heard about COVID-19 infection	386 (99.7)	Wearing a facemask is important.	381 (98.4)
There is a cure for COVID-19	193 (49.9)	When to wear a face mask be worn	254 (66.3)
Can be passed from one person to another.	376 (97.1)	The correct way to put on a face mask	385 (99.4)
COVID-19 is Caused by a virus.	310 (80.1)	knows the correct to wear a face mask.	325 (84.0)
COVID-19 incubation period.	237 (61.2)	You can recycle the surgical masks.	134 (34.6)
COVID-19 can affect anybody.	296 (76.5)	Knows correct distance for social distancing.	303 (78.3)
COVID-19 is severe in Co-morbid /elderly	281 (72.6)	Cloth masks should be washed daily	353 (91.2)
Expectant mothers vulnerable to COVID-19	292 (75.4)	If infected avoid unnecessary daily activities	371 (95.9)
Asymptomatic people can spread COVID-19.	326 (84.2)	knows the correct steps in hand washing	368 (95.1)
There is COVID-19 infection Vaccine	371 (95.8)	Describes correct steps in hand washing	211 (54.5)
Knows personal protective equipment	281 (72.6)	Social distancing can prevent COVID-19	385 (99.4)
Sore throat is a symptom of COVID-19	300 (77.5)	Washing hands can prevent COVID 19.	386 (99.7)
Fever is a symptom of COVID-19	368 (95.1)	Coughing is a symptom of COVID-19	357 (92.2)
Body pains is a symptom of COVID-19	293 (75.7)	Diarrhoea is a symptom of COVID-19	114(29.5)
COVID-19 can be transmitted through contact with infected surfaces	281 (72.6)	Avoid touching eyes and face if suspect COVID-19	371(95.9)
Chest pains,]a runny nose and difficulty breathing are signs of COVID 19	360 (93.0)	Having a Headache, is a symptom of COVID-19 infection.	332 (86.0)
They will measure fever if suspecting COVID-19	334 (86.3)	Can contract COVID-19 through shaking hands	358 (92.5)

4.4. Attitude assessment

Nearly all the respondents believed (99%; 382/387) COVID-19 exist. They believed that wearing a face mask (99.2%; 384/387), frequent hand washing (98.4%; 381/387) and social distancing (98.7%; 383/387) could prevent them from getting COVID-19. Similarly, the focused group discussants believed that social distance and other preventive measures were beneficial in protecting them from COVID-19.

However, they felt like lockdowns and curfews had a negative impact on their businesses and ANC attendance, and that they were used by those in authority to extort money from citizens as expressed by one of the key informants in the following quote:

"Lockdown and curfew were not embraced well by pregnant women because they were affecting them. You know a pregnant woman can get an emergency at night but fear to come to the hospital, so they will just stay at home and come the next day when they are seriously sick, and then they will tell you that there was a curfew and so I could not leave the house." KII

Furthermore, two key informants cited politicians and ongoing media debriefings as factors that influenced pregnant women's attitudes toward COVID-19 prevention measures. This was supported by the quotations below:

"My first point will be politicians. Our politicians are holding meetings with large crowds, but they are not maintaining social distance, they are not putting on masks, the crowd is not putting on masks, so when we tell our clients to put on masks, they say, the politicians were here the other day with a large crowd and they were not putting on masks, why are they not getting COVID-19?" KII

"The continuous COVID-19 debriefings by government officials also had an impact. When the COVID-19 deaths were high, most pregnant mothers followed the COVID-19 preventive measures; however, when the number of deaths decreased, pregnant mothers relaxed their adherence to the COVID-19 preventive measures." KII

Majority of the respondent had poor attitude towards COVID-19 vaccine, of the women interviewed, 95.3%; 369/387) did not think getting the COVID-19 vaccine is a good way to avoid getting the infection, table 4-3. The KIIs further explained that the vaccination issue in pregnancy had not been received well. the respondents noted that majority of the pregnant mothers felt like they are being forced to take the vaccine which they have no good knowledge about.

"The greatest myth is they talk of about some say 2 years from now some say 10 years from now we will all be dead, or people would have changed in their faces, and they would be deformed in some way." KII

"So, they believe if you are given the vaccine and you are pregnant the baby will be deformed and if you are not pregnant you will not be pregnant, men also believe that you will not be sexually active so those are some of the beliefs you will die after 2 years, you are going to die after 1 year (laughs)" KII

Table 4-1: Attitude of respondents towards COVID-19 preventive measures

Attitude items	**Total (%) Yes**
Believe COVID-19 infection still exists	382 (98.7)
Think wearing a face mask can prevent COVID-19	384 (99.2)
Think frequent handwashing can prevent COVID-19	381 (98.4)
Think following handwashing steps is a good thing	382 (99.2)
Think social distancing can prevent COVID-19	383 (98.7)
Think COVID 19 Vaccine can prevent COVID-19	369 (95.3)
Willing to take Covid 19-vaccine	307 (79.3)
Think using of PPE is an effective way to avoid Covid-19	304 (78.6)

4.5. Practice assessment

COVID-19 preventive practices were low, two hundred and ninety-two respondents (75.5%; 292/387) always wore a face mask in public places, slightly more than a half of the respondents (57.4%; 222/387) spent at least 20 seconds following all the handwashing steps and 57.1% (221/387) always tried to maintain social distance from people when in public. Similarly, during FGD and KIIs respondents had poor practices towards COVID-19 preventive measures they mentioned that face masks were expensive and uncomfortable to wear. In terms of hand washing and use of sanitizers the respondents reported that most of the soaps and sanitizers had a strong smell, so they avoided using them. In addition, the respondents mentioned that keeping social distance was a problem because of inadequate space especially at the clinic and workplaces. These were further described in the quotes below:

"The face mask is not welcomed, let me just be honest, with the pregnant mothers. Sister we are not breathing, they are very uncomfortable, and you know sister these masks are very expensive." KII

Speaking about sanitizer and hand washing, you know if someone is pregnant, she has a challenge on some things for example sanitizer, we are not comfortable with it, and the smell makes it difficult to use it." FGD

"Keeping social distance is difficult even at the antenatal clinic because of the huge population, and you know most of our facilities, churches, and homes are very small. It is good to keep social distance but sometimes there is no space because we are many even the space to occupy is small." FGD

Most pregnant women had not been vaccinated (71.8%; 278/387), table 4-4. In FGDs and KIIs, respondents were opposed to the idea of vaccination during pregnancy. They believed it was linked to facial deformation one year after vaccination. Some believed that vaccines could cause disability or

illness, while others believed that it was a method of family planning and that it would reduce libido in men. Some of the key informants further explained with the following quotes:

"Their attitude is wanting, because I think they have that notion that when they get the vaccine, their children are going to be born with problems, most of them want it after their delivery but a few maybe two out of ten are coming for it during their pregnancy." KII

"So, they believe if you are given the vaccine and you are pregnant the baby will be deformed and if you are given when you are not pregnant you will not be pregnant, men also believe that you will not be sexually active and that you will die after 2 years, you are going to die after 1 year (laughs)" KII

Table 4-1: Practices of respondents towards COVID-19 preventive measures

Practice items	**Total (%) Yes**
Wears a face mask when in public	292 (75.5)
Wash hands several times a day with soap and water	330 (85.3)
Spend at least 20 seconds washing hands	222 (57.4)
Always maintains social distance when in public	221 (57.1)
It is easy to acquire the PPE for mothers in your area	83 (21.4)
Anyone in the household has been vaccinated against COVID 19	275 (71.1)
Has been vaccinated for COVID 19	109 (28.2)
If not vaccinated, intends to be vaccinated when it is availed	222 (69.4)
If vaccinated, received both the first and the second jabs	29 (32.6)
Anyone in the household own personal protective equipment besides the face mask	90 (23.3)
Visitors to the home observe the steps in handwashing	190 (49.2)
Owns Personal Protective Equipment besides the face mask	93 (24.0)
Has a handwashing unit for visitors at home	337 (87.1)

4.6. Further comments and recommendations by participants

Study participants made a few recommendations regarding low vaccine uptake and use of face masks. One of the key informants recommended that when communicating about COVID-19 preventive measures the messaging should be tailored in a way that the pregnant mothers can understand for example using the local language to prepare Information Education and Communication (IEC) Materials.

"The first, as I believe I mentioned, is that preventive materials should be made available in different languages so that mothers can understand" KII

Another key informant added in the quote below:

"I am trying to think of any way to improve vaccine uptake, I think mobilization as far as Covid-19 vaccine is concerned for pregnant mothers, like if it comes to TV, that pregnant mothers are supposed to get the vaccine maybe they will come because most of the people are watching TV, yeah there should be a clip that shows a pregnant woman getting the COVID vaccine they will come." KII

4.7. Correlation between knowledge attitude and practice

A matrix plot was used to show the correlation between knowledge attitude and practice. The light blue bubble shades indicate their level of relationship with each other against the r-squared values on the vertical axis. There was a moderate correlation between knowledge and practice (R=0.3) and weak correlation between attitude and practice (R=0.2).

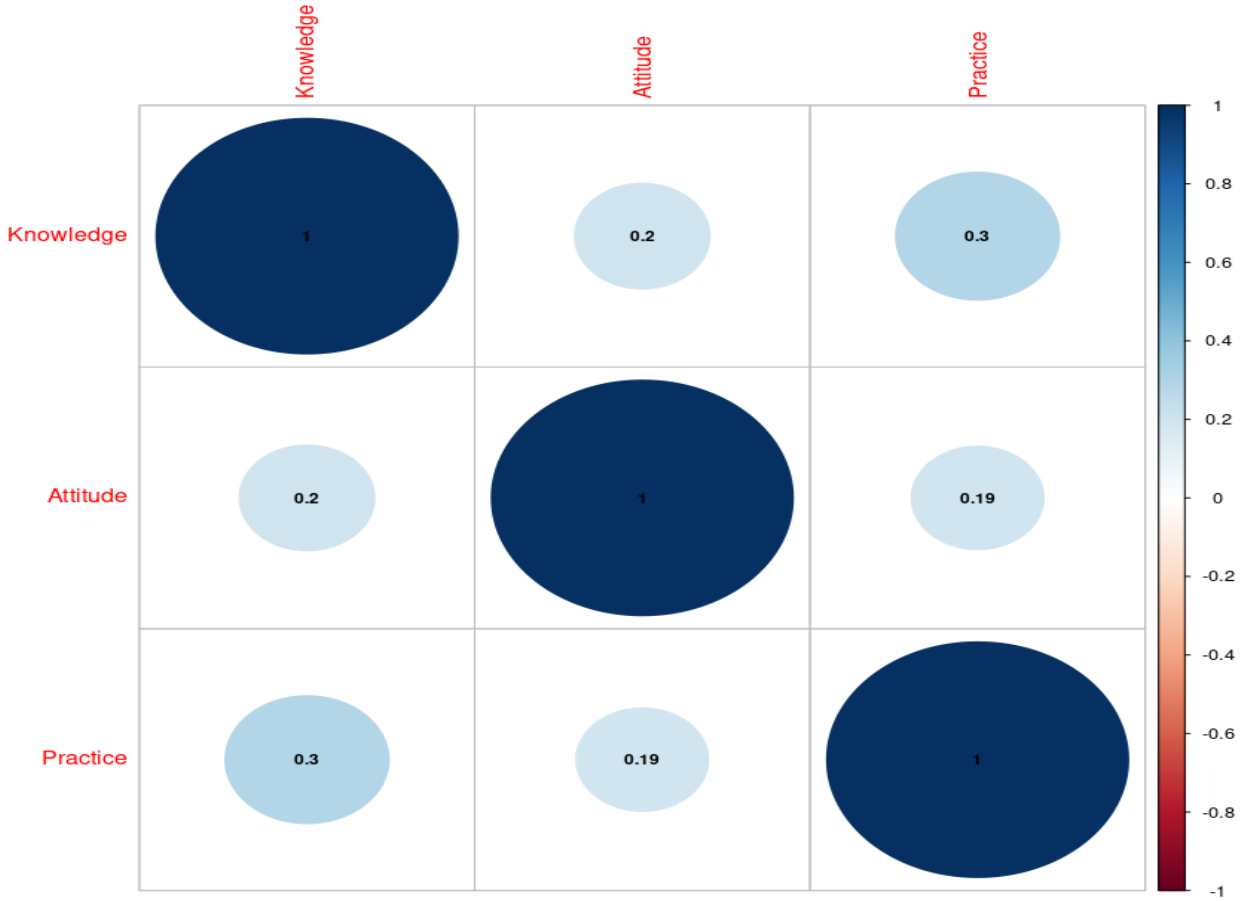

Figure 4-1: Matrix plot for correlation between knowledge attitude and practice scores

4.8. Association between socio-demographic characteristics and KAP

Using Pearson's chi-square test, Age was significantly associated with knowledge (p=0.026) and attitude (p=0.042) but not with practices. Educational level was associated with knowledge attitude and practice

(P<0.05). However, family size was not significantly related to neither knowledge, attitude nor COVID-19 related practices, table 4-5.

Table 4-1: Pearson's chi-square test for association between socio-demographic and respondents KAP

Sociodemographic		**Knowledge**			**Attitude**			**Practice**		
Variables	**N-** (387)	**Good** N=163 (%)	**V-good** N=224 (%)	**p-value[1]**	**Good** N=163 (%)	**V-good** N=224 (%)	**P-value[1]**	**Inadequate** N=298 (%)	**Adequate** N=89 (%)	**P-value[1]**
Age				**0.026***			**0.040***			**0.065**
10-20	69	39 (23.0)	30 (13.4)		39 (24.0)	29 (13.0)		60 (20.1)	9 (10.1)	
21-30	240	93 (57.1)	147 (65.6)		93 (57.1)	142 (63.4)		175 (58.7)	65 (73.0)	
31-40	73	28 (17.2)	45 (20.1)		28 (17.2)	44 (20.0)		59 (19.8)	14 (15.7)	
Above 40	5	3 (1.8)	2 (0.9)		3 (1.8)	29 (13.0)		4 (1.3)	1 (1.1)	
Family size				**0.300**			**0.200**			**0.120**
9-12	10	4 (2.5)	6 (2.7)		4 (2.5)	6 (2.7)		6 (2.0)	4 (4.5)	
3-5	221	89 (54.6)	132 (59.0)		89 (54.6)	128 (57.1))		175 (58.7)	46 (51.7)	
6-8	98	50 (30.7)	48 (21.4)		50 (30.7)	47 (21.0)		78 (26.2)	20 (22.5)	
<3	58	20 (12.3)	38 (17.0)		20 (12.3)	36 (16.1)		39 (13.1)	19 (21.3)	
Education level				**<0.001***			**<0.001***			**0.001***
Highschool	164	72 (44.2)	92 (41.1)		72 (44.2)	90 (40.2)		114 (38.3)	50 (56.2)	
Primary	133	68 (41.7	65 (29.0)		68 (41.7)	61(27.2)		116 (38.9)	17 (19.1)	
Tertiary	87	21(12.9)	66 (29.5)		21(13.0)	65 (29.0)		66 (22.1)	21 (23.6)	

V-good= Very good** ***Statistically significant p-value (P<0.005)** **[1] Pearson's chi-square test

4.9. Predictors of knowledge attitude and practice

A multinomial logistics regression was performed to ascertain the predictors of KAP using Bloom's cut-off point. In this analysis the risk of having good knowledge relative to moderate knowledge among respondents with tertiary level of education was 3.54 times higher than respondents with primary level of education. Whereas the risk of having poor practices relative to good practices for respondents from households with 3-5 and 6-8 members was 2.11 and 2.58 times respectively higher than respondents from household with less than 3 members. In addition, the risk of having poor practices relative to good practices for respondents with tertiary and secondary level of education was 0.48 and 0.49 times respectively lower than primary level of education.

Table 4-1: Multinomial logistic regression for predictors of KAP

Variable	**Knowledge**				**Attitude**		**practice**			
Social demographics	**RRR Poor**	**P-value**	**RRR V-good**	**P-value**	**RRR V-good**	**P-value**	**RRR Poor**	**P-value**	**RRR V-Good**	**P-valu**
Age										
10-20	Reference									
21-30	1.80	0.992	1.53	0.141	0.78	0.033*	1.15	0.655	2.15	0.24
31-40	1.33	0.844	1.86	0.083	1.56	0.638	1.17	0.670	1.45	0.63
Above 40	5.43	0.000*	1.01	0.995	0.13	0.995	4.93	0.172	9.09	0.99
Household numbers										
less than 3	Reference									
3 to 5	0.60	0.995	1.00	0.995	0.77	0.943	2.11	0.043*	1.19	0.75
6 to 8	1.24	0.994	0.69	0.305	0.90	0.977	2.58	0.022*	2.22	0.21
9 to 12	0.43	1.000	1.02	0.981	1.86	0.993	0.40	0.418	0.30	0.25
Education level										
Primary	Reference									
Secondary	1.70	0.713	1.36	0.200	1.94	0.248	0.49	0.004*	0.84	0.71
Tertiary	3.54	0.994	3.16	0.001*	2.66	0.255	0.48	0.004*	1.45	0.49
Good = Base outcome	***V-good= Very good***		**** Statistically significant (P<0.05)***				***RRR= relative risk rati***			

CHAPTER FIVE: DISCUSSION

5.1. Introduction

This chapter discusses the findings from knowledge attitude and practice assessment including the social demographic factors that were associated with both KAP.

5.2. Knowledge assessment

The current study revealed that, more than four-fifths of the participants had moderate and above knowledge of COVID-19 infection. This demonstrates that COVID-19 the government had done a great job in creating awareness throughout the country and this had a positive impact on pregnant women's knowledge level. However, among pregnant women in the area, the use of COVID-19 preventive measures was low. As a result, having enough knowledge does not always translate into the adoption of good practices. A study conducted in Uganda among healthcare workers (Olum *et al*., 2020) and Ethiopia (Besho *et al*., 2021) had similar findings has majority of the participants had adequate knowledge and poor practices towards the pandemic. As a result, despite a health education campaign to increase public awareness, the government will need to take a regulatory approach to COVID-19 prevention measures, including COVID-19 vaccine uptake among pregnant women.

The high average knowledge score in our study corroborates the findings from a study done in Abakaliki, Ebonyi State, Nigeria (Anozie *et al*., 2020) and China (Zhong *et al*., 2020), but our finding was slightly higher than a KAP study done in Uganda (Olum *et al*., 2020), among residents in Tanzania (Hussain *et al*., 2020) citizens in Sudan (Altayb Mousa *et al*., 2020) and among general population in Nigeria (Adesegun *et al*., 2020). Much lower levels were reported in some parts of Nigeria (West *et al*., 2021). This disparity in knowledge could be attributed to times the study was conducted as compared to when the pandemic began. furthurmore media coverage and debriefs of COVID-19 may have contributed to the high knowledge reported in the current study.

In the current study the women had good knowledge regarding symptoms of COVID-19. These is similar with the study conducted in Egypt (Abdelhafiz *et al*., 2020), China (Zhong *et al*., 2020), Ethiopia (Degu *et al*., 2021) and Bangladesh (Farhana & Mannan, 2020). Knowledge of signs and symptoms is especially important in early disease detection and treatment, as well as timely referrals to hospitals. This demonstrates that the government has done a good job in educating Kenyans on how to identify disease symptoms.

The majority of pregnant women understood how COVID-19 is transmitted; more than 70% of pregnant mothers correctly answered this question. These findings was consistent with reports from studies

conducted in Iran (Maharlouei *et al*., 2020) and Bangladeshi (Farhana & Mannan, 2020) where the majority of the participants had good knowledge of COVID-19 modes of transmission. This is important because it can lead to people taking appropriate preventive measures. In addition , a sizable number of pregnant women (38.9%) still think there is a treatment for COVID-19. This finding was supported by a study conducted on the general population in Nigeria (Mustapha *et al*., 2020). In contrast a study done in Ethiopia (Besho *et al*., 2021) majority (87.2%) of the respondents knew there is no treatment for COVID 19. This disparity could be attributed to the education status of the respondents, only (22.5%) of the respondents had attained tertiary level of education in our study as compared to more than 35.3% in Ethiopia. This claim could also be associated with treatments given to COVID-19 patients in hospitals for any symptom. As a result, more emphasis should be placed on educating pregnant women about COVID-19 management.

The current study illustrates that most of the respondents had good knowledge of the main preventive measures of COVID-19, wearing a facemask 98.4%, washing hands with water and soap 99.7%, maintaining social distance in public places 99.5% and vaccination 95.9%. These findings were similar to a study done in Sudan (Mohamed *et al*., 2021) and Ethiopia among pregnant women (Aboma & Gurmu, n.d.). The high level of COVID-19 knowledge towards COVID-19 preventive measures could be attributed to the study being conducted during the fourth wave of the pandemic (December 2021 to January 2022) when there were numerous news and information about the pandemic on social media. Furthermore, the commonest source of information in the present study as revealed from FGDs, was mass media, indicating that mainstream media (radio or television) played an important role in disseminating the COVID-19 prevention knowledge. This finding is in agreement with a quantitative study done in Uganda (Okello *et al*., 2020), Bangladesh (Farhana & Mannan, 2020) and Ethiopia (Degu *et al*., 2021). Likewise, a quantitative study conducted in Kenya showed that mass media was the main source of information about COVID-19 (Austrian *et al*., 2020). As a result, it is important to ensure that informations passed through media is accurate especially during outbreaks (Caplan, 2010), because outbreaks are associated with a mixture of misconceptions, which can be spread through social media and cause panic. As in the case of hydroxychloroquine, which ran out of stock in some countries, such as Egypt (Abdelhafiz *et al*., 2020) and Sudan (Mohamed *et al*., 2021), because it was said to have a positive effect on COVID-19.

5.3. Attitude assessment

Overall, the respondents had a good attitude toward COVID-19 preventive measures. They believed in the value of frequent hand washing, wearing a face mask and social distancing. A study conducted in

Nigeria (Anikwe *et al*., 2020) and China (Zhong *et al*., 2020) had similar findings as majority of the respondents demonstrated good attitude towards COVID-19 preventive measures. A similar finding was also noted in a study conducted in Iran (Erfani *et al*., 2020). The positive attitude may be because the study was conducted during the main phase of the outbreak and there was a lot of information about the infection, symptoms, transmission, and prevention and control measures.

During the focus group discussions, one of the participants stated that pregnant women had a negative attitude toward lockdown and curfews. This could be due to how the authorities treated the public during curfew hours and lockdown areas, as well as the fact that one of the major social economic activities in Kisumu and Siaya Counties is fishing, which is mostly done at night, so the curfews and lockdown were interfering with their main economic activity. In addition, FGDs revealed that one of the predictors of respondents' attitude toward the preventive measure was continuous COVID-19 media debriefings by government officials. This finding was supported with the findings from a quantitative study conducted in Bangladesh (Banik *et al*., 2021) among the youths that showed that social media exposure to COVID-19 information had a great influence on attitudes and behaviors of the population. Furthermore, one key informant stated that politicians had a negative influence on the pregnant women attitudes toward preventive measures because they were not following the COVID-19 rules during their rallies, and thus the respondents did not take the measures seriously, this could be because majority of our respondent's main source of information was mainstream/ social media hence able to watch the politicians holding their rallies.

5.4. Practice assessment

The current study results showed low practice towards COVID-19 preventive measures for most of the participants. This finding is comparable to similar studies done in Ethiopia (Besho *et al.*, 2021) Ghana (Kumbeni *et al.*, 2021) and Nigeria (Nwafor *et al*., 2020). Similarly, according to a study in Uganda (Okello *et al*., 2020), there was a low level of adherence to public health preventive measures. The low prevalence of COVID -19 preventive practices according to KIIs and FGDs could be due to the barriers identified by our study like, the high cost of face masks, the smell of soaps and hand sanitizers, and poor quality of face masks that were making pregnant women uncomfortable to wear them. The smell of soaps and sanitizers, as well as the inability to breathe well when wearing a face mask, could be due to physiological and hormonal changes in pregnancy. As pregnancy progresses, there is an increase in the hormone progesterone, which makes pregnant women have difficulty breathing. As a result, wearing a face mask that covers both the mouth and the nose is uncomfortable (LoMauro & Aliverti, 2015).

Wearing a face mask, social distancing and frequent hand washing using soap and water have proven to be effective in the prevention and control of COVID-19. However, vaccination is the most promising solution. In our study, majority of the participants knew that there was COVID-19 vaccine, however only 28% of respondents had been vaccinated at the time of data collection. These could be due to several myths and misconceptions about COVID-19 vaccine as revealed by respondents from FGDs and KIIs. The respondents mentioned that COVID-19 vaccination was associated with facial deformation, it can reduce libido in men and that the vaccine is a source of family planning. However, this is not the case; COVID-19 vaccines have been shown to be both safe and effective. Despite their rapid development, they have gone through the same rigorous licensing process as other vaccines, meeting all safety standards (Lockerd & David, 2021).

The current study found a significant weak correlation between attitude and practice and moderate correlation between knowledge and practice. This corroborates findings from a similar study on COVID-19 in India (Singh *et al.*, 2022) and Bangkok, Thailand (Kunno *et al.*, 2022). This was most likely because, while attitudes are a driving force behind behavior change, they are not absolute, and a variety of other factors may be at work for example the current study, FGDs and KIIs revealed some factors that hindered the pregnant women from using the preventive measures like the cost of a face mask, smell of soaps and sanitizers and inadequate space at the facilities and public places.

5.5. Social demographic factors associated KAP of COVID-19 preventive measures

In the current study, respondents who had tertiary level of education were likely to have good knowledge as compared to those with primary level of education. This positive association between knowledge of COVID-19 and level of education has been reported in other studies, a study conducted in Ethiopia the pregnant women who had secondary and above education were more likely to have good knowledge of COVID 19 as compared with below primary level of education. These finding was similar to a studies conducted in China, (Lee *et al.*, 2021) Debra Tabor, (Kamal *et al.*, 2020) China, (Lee *et al*., 2021) and Iran (Maharlouei *et al.*, 2020) where a majority of pregnant women who had higher educational level had good knowledge. This can be deu to the fact women with a higher education can have access to information from several sources and are able to understand that information. In contrast, in a study conducted in India (Kaur *et al.*, 2021) there was no significant relationship between knowledge and education level. In addition, age was also associated with knowledge level, participants who were 40 years and above were more likely to have poor knowledge as compared to those below 20 years. This is because younger age groups spend most time on social media and watching television shows, hence getting more information as compared to the older group who are busy with mostly working to provide for their

families. Therefore health education interventions would be more effective if it targets certain social demographic groups.

The respondent’s age was associated with participants' attitudes toward preventive measures, with participants aged 21-30 years being less likely to have a positive attitude toward the COVID-19 preventive measures as compared to those between the age category of 10-20. The findings were similar to those of a study conducted in Ethiopia (Goshiye *et al*., 2022), which reported that older mothers were less likely to have positive attitude towards COVID-19 prevention measures. This is because as mothers get older, they may become more difficult to persuade and change their attitudes as compared to when they are younger.

The current study found a low level of good COVID-19 preventive practices, however, having a moderate level of knowledge of COVID-19 preventive measures and having at least primary education, were positively associated with adequate practices on COVID-19 in regression analysis. Our finding is supported by a study conducted among pregnant women in Ghana (Kumbeni *et al*., 2021). This is due to the fact that women with at least a primary education are more likely to be exposed to variety of information and, as a result, take proactive steps to protect themselves from the infection. *(Feinstein et al.*, 2006).

CHAPTER SIX: CONCLUSSION AND RECOMMENDATION

6.1. Conclusion

Pregnant women were knowledgeable and had a positive attitude towards COVID-19 preventive measures. However, this did not translate into pregnant women engaging in good COVID-19 preventive practices. This study found that poor COVID-19 preventive practices were due to perceived high cost of facemasks then, smell of soaps and hand sanitizers, and poor quality of face masks and that poor COVID-19 vaccine uptake among pregnant women was caused by vaccine misconceptions. In addition, respondents' educational level was associated with knowledge, attitude and practice

6.2. Recommendation

I. The government, through the Ministry of Health, should continue with health education campaigns via mainstream/social media, ANC, and churches to improve or maintain pregnant women's knowledge levels toward COVID -19 preventive measures. During these campaigns special consideration should be given to those who are less-educated pregnant women and the older age group.

II. The government should ensure that policies governing politicians when they hold rallies and campaigns during a pandemic are strictly adhered to, so that their actions do not influence the public's attitude and willingness to follow any measures put in place.

III. To improve COVID-19 preventive practices among pregnant women:

- The government should ensure that the costs of any preventive or control measures implemented are subsidized so that everyone can afford especially the pregnant women. Furthermore, if pregnant women must use the clothe mask, they should be standardized and be of good quality.
- The government should also ensure that hand sanitizer manufacturers improve their labeling techniques so that pregnant women can distinguish between scented and unscented sanitizers. There should also be a policy governing soaps and sanitizers in public places, they should have both scented and unscented soaps and sanitizers to accommodate pregnant women who are sensitive to smell.
- The hospital administration should ensure that the safety information on the COVID-19 vaccine in pregnancy is clearly communicated to pregnant women, for example, by using infographics pasted on the walls of ANC clinics and hospital maternity wards. Furthermore, each pregnant woman should receive at least one counselling session from a midwife during her visits that addresses her concerns about the COVID-19 vaccination.

IV. During sensitization about COVID-19 preventive measures, special consideration should be given to those who are less-educated, older age group and those from large families.

6.3. Future studies

More research is needed on other groups in Kisumu and Siaya Counties, such as the less educated, the elderly, the younger group and house holds with more than five members to get a more information about the situation in terms of COVID-19 knowledge, attitudes, and practices, and to propose better interventions.

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APPENDICES

APPENDIX I: Informed Consent: Quantitative English Version

Title of the study

KNOWLEDGE ATTITUDE AND PRACTICE OF COVID 19 PREVENTIVE MEASURES AMONG PREGNANT WOMEN ATTENDING ANTENATAL CLINIC IN KISUMU AND SIAYA COUNTIES.

Investigators

Name of student	Institution
EverlyneDelylah Ondieki	Jaramogi Oginga Odinga University of science and Technology

Introduction

You are being asked to take part in a research study. This study is being conducted by Everlyne Delylah Ondieki A master's in Public Health student at Jaramogi Oginga Odinga University of Science and Technology.

Before you decide if you want to take part in the study, it is important that you understand what it is about and how you will be involved. I am going to read this statement about the study out loud. You can also read it as I read it out loud. You can take all the time you need to read the statement yourself now. At any time, you can ask me about anything that you do not understand or if you want more information.

What is the study about?

This is a study about assessing the knowledge attitude and practice of COVID-19 infection preventive measures among pregnant women attending first antenatal clinic in Kisumu and Siaya Counties in 12 selected health facilities and I will interview 422 pregnant women in this study.

I want to answer the following questions:

1. What is the COVID-19 knowledge level among pregnant women attending antenatal care Siaya and Kisumu Counties?
2. What are the attitudes towards COVID-19 preventive measures among pregnant women attending antenatal care in Siaya and Kisumu Counties?

3. What are the practices of COVID-19 preventive measures among pregnant women attending antenatal care in Siaya and Kisumu Counties?

What will I be asked to do if I am in this study?

I will ask you questions about what you know about COVID-19, like transmission, and prevention measures. What you think about Covid-19 infection prevention measures and what you practice in regard to COVID 19 prevention. This will take at least 10 minutes. You do not have to answer any questions that make you uncomfortable. I will also ask about your age, highest level of schooling you have completed, marital status, religion, ethnicity and where you come from.

I will like you to feel comfortable to give your answer throughout the interview. I am here to learn from you and seek your opinions therefore it is important that you answer in the way you feel most appropriate, and that you understand that your opinions and ideas are valuable.

Are there any risks to me if take part in this study?

You may find some of these questions uncomfortable and prefer not to answer them. You can choose to not answer any of the questions we ask for any reason and at any time. You can also choose to stop the Interview.

Are there any benefits to me if take part in this study?

There will be no direct benefits to you by agreeing to participate in this study. My work is to learn about the knowledge attitude and practice of COVID-19 infection preventive measures among pregnant women this can make constructive suggestions about designing information and education interventions to be provided in antenatal clinic visits regarding COVID-19 preventive measures.

How will my personal information be protected?

We will not record participants' names. Instead, we will assign numbers to individuals that will be matched against the responses. No names will be entered into the computer safely and made accessible to the research team only. No quotes or other results arising from your participation in this study will be included in any reports, even anonymously, without your agreement.

Data processing and storage

All data and case report forms will only be identified by an ID number and be stored only on password-protected computers to which only project researchers have access. Throughout the data collection and

analysis period, printed transcripts and any other written information will remain in locked cabinets when not in usage.

What happens if I don't want to participate?

You are free to decide whether you wish to participate. Participation is voluntary. If you agree to take part in the study, you will be asked to give your consent that you agree to take part. Before deciding whether you are willing to support our study, please feel free to ask any questions about what we have just said. If you agree to participate, we will record your agreement now and give you a copy. Even after you agree to take part, you can still leave the study at any time. If you choose not to participate, this will have no effect on you nor any of your household members.

What if I have any questions?

If you have questions about this study, please contact: Everlyne Delylah Ondeiki A student at Jaramogi Oginga Odinga University of science and Technology: email address evedelylah@gmail.com

If you want to ask someone independent about this research, please contact:

Dr Shehu Awandu +254741911577 a lecturer at Jaramogi Oginga Odinga University of science and Technology

Dr Elizabeth Obinge +254714606872 a lecturer at Jaramogi Oginga Odinga University of science and Technology

By signing below, I affirm that

- ☐ ***Yes,*** *please tick* I agree to take part in this study.
- ☐ ***Yes,*** *please tick* I agree that information I give will be stored and may be used further in the future.
- ☐ ***Yes,*** *please tick* I agree to the use of anonymous quotes in future reports and publications

Confirmation of written consent

_____ _____

Printed name Date

_____

Signature of Participant

Member of research team

Signing my name below means I have explained this research study to you and answered your questions to the best of my ability. I will give you a copy of this form to keep.

_____ _____

Signature of Person Obtaining Consent Date

_____

Printed name

APPENDIX II: Informed Consent: Focus Group Discussions English version

Title of the study

KNOWLEDGE ATTITUDE AND PRACTICE OF COVID 19 PREVENTIVE MEASURES AMONG PREGNANT WOMEN ATTENDING ANTENATAL CLINIC IN KISUMU AND SIAYA COUNTIES.

Investigators

Name of student	Institution
Everlyne Delylah Ondieki	Jaramogi Oginga Odinga University of science and Technology

Introduction

You are being asked to take part in a research study. This study is being conducted by Everlyne Delylah Ondieki A master's in Public Health student at Jaramogi Oginga Odinga University of science and Technology.

Before you decide if you want to take part in the study, it is important that you understand what it is about and how you will be involved. I am going to read this statement about the study out loud. You can also read it as I read it out loud. You can take all the time you need to read the statement yourself now. At any time, you can ask me about anything that you do not understand or if you want more information.

What is the study about?

This is a study about assessing the knowledge attitude and practice of COVID-19 infection preventive measures among pregnant women attending first antenatal clinic in Kisumu and Siaya Counties in selected health facilities. I am planning to do this study in four facilities in Kisumu County and four facilities in Siaya County and I will interview 385 pregnant women in this study.

In this study, I want to answer the following questions:

1 What is the COVID-19 infection knowledge level among pregnant women attending antenatal care Siaya and Kisumu Counties?

2 What are the attitudes towards COVID-19 infection preventive measures among pregnant women attending antenatal care in Siaya and Kisumu Counties?

3 What are the practices of COVID-19 infection preventive measures among pregnant women attending antenatal care in Siaya and Kisumu Counties?

What will I be asked to do if I am in this study?

I would like you to share with me your knowledge on COVID 19. This includes the causes, transmission, symptoms, and prevention, what you feel about the existing COVID 19 Preventive Measures and what influences your feeling towards these preventive measures, and I would also like to know existing facilitators and barriers to your practicing COVID 19 prevention and control measures.

The group discussion will take approximately one hour. At the end of the discussion, we will record your age, years of education, marital status, religion, ethnicity and where you come from. You should feel free to withdraw from the discussion at any point.

I would like you all to feel comfortable to give your opinions throughout the discussion. Please remember, there are no right or wrong answers. We are here to learn from you and seek your opinions therefore it is important that you answer in the way you feel most appropriate, and that you understand that all of your opinions and ideas are valuable.

Are there any risks to me if take part in this study?

You may find some of these questions uncomfortable and prefer not to answer them. You can choose to not answer any of the questions we ask for any reason and at any time. You can also choose to exit the discussion at any time.

Are there any benefits to me if take part in this study?

There will be no direct benefits to you by agreeing to participate in this group discussion. My work is to learn about the knowledge attitude and practice of COVID-19 infection preventive measures among pregnant women this can make constructive suggestions about designing information and education interventions to be provided in antenatal clinic visits regarding COVID-19 preventive and control measures.

Costs and compensation for being in the study.

It is free to take part in the study. You will receive reimbursement for your transport of Ksh 300. If the staff ask you to wait for more than half a day for study discussions, you will be provided some snacks and refreshments.

How will my personal information be protected?

During the discussion we will take handwritten notes and also tape record the session. We will not record participants' names during note taking. Instead, we will assign numbers to individuals that will be matched against the responses. The notes will be entered into a computer. No names will be entered into the computer. Tapes will be transcribed; they will be destroyed after they have been transcribed. Until they are transcribed, they will be kept safely and made accessible to the research team only. Where we use quotes from the discussions, they will be designated by woman number. No quotes will be traceable to a specific person. No quotes or other results arising from your participation in this study will be included in any reports, even anonymously, without your agreement.

Data processing and storage

All recordings and transcriptions will only be identified by an ID number and be stored only on password-protected computers to which only project researchers have access. Throughout the data collection and analysis period, printed transcripts and any other written information will remain in locked cabinets when not in usage.

What happens if I don't want to participate?

You are free to decide whether you wish to participate. Participation is voluntary. If you agree to take part in the study, you will be asked to give your consent that you agree to take part. Before deciding whether you are willing to support our study, please feel free to ask any questions about what we have just said. If you agree to participate, we will record your agreement now and give you a copy. Even after you agree to take part, you can still leave the study at any time. If you choose not to participate, this will have no effect on you nor any of your household members.

What if I have any questions?

If you have questions about this study, please contact: Everlyne Delylah Ondeiki A student at Jaramogi Oginga Odinga University of science and Technology: email address *evedelylah@gmail.com*

If you want to ask someone independent about this research, please contact:

Dr Shehu Awandu +254741911577 a lecturer at Jaramogi Oginga Odinga University of science and Technology

Dr Elizabeth Obinge +254714606872 a lecturer at Jaramogi Oginga Odinga University of science and Technology

By signing below, I affirm that:

- ☐ ***Yes,*** *please tick* I agree to take part in this study.
- ☐ **Yes,** *please tick* I agree that the interview be audio recorded.
- ☐ ***Yes,*** *please tick* I agree that information I give will be stored and may be used further in the future.
- ☐ ***Yes,*** *please tick* I agree to the use of anonymous quotes in future reports and publications.

Confirmation of written consent

_____ _____

Printed name Date

_____

Signature of Participant

Member of research team

Signing my name below means I have explained this research study to you and answered your questions to the best of my ability. I will give you a copy of this form to keep.

_____ _____

Signature of Person Obtaining Consent Date

_____

Printed name

APPENDIX III: Informed Consent: Key Informant Interview English Version

Title of the study

KNOWLEDGE ATTITUDE AND PRACTICE OF COVID 19 PREVENTIVE MEASURES AMONG PREGNANT WOMEN ATTENDING ANTENATAL CLINIC IN KISUMU AND SIAYA COUNTIES.

Investigators

Name of student	Institution
Everlyne Delylah Ondieki	Jaramogi Oginga Odinga University of science and Technology

Introduction

You are being asked to take part in a research study. This study is being conducted by EverlyneDelylah Ondieki A master's in Public Health student at Jaramogi Oginga Odinga University of Science and Technology.

Before you decide if you want to take part in the study, it is important that you understand what it is about and how you will be involved. I am going to read this statement about the study out loud. You can also read it as I read it out loud. You can take all the time you need to read the statement yourself now. At any time, you can ask me about anything that you do not understand or if you want more information.

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This is a study about assessing the knowledge attitude and practice of COVID-19 infection preventive measures among pregnant women attending first antenatal clinic in Kisumu and Siaya counties in selected health facilities. I am planning to do this study in four facilities in Kisumu County and four facilities in Siaya county and I will interview 385 pregnant women in this study.

In this study, I want to answer the following questions:

4 What is the COVID-19 infection preventive measures knowledge level among pregnant women attending antenatal care Siaya and Kisumu counties?

5 What are the attitudes towards COVID-19 infection preventive measures among pregnant women attending antenatal care in Siaya and Kisumu counties?

6 What are the practices of COVID-19infection preventive measures among pregnant women attending antenatal care in Siaya and Kisumu Counties?

What will I be asked to do if I am in this study?

I would like you to share with me more about the knowledge of COVID 19 among the pregnant women who visit your facility this includes the causes, transmission, symptoms, and prevention, where you think the pregnant women get their knowledge on COVID 19 prevention from, tell me more about the myths and misconceptions the pregnant women have about COVID 19,the perception of the pregnant women towards the COVID 19 Preventive measures and what influences their perception towards these preventive measures, and I would also like to know existing facilitators and barriers to the pregnant women in practicing COVID 19 prevention and control measures. The Interview will take approximately one hour. At the end of the discussion, we will record your age, years of education, marital status, religion, ethnicity and where you come from. You should feel free to withdraw from the discussion at any point.

We would like you all to feel comfortable to give your opinions throughout the discussion. Please remember, there are no right or wrong answers. We are here to learn from you and seek your opinions therefore it is important that you answer in the way you feel most appropriate, and that you understand that all of your opinions and ideas are valuable.

Are there any risks to me if take part in this study?

You may find some of these questions uncomfortable and prefer not to answer them. You can choose to not answer any of the questions we ask for any reason and at any time. You can also choose to exit the discussion at any time.

Are there any benefits to me if take part in this study?

There will be no direct benefits to you by agreeing to participate in this group discussion. My work is to learn about the knowledge attitude and practice of COVID-19 infection preventive measures among pregnant women this can make constructive suggestions about designing information and education interventions to be provided in antenatal clinic visits regarding COVID-19 preventive and control measures.

How will my personal information be protected?

During the Interview we will take handwritten notes and tape record the session. No participant name will be recorded when taking notes but use numbers that will be matched with their responses. The notes will be entered into a computer. No names will be entered into the computer. Tapes will be transcribed; they will be destroyed after they have been transcribed. Until they are transcribed, they will be kept safely and made accessible to the research team only. Where we use quotes from the discussions, they will be designated by woman number. We will not include quotes that can help a person trace you or trace any results from your participation without your agreement.

Data processing and storage

All recordings and transcriptions will only be identified by an ID number and be stored only on password-protected computers to which only project researchers have access. Throughout the data collection and analysis period, printed transcripts and any other written information will remain in locked cabinets when not in usage.

What happens if I don't want to participate?

You are free to decide whether you wish to participate. Participation is voluntary. If you agree to take part in the study, you will be asked to give your consent that you agree to take part. Before deciding whether you are willing to support our study, please feel free to ask any questions about what we have just said. If you agree to participate, we will record your agreement now and give you a copy. Even after you agree to take part, you can still leave the study at any time. If you choose not to participate, this will have no effect on you nor any of your household members.

What if I have any questions?

If you have questions about this study, please contact: Everlyne Delylah Ondieki A student at Jaramogi Oginga Odinga University of science and Technology: email address evedelylah@gmail.com

If you want to ask someone independent about this research, please contact:

Dr Shehu Awandu +254741911577 a lecturer at Jaramogi Oginga Odinga University of science and Technology

Dr Elizabeth Obinge +254714606872 a lecturer at Jaramogi Oginga Odinga University of science and Technology

By signing below, I affirm that

- ☐ ***Yes,*** *please tick* I agree to take part in this study
- ☐ **Yes,***please tick* I agree that the interview be audio recorded.
- ☐ ***Yes,*** *please tick* I agree that information I give will be stored and may be used further in the future.
- ☐ ***Yes,*** *please tick* I agree to the use of anonymous quotes in future reports and publications

Confirmation of written consent

_____ _____

Printed name Date

_____

Signature of Participant

Member of research team

Signing my name below means I have explained this research study to you and answered your questions to the best of my ability. I will give you a copy of this form to keep.

_____ _____

Signature of Person Obtaining Consent Date

APPENDIX 1V: Informed Consent: Quantitative Luo version

Oboke ma moko ma otudre kod nonroni

Oboke mar ayie: Rango nok kata ng'eny mar gi moro kokalo e nonro

KNOWLEDGE ATTITUDE AND PRACTICE OF COVID 19 PREVENTIVE MEASURES AMONG PREGNANT WOMEN ATTENDING ANTENATAL CLINIC IN KISUMU AND SIAYA COUNTIES.

Jotend nonro

Nying jalno ma somo	Nying kar somo
EverlyneDelylah Ondieki	Jaramogi Oginga Odinga University of science and Technology

Chakruok

Ikwayi mondo idonj e nonro. Nonro ni itime gi Everlyne Delylah Ondieki ma en japuonjre e ranginy mamalo e weche mag ler kod ngima dhano e mbalariany ma Jaramogi Oginga Odinga University of Science and Technology.

Kapok ing'ado mar donjo e nonroni, ber mondo ing'e gino momiyo watimo nonroni to kod gima ibiro dwaro mondo itim. Abiro somo matek weche ma otudre kod wach nonroni. In bende inyalo somo koda seche ma asome matek no. Inyalo bende kawo kinde mari kaka idwaro mondo mi isom wechegi in iwuon sani . In thuolo saa moro amora mondo ipenja gin moro a mora ma ok I winjo kata ka idwaro mondo omed leri matut .

Nonroni en kuom ango?

Nonro ni en kuom rango weche mag ngeyo ,paro ka achiel kod tim ma mine man kod ich kendo dhi e klinik mar gi mokuongo mar mar mine mayach ni kodo egwenge ma siaya kod kisumu counties kaluwre kod yore mag gengo tuo mar COVID- 19 . Nonro ni abiro tim kuonde 12 mag thieth ma oyier e gwengegi kendo abiro loso kod mine 385 man kod ich ka apenjogi penjo moko.

Adwaro duoko penjogi e nonroni:

- Okang mar ngeyo ma mine man kod ich kendo dhi e KLINIK margi mokuong ni godo egwenge ma siaya kod kisumu kauntis kaluwre kod yore mag gengo tuo mar COVID- 19
- Paro ma mine man kod ich kendo dhi e klinik margi mokuongo mar mine mayach ni kodo egwenge ma siaya kod kisumu counties kaluwre kod yore mag gengo tuo mar COVID-19
- Timbe ma mine man kod ich kendo dhi e klinik mar gi mokuongo mar mine mayach ni kodo egwenge ma siaya kod kisumu kauntis kaluwre kod yore mag gengo tuo mar COVID- 19.

En ango ma ibiro dwaro mondo atim ka adojo e nonroni?

Ka iyie donjo e nonroni, abiro penji penjo moko kaluwre kod gigo ma ingeyo kuom tuo mar COVID-19. Penjo gi gin kuom kaka olandore, kaka igenge ,paro mari kuom yore mag temo genge ka achiel kod tim mari in iwuon kaluwre kod weche mag gengo tuo mar COVID-19. Penjogi duto biro kawo dakika apar katin. In thuolo tamruok duoko penjo moro amora ma ok in kodo thuolo.

Abiro nyaka penji hiki,okang ma malo mogik mar somo mari ,chal mari e yore mag keny ,dini,kabila mari to kod thuru kama iwuok e.

Adwaro mondo ibed thuolo mondo ichiw pachi.nge ni onge duoko maber kata marach.an ka mondo apuonjra ko kalo kuomi kendo mondo awinj pachi.emomiyo bed thuolo kendo iduok penjo eyo ma madi ber ni ka ingeyo ni duoko kod paroni duto beyo.

En rach mane manyalo betye ka adonjo e nonroni?

Inyalo yudo ka ok in thuolo kod penjo moko kendo ok di gomb duoko gi.in thuolo yiero mar mondo kik iduok penjo go.Bende in thuolo saa asaya mar chungo kata tamruok dhi mbele kod penjo

Bende nitie ber moro amora manyalo yudo ka adonjo e nonroni?

Onge ber moro amora ma ochiki tir ma idhi nwang'o ka iyie duoko penjogi .Tija en ni adwa ngeyo mangeny kaluwore kod ngeyo ,paro ka achiel kod tim ma mine man kod ich kendo dhi

e klinik mar mine mayach ni godo kaluwre kod yore mag gengo tuo mar COVID-19 . Paro ma ayudo nyalo konyo e chiwo paro mochiek ni jogo matayo weche mag gengo COVID- 19.

Ere kaka wechena makende ma amiyou ibiro kan kendo rit ?

Ok wabi ndiko kendo tiyo kod nying mar ng'ama duoko penjo.Wabiro chiwo namba ma opondo ne joma duoko penjo kendo namba no ema ibiro tiyo godo e fwenyo duoko margi.

Nying ok bi ndik e kompyuta. Duoko gi ibiro kano eyoo ma opuodhi kama ngato angata maonge rusa ok nyal yudogi mak mana ngatno ma tiyo e nonro ni. Wecheni kata wach moro amoro ma otudre kodi tir ok bi ti godo e duok moro amora kata e yoo ma opondo kaonge thuolo mari.

Puodho kendo kano weche

Oboke duto mag penjo ibiro mi namba kendo ibiro ngeyo kod nanba no ma opondo , ibiro kano gi eyoo ma opuodhi kama ngato angata maonge rusa ok nyal yudogi mak mana ngatno ma tiyo e nonroni. Saa asaya ma form kata andike mamoko mag nonroni ok tigo,ibiro kano gi kuonde ma opuodhi.

To ka ok adwar donjoe nonro?

In thuolo yiero ka di dwar donjo e nonro. Donjo e nonro en hero mari ok.ka iyie donjo e nonroni, ibiro kwayi mondo I ket sei e form kaka yo manyiso ni iyie.kapok iyiero mar donjo e nonro, bed thuolo mondo ipenj penjo duto kuom gigo ma wase wacho.ka I yie to wabiro keto andike mar ayie kendo wabiro miyi achiel kuom andike mar yie mari no no mondo in bendeb I bed kodo.kata bang ka i segoyo sei e andike no ,pod in thuolo mar weyo nonro saa asaya.ka po ni iyiero ni ok igomb donjo e nonro to mano ok bi kelo pogruok kata ngikruok moro amora ni an kata jo odi .

To kadipo ni an kod penjo?

Kadipo ni in kod penjo to tudri kod Everlyne Delylah Ondeiki A student at Jaramogi Oginga Odinga University of science and Technology: email address evedelylah@gmail.com

To ka idwa penjo malingling mamoko kuom nonroni to inyalo tudri kod

Dr Shehu Awandu +254741911577 a lecturer at Jaramogi Oginga Odinga University of science and Technology

Dr Elizabeth Obinge +254714606872 a lecturer at Jaramogi Oginga Odinga University of science and Technology

Sei mara pinyka tiende ni

- **Ee** ,(*ket tick)* Ayie bet jakanyo mar nonro.
- **Ee** ,(*ket tick)* Ayie weche go ma chiwo ibiro kan kendo inyalo med tiyo kodo endalo mabiro
- **Ee,(*ket tick)*** Ayie ni inyalo ti kod moko kuom weche ga mawacho eyo ma opondo kata maonge nyinga endalo mabiro e repode kata andike mamoko

kar keto andike manyiso ayie

Nying mar ng'ama donjo enonro_____ Tarik_____

Seyi mar ng'ama donjo enonro_____

_____Keto lweta ka andiko nyinga pinyka tiendeni aselero ni nonro ni kendo ase duoko penjo magi duto kaka anyalo . Abiro miyi achiel kuom oboke mar nonro ni mondo ibed kodo.

Seyi mar ng'ama rwako ji enonro_____ Tarik_____

Nying -
_____

APPENDIX V: Informed Consent: Focus Group Discussions Luo version

Oboke mar ayie: Twak mar chokrouok kod mine manigi ich e nonro

KNOWLEDGE ATTITUDE AND PRACTICE OF COVID 19 PREVENTIVE MEASURES AMONG PREGNANT WOMEN ATTENDING ANTENATAL CLINIC IN KISUMU AND SIAYA COUNTIES.

Jotend nonro

Nying kar somo	
Everlyne Delylah Ondieki	Jaramogi Oginga Odinga University of science and Technology

Chakruok

Ikwayi mondo idonj e nonro. Nonro ni itime gi Everlyne Delylah Ondieki ma en japuonjre e ranginy mamalo e weche mag ler kod ngima dhano e mbalariany ma Jaramogi Oginga Odinga University of Science and Technology.

Kapok ingado mar donjo e nonoroni,ber mondo ing'e gino momiyo watimo nonroni to kod gima ibiro dwaro mondo itim.abiro somo matek weche ma otudre kod wach nonroni.in bende inyalo somo koda eche ma asome matek no.inyalo bende kawo kinde mari kaka idwaro mondo mi isom wechegi in iwuon sani .in thuolo saa moro amora mondo ipenja gin moro a mora ma ok I winjo kata ka idwaro mondo omed leri matut .

Nonroni en kuom ango?

Nonro ni en kuom rango weche mag ngeyo ,paro ka achiel kod tim ma mine man kod ich kendo dhi e clinic mar gi mokuongo mar mar mine mayach ni kodo egwenge ma siaya kod kisumu counties kaluwre kod yore mag gengo tuo mar COVID- 19 . Nonro ni abiro tim kuonde 12 mag thieth ma oyier e gwengegi kendo abiro loso kod mine 385 man kod ich a ka apenjogi penjo moko

E nonroni, adwaro duoko penjogi :

- Okang mar ngeyo ma mine man kod ich kendo dhi e clinic mar gi mokuongo mar mar mine mayach ni kodo egwenge ma siaya kod kisumu counties kaluwre kod yore mag gengo tuo mar COVID- 19

- Paro ma mine man kod ich kendo dhi e klinik mar gi mokuongo mar mar mine mayach ni kodo egwenge ma siaya kod kisumu counties kaluwre kod yore mag gengo tuo mar COVID- 19
- Timbe ma mine man kod ich kendo dhi e clinic mar gi mokuongo mar mar mine mayach ni kodo egwenge ma siaya kod kisumu counties kaluwre kod yore mag gengo tuo mar COVID- 19

En ango ma ibiro dwaro mondo atim ka adonjo e nonroni?

Ka iyie donjo e nonroni, abiro kwayi mondo igoye koda mbaka kendo mondo apuonjra ka okalo kuomi kuom gigo ma ingeyo kuom tuo mar COVID- 19,kaka olandore, kaka I genge ,paro mari kuom yore mag temo genge kodo kaachiel kod gigo mamiyo ibet kod paro ma chalo kamano kuom yore mag gengego. Ibiro kendo lera kuom tim mari in iwuon kaluwre kod weche mag gengo tuo mar COVID- 19 ka achiel kod chandruok ma in kodo e chopo moko kuom timbe ma iduaro mondo otim mondo okony e gengo tuo mar COVID-19.Twak biro kawo moromo saa achiel. Bang twak abiro kwayo mondo akaw kendo andik weche moko kuomi ma otudre kod hiki,okang mari ma malo mogik mar ,chal mari e yore mag keny ,dini,kabila mari to kod thuru kama iwuok e. in thuolo chungo kendo wuok e twak saa moro amora ma iparo eseche mag twak.

Adwaro mondo ibed thuolo mondo ichiw pachi.Ng'e ni onge duoko maber kata marach. An ka mondo apuonjra ko kalo kuomi kendo mondo awinj pachi.emomiyo bed thuolo kendo iduok penjo eyo ma madi ber ni ka ingeyo ni duoko kod paroni duto beyo.

Bende nitie ber moro amora manyalo yudo ka adonjo e nonroni?

Onge ber moro amora ma ochiki tir ma idhi nwang'o ka iyie duoko penjogi .tija en ni adwa ngeyo mangeny kaluwre kod ngeyo ,paro ka achiel kod tim ma mine man kod ich kendo dhi e clinic nigodo kuom weche mag gengo COVID- 19

Bende nitie ber moro amora manyalo yudo ka adonjo e nonroni?

Onge ber moro amora ma ochiki tir ma idhi nwang'o ka iyie duoko penjogi .tija en ni adwa ngeyo mangeny kaluwre kod ngeyo ,paro ka achiel kod tim ma mine man kod ich kendo dhi e e clinic nigodo kuom weche mag gengo COVID- 19

Chudo kuom donjo e nonro

Onge chudo moro amoro kuom bedo e nonro .ibiro duokoni ksh300 kaka pesa mari mar wuoth.ka jatij nonro okwayi ma ibet ka irito weche mag nonro ma oloyo nus mar odiechieng to ibiro miyi math mayot ma igayo kodo kech

Ere kaka wechena ibiro rit?

Eseche mag twak,wabiro ndiko gigo ma owach kendo wabiro mako dwol nyaka sama waloso.Ok wabi ndiko kendo tiyo kod nying mar ngama twak kata duoko penjo.Wabiro chiwo namba ma opondo ne ngato ka ngato man e twak kendo namba no ema ibiro tiyo godo e fwenyo kendo tudo duoko mar jatwak no. andike gi ibiro rwako e kompyuta.Nying ok bi ndik e kompyuta. Duol ma omaki ibro loki eyor andike kendo ibiro kan eyo maratiro. Duol ma omaki ibiro ruch oko kuom gik mako duol bang ka osetiek lokogi e andike. Andikego ibiro kano e yoo ma opuodhi kama ngato angata maonge rusa ok nyal yudogi mak mana ngatno ma tiyo e nonro ni. Ka watiyo kod kod wach jatwak moro amoro e to wabiro mana ngeye kod namba.weche jatwak kata wach moro amoro ma otudre kod jatwak tir ok bi ti kodo eriport moro amora kata e yoo ma opondo ka ok oyud e thuolo mar timo mano ka owuok kuom jatwak no .

Puodho kendo kano weche

Duol duto ma omaki kaachiel kod andikeduto mawatimo evesche mag twak ibiro mi namba ma opondo. Andikego ibiro kano e yoo ma opuodhi e computer kama ngato angata maonge rusa ok nyal yudogi mak mana ngatno ma tiyo e nonro ni. E kinde duto mag nonro weche mag twak ,andike kod gik ma moko mag nonro biro bet ka olor ni gi kiful kendo okan eyoo ma opuodhi .

To ka ok adwar donjo I nonro?

In thuolo yiero ka di dwar donjo e nonro. Donjo e nonro en hero mari ok.ka iyie donjo e nonroni, ibiro kwayi mondo I ket sei e form kaka yo manyiso ni iyie.kapok iyiero mar donjo e nonro, bed thuolo mondo ipenj penjo duto kuom gigo ma wase wacho.ka I yie to wabiro keto andike mar ayie kendo wabiro miyi achiel kuom andike mar yie mari no no mondo in bendeb I bed kodo.kata bang ka i segoyo sei e andike no ,pod in thuolo mar weyo nonro saa asaya.ka po ni iyiero ni ok igomb donjo e nonro to mano ok bi kelo pogruok kata ngikruok moro amora ni an kata jo odi .

To kadipo ni an kod penjo?

Kadipo ni in kod penjo to tudri kod Everlyne Delylah Ondeiki A student at Jaramogi Oginga Odinga University of science and Technology: email address evedelylah@gmail.com

To ka idwa penjo malingling mamoko kuom nonroni to inyalo tudri kod

Dr Shehu Awandu +254741911577 a lecturer at Jaramogi Oginga Odinga University of science and Technology

Dr Elizabeth Obinge +254714606872 a lecturer at Jaramogi Oginga Odinga University of science and Technology

Sei mara pinyka tiende ni

- **Ee** ,(*ket tick)* Ayie bet jakanyo mar nonro.
- **Ee** ,(*ket tick)* Ayie weche go ma chiwo ibiro kan kendo inyalo med tiyo kodo endalo mabiro
- **Ee,(*ket tick)*** Ayie ni inyalo ti kod moko kuom weche ga mawacho eyo ma opondo kata maonge nyinga endalo mabiro e repode kata andike mamoko .

kar keto andike manyiso ayie

Nying mar ng'ama donjo
enonro_____ Tarik_____

Seyi mar ng'ama donjo
enonro_____

Keto lweta ka andiko nyinga pinyka tiende ni aselero ni nonro ni kendo ase duoko penjo magi duto kaka anyalo .abiro miyi achiel kuom oboke mar nonro ni mondo ibed kodo.

Seyi mar ng'ama rwako ji enonro_____ Tarik_____

Nying -
_____

APPENDIX VI: Informed Consent: Key Informant Interview Luo Version

Oboke mar ayie: Penjo matut kod jogo ma olony ewechegi wi nonro

KNOWLEDGE ATTITUDE AND PRACTICE OF COVID 19 PREVENTIVE MEASURES AMONG PREGNANT WOMEN ATTENDING ANTENATAL CLINIC IN KISUMU AND SIAYA COUNTIES.

Jotend nonro

Nying jalno ma somo	Nying kar somo
Everlyne Delylah Ondieki	Jaramogi Oginga Odinga University of science and Technology

Chakruok

Ikwayi mondo idonj e nonro.nonro ni itime gi Everlyne Delylah Ondieki ma en japuonjre e ranginy mamalo e weche mag ler kod ngima dhano e mbalariany ma Jaramogi Oginga Odinga University of Science and Technology.

Kapok ingado mar donjo e nonoroni,ber mondo ing'e gino momiyo watimo nonroni to kod gima ibiro dwaro mondo itim.abiro somo matek weche ma otudre kod wach nonroni.in bende inyalo somo koda seche ma asome matek no.inyalo bende kawo kinde mari kaka idwaro mondo mi isom wechegi in iwuon sani .in thuolo saa moro amora mondo ipenja gin moro a mora ma ok I winjo kata ka idwaro mondo omed leri matut .

Nonroni en kuom ango?

Nonro ni en kuom rango weche mag ngeyo ,paro ka achiel kod tim ma mine man kod ich kendo dhi e clinic mar gi mokuongo mar mar mine mayach ni kodo egwenge ma siaya kod kisumu counties kaluwre kod yore mag gengo tuo mar COVID-19 . Nonro ni ibiro tim kuonde 12 mag thieth ma oyier e gwengegi kendo abiro loso kod mine 385 man kod ich ka apenjogi penjo moko.

Adwaro duoko penjogi e nonroni

1. O mar ngeyo ma mine man kod ich kendo dhi e clinic mar gi mokuonhgo mar mar mine mayach ni kodo egwenge ma siaya kod kisumu counties kaluwre kod yore mag gengo tuo mar COVID- 19
2. Paro ma mine man kod ich kendo dhi e clinic mar gi mokuongo mar mar mine mayach ni kodo egwenge ma siaya kod kisumu counties kaluwre kod yore mag gengo tuo marCOVID- 19

3. Timbe ma mine man kod ich kendo dhi e clinic mar gi mokuongo mar mar mine mayach ni kodo egwenge ma siaya kod kisumu counties kaluwre kod yore mag gengo tuo mar COVID- 19

En ango ma ibiro dwaro mondo atim ka adojo e nonroni?

Ka iyie donjo e nonroni, abiro kwayi mondo ipimna mangeny kendo ilera maber moko kuom gigo ma ingeyo kaluwre gi okang mar ngeyo ma mine man gi ich mabiro e clinic mari ka ni kodo kuom tuo mar COVID- 19.Ibiro llera kuom ngeyo margi e kaka ikele, kaka olandore,ranyisi meke, kaka I genge kaachiel gi guma iparo ni mine gi yude weche duto magingeyo kuom tuoni. Ibiro kendo lera kuom paro ma mine gi nikodo kuom tuoni kaachiel gi timbe ma kamoro nitie ekindgi kata e kind oganda ma gi wuok e mamiyo gibet kod paro makamano kuom tuo ni . Abiro bende dwaro mar mondo ilera ni gi kor ka kori gin gik mage matamo mine gi luwo kendo rito yore ma oket mondo okony e gengo tuo mar COVID- 19.mbaka ni duto nyalo kawo saa achiel. Bang twak abiro kwayo mondo akaw kendo andik weche moko kuomi ma otudre kod hiki,okang mari ma malo mogik mar ,chal mari e yore mag keny ,dini,kabila mari to kod thuru kama iwuok e. In thuolo chungo kendo wuok e twak saa moro amora ma iparo eseche mag twak .

Adwaro mondo ibed thuolo mondo ichiw pachi.nge ni onge duoko maber kata marach.an ka mondo apuonjra ko kalo kuomi kendo mondo awinj pachi.Emomiyo bed thuolo kendo iduok penjo eyo ma madi ber ni ka ingeyo ni duoko kod paroni duto beyo.

En rach mane manyalo bet ye ka adonjo e nonroni?

Inyalo yudo ka ok in thuolo kod penjo moko kendo ok di gomb duoko gi.in thuolo yiero mar mondo kik iduok penjo go.Bende in thuolo saa asaya mar chungo kata tamruok dhi mbele kod penjo

Bende nitie ber moro amora manyalo yudo ka adonjo e nonroni?

onge ber moro amora ma ochiki tir ma idhi nwang'o ka iyie duoko penjogi .tija en ni adwa ngeyo mangeny kaluwre kod ngeyo ,paro ka achiel kod tim ma mine man kod ich kendo dhi e clinic mar mine mayach ni kodo kaluwre kod yore mag gengo tuo mar COVID- 19 kaka wanyalo chopo weche mag gengo malaria e yoo maber kokalo kuom clinic mag mine mayach . Paro ma ayudo nyalo konyo e chiwo paro mochiek ni jogo matayo weche mag gengo COVID- 19.

Ere kaka wche na ibro rit?

Eseche mag twak,wabiro ndiko gigo ma owach kend wabiro mako dwol sama waloso.Ok wabi ndiko kendo tiyo kod nying mari kaka ngama twak kata duoko penjo.wabiro chiwo namba ma opondo ne ngato e twak kendo namba no ema ibiro tiyo godo e fwenyo kendo tudo duoko mare etwak no. andike gi duto ibiro rwako e computer.Nying ok bi ndik e computer. Duol ma omaki ibro loki eyor andike kendo ibiro kano eyo ma opuodhi. Duol ma omaki ibiro ruch oko kuom gik mako duol bang ka osetiek lokogi e andike. Andikego ibiro kano e yoo ma opuodhi kama ngato angata maonge rusa ok nyal yudogi mak mana ngatno ma tiyo e nonro ni. Ka watiyo kod wach jatwak moro amoro e to wabiro mana ngeye kod namba. Weche jatwak kata wach moro amoro ma otudre kod jatwak tir ok bi ti kodo eriport moro amora kata e yoo moro ma opondo ka ok oyud ethuolo mar timo mano ka owuok kuom jatwak no .

Puodho kendo kano weche

Duol duto ma omaki kaachiel kod andike duto mawatimo eweche mag twak ibiro mi namba ma opondo. Andikego ibiro kano e yoo ma opuodhi e kompyuta kama ngato angata maonge rusa ok nyal yudogi mak mana ngatno ma tiyo e nonro ni. E kinde duto mag nonro weche mag twak ,andike kod gik ma moko mag nonro biro bet ka olor ni gi kiful kendo okan eyoo ma opuodhi .

To ka ok adwar donjo I nonro?

In thuolo yiero ka di dwa donjo e nonro. Donjo e nonro en hero mari. Ka iyie donjo e nonroni, ibiro kwayi mondo iket sei e oboke kaka yo manyisoni iyie. Kapok iyiero mar donjo e nonro, bed thuolo mondo ipenj penjo duto kuom gigo ma wase wacho. Ka iyie to wabiro keto andike mar ayie kendo wabiro miyi achiel kuom andike mar yie marino mondo in bende ibed godo. Kata bang ka isegoyo sei e andike no ,pod in thuolo mar weyo nonro saa asaya. Kaponi iyiero ni ok igomb donjo e nonro to mano ok bi kelo pogruok kata ngikruok moro amora ni an kata jo odi .

To kadipo ni an kod penjo?

Kadipo ni in kod penjo to tudri kod Everlyne Delylah Ondeiki japuonyre mawuok Jaramogi Oginga Odinga University of science and Technology: email address evedelylah@gmail.com

To ka idwa penjo malingling mamoko kuom nonroni to inyalo tudri kod

Dr Shehu Awandu +254741911577 a lecturer at Jaramogi Oginga Odinga University of science and Technology

Dr Elizabeth Obinge +254714606872 a lecturer at Jaramogi Oginga Odinga University of science and Technology

Sei mara pinyka tiendeni

- **Ee, (***ket tik)* Ayie bet jakanyo mar nonro.
- **Ee** ,(*ket tik)* Ayie weche go ma chiwo ibiro kan kendo inyalo med tiyo kodo endalo

kar keto andike manyiso ayie

Nying mar ng'ama donjo
enonro_____ Tarik_____

Seyi mar ng'ama donjo
enonro_____

Keto lweta ka andiko nyinga pinyka tiende ni aselero ni nonro ni kendo ase duoko penjo magi duto kaka anyalo .abiro miyi achiel kuom oboke mar nonro ni mondo ibed kodo.

Seyi mar ng'ama rwako ji enonro_____ Tarik_____

mabiro

kar keto andike manyiso ayie

nonro_____ Tarik_____

Seyi mar ng'ama donjo
enonro_____

Keto lweta ka andiko nyinga pinyka tiende ni aselero ni nonro ni kendo ase duoko penjo magi duto kaka anyalo ,abiro miyi achiel kuom oboke mar nonro ni mondo ibed kodo.

Tarik_____
Seyi mar ng'ama rwako ji enonro_____ _

- **Ee,(*ket tik)*** Ayie ni inyalo ti kod moko kuom weche ga mawacho eyo ma opondo kata maonge nyinga endalo mabiro e repode kata andike mamoko

APPENDIX VII: Key Informant Interview Guide

KNOWLEDGE ATTITUDE AND PRACTICE OF COVID 19 INFECTION PREVENTIVE MEASURES AMONG PREGNANT WOMEN ATTENDING ANTENATAL CLINIC IN KISUMU AND SIAYA COUNTY.

Good morning/afternoon.

My name is…….and I will be taking you through the discussion. Just as you have learnt from the consent form, this is going to be an open discussion where you shall share with us on COVID 19 infection Preventive Measures.

We shall record your responses in order to ensure that we do not miss any information. We do not have right or wrong responses. The feedback you are going to give us will help us to better understand the knowledge, attitude, and practice of COVID 19 infection Preventive Measures among pregnant Women in Kisumu and Siaya Counties.

The data will be confidential, and your name will not appear anywhere on the report. You are allowed not to answer any question that you are not comfortable with.

I would now like to turn on the digital recorder.

Ice Breaker

What comes to your mind when you heard about the third wave of COVID 19 infection?

a) General Information

1. What is your role in the facility?
2. How long have you been in the current position?

b) Knowledge on COVID 19

3. From your daily interaction with the pregnant women, share with me more about the knowledge of COVID 19 infection among the pregnant women who visit your facility?

Probe on:

i) Knowledge transmission

ii) Knowledge on prevention

iii) Knowledge on Vaccine

4. In your own opinion, from where do you think the pregnant women get their knowledge on COVID 19 infection prevention?

Probe on

i) Health talks

ii) Mainstream/social media

iii) Political Gathering

5. Tell me more about the myths and misconceptions the pregnant women have about COVID-19 infection?

6. In your opinion, what is the role of the health workers in improving the knowledge of COVID 19 infection preventive measures among pregnant women?

7. What are some of the ways in which we can increase access of knowledge on COVID 19 infection preventive measures?

c) Attitude on COVID 19 infection Preventive Measures

8. In your own opinion, what is the attitude of the pregnant women towards the COVID 19 infection Preventive measures?

Probe on attitude on:

i) Face masks (Surgical or cloth)

ii) Hand washing/using of alcohol-based sanitizers

iii) Social distancing

iv) Lockdown and Curfews

v) Vaccine

9. Share with me more about what you think influences their attitude on the existing COVID 19 infection Preventive measures?

Probe on influential factors like:

i) Political factors

ii) Economic factors

iii) Public Health factors.

10. In your opinion, what is the role of the health workers in influencing the attitude of the pregnant women towards the COVID 19 infection Preventive measures?

11. What are some of the ways in which we can develop positive attitude towards the COVID 19 infection Preventive measures among pregnant women?

d) Practice towards prevention

12. What is the role of the health workers in ensuring good practices of COVID 19 infection Prevention measures among pregnant women?

Probe on:

i) Practice infection prevention control at facility level

ii) Provision of infection prevention control at facility level

13. What are the existing facilitators to the pregnant women in practicing COVID- 19 infection prevention measures?

14. What are the existing barriers to the pregnant women in practicing COVID 19 infection prevention measures?

15. Share with me some of the recommendations on COVID 19 infection prevention measures in ensuring adherence to good practice on COVID 19 infection preventive measures among pregnant women?

16. We have come to the end of the interview. Do you have any questions or feedback.

APPENDIX VIII: Focus Group Discussion Guide

KNOWLEDGE ATTITUDE AND PRACTICE OF COVID 19 INFECTION PREVENTIVE MEASURES AMONG PREGNANT WOMEN ATTENDING ANTENATAL CLINIC IN KISUMU AND SIAYA COUNTY.

Good morning/afternoon

My name is…….and I will be taking you through the discussion. Just as you have learnt from the consent form, this is going to be an open discussion where you shall share with me on COVID 19 infection Preventive Measures among pregnant women. We shall record your responses in order to ensure that we do not miss any information.

We do not have right or wrong responses. The feedback you are going to give us will help us to better understand the knowledge, attitude, and practice of COVID 19 infection Preventive Measures among pregnant Women attending ANC in Kisumu and Siaya Counties. The data will be confidential, and your name will not appear anywhere on the report. You are allowed not to answer any question that you are not comfortable with.

During the discussion we are requesting you to respect the group members' opinion and we get to talk one person at a time. We shall provide you with identifiers which we shall use to refer to each other during the discussion.

I would now like to turn on the digital recorder.

Ice breaker

What came to your mind when you first heard about COVID 19?

a) General information

1. Tell me more about your ANC visits?

b) Knowledge on COVID 19

2. I would like you to share with me your knowledge on COVID 19 infection transmission, preventive measures

- Like Hand washing (purpose and technique)

- Wearing of Face masks (correct donning, removal, disposal of temporary ones)
- Social distancing (when and how)

3. Tell me more about the sources of your information on COVID 19 infection. Probe more if they consider the sources reliable, why they consider the sources reliable.
4. In your opinion, do you think the knowledge on COVID- 19 infection is accessible? Tell me more?
5. What do you feel about the knowledge that you have in terms of being sufficient? Probe on additional knowledge that you may wish to have.
6. Share with me more on the existing myths and misconceptions about COVID 19 infection?
7. What are some of the ways in which the knowledge of COVID 19 infection Preventive measures can be increased among pregnant women?

c) Attitude on the COVID- 19 Preventive measures

8. Share with me what you feel about the existing COVID 19 infection Preventive Measures? Probe on Face masks, hand washing/use of alcohol-based sanitizers, social distancing, lockdown and curfews.
9. What are some of the influential factors on your attitude towards COVID 19 infection preventive measures? Probe on influential factors like: Political factors, Economic factors, Health factors.
10. Tell me more on how we can improve positive attitude on COVID 19 infection preventive measures among pregnant women?

d) Practice towards prevention

11. What are the existing facilitators to practicing COVID-19 infection prevention measures among pregnant women?
12. What are the existing barriers to practicing COVID-19 infection prevention measures among pregnant women?

13. Share with me recommendations you may have to improve good practices of COVID-19 infection prevention and control among pregnant women?
14. We have come to the end of our discussion, do you have any questions and feedback

End of Discussion.

APPENDIX IX: Individual Questionnaire for Expectant Mother

Study: **KNOWLEDGE ATTITUDE AND PRACTICE OF COVID 19 INFECTION PREVENTIVE MEASURES AMONG PREGNANT WOMEN ATTENDING FIRST ANTENATAL CLINIC IN KISUMU AND SIAYA COUNTY**.

Researcher: Everlyne Delylah Ondieki.

Institution: Jaramogi Oginga Odinga University of Science and Technology

Section 1: Background Information

Cluster name and number:

Respondent number:……

Respondent Age:……..

Number of people in household:……

Level of Education:……..

Section 2: Assessment of Expectant Mother's Knowledge of COVID-19 infection Personal Preventive Measures

1) Have you heard about COVID-19 infection?

1. Yes
2. No

2) To the best of your knowledge, can the disease be passed from one person to another?

1. Yes
2. No
3. Don't Know

3) Which of the following is the cause of COVID-19 infection?

1. Bacteria
2. Virus
3. Fungus
4. Immunodeficiency
5. I don't know

4) How long is the incubation period of the disease? (How long does it stay in your body before you start having symptoms)?

1. Less than 2 days
2. 2 to 5 days

3. 3 to 14 days
4. I Don’t know

5) Is there a cure for COVID-19 infection?

1. Yes
2. No
3. Don’t know

6) Are there people of certain ages who are more likely to suffer from COVID-19 infection than others?

1. Yes
2. No
3. Don’t know

7) Are expectant mothers like yourself more prone to getting infected than other people in the community?

1. Yes
2. No
3. Don’t know

8) Is Fever a symptom of COVID-19 infection?

1. Yes
2. No
3. Don’t know

9) Is coughing a symptom of COVID-19 infection?

1. Yes
2. No
3. Don’t Know

10) Is having a sore throat one of the symptoms of COVID-19 infection?

1. Yes
2. No
3. Don’t know

11) Are body pains a symptom of COVID-19 infection?

1. Yes

2. No
3. Don’t know

12) Are chest pains, a runny nose and difficulty breathing signs of COVID-19 infection?

1. Yes
2. No
3. Don’t know

13) Is Diarrhea or constipation a symptom of COVID-19 infection?

1. Yes
2. No
3. Don’t know

14) Is having a Headache a symptom of COVID-19 infection?

1. Yes
2. No
3. Don’t know

15) In suspecting infection with COVID-19, primarily they will measure fever

1. True
2. False
3. Don’t know

16) Is it true that Individuals with corona virus disease can spread the virus to others even without developing signs and symptoms?

1. Yes
2. No
3. Don’t know

17) Is there a COVID-19 infection Vaccine?

1. Yes
2. No
3. Don’t Know

18) In suspecting infection with COVID-19, I should avoid unnecessary daily activities

1. Yes
2. No
3. Don’t know

19) Wearing a facemask is important to avoid getting infected

1. True
2. False
3. Don’t know

20) When should a facemask be worn?

1. All the time
2. Only When in public
3. When in the presence of a stranger even at my home
4. Not sure

21) Do you know the correct way to put on a face mask?

1. Yes
2. No

22) If yes, ask respondent to explain the procedure

1. Respondent describes the correct procedure
2. Respondent does not know correct donning procedure

23) It is alright to recycle the surgical masks.

1. Yes
2. No
3. Don’t know

24) Should the cloth masks be washed every day?

1. Yes
2. No
3. Don’t know

25) Can a person contract COVID-19 infection through shaking hands?

1. Yes
2. No
3. Don’t know

26) Can you reduce the risk of getting Corona through avoiding touching your eyes, nose, and mouth with hands?

1. Yes
2. No

3. Don’t know

27) Washing hands with water and soap can help prevent the transmission of COVID-19 infection.

1. Yes
2. No
3. Don’t know

28) Do you know the steps in handwashing?

1. Yes
2. No

29) If yes, kindly explain the steps

1. Respondent correctly describes all the steps
2. Respondent correctly describes at least half of the steps
3. Respondent Describes less than half the steps correctly
4. Respondent does not know more than two steps

30) Can social distancing help prevent the spread of the Corona Virus?

1. Yes
2. No
3. Don’t know

31) What is the correct distance for social distancing?

1. Half a meter
2. At least one and a half meters away
3. At least two meters away
4. I don’t know

32) Is it true that the virus can be transmitted directly through contact with infected surfaces?

1. Yes
2. No
3. Don’t know

33) Is it true that the disease is more dangerous is in the elderly, people with cancer, diabetes, and chronic respiratory diseases?

1. Yes
2. No

3. Don’t know

34) Do you know what personal protective equipment (PPE) is?

1. Yes
2. No

Section 3: Assessment of Expectant Mother’s attitude regarding COVID-19 infection Personal Preventive Measures

3a Attitude regarding Facial Masks measures

Do you believe COVID-19 infection exists?

1. Yes, it exists
2. No, it is something made up
3. I am not sure what to believe

Do you think wearing a face mask can help prevent you catching the virus?

1. Yes, I think it can
2. No, I don’t think it helps
3. Not sure wat to think about it

3b Attitude Regarding Hand washing Measures

Do you think frequent handwashing is an effective way to avoid getting infected with the Corona virus?

1. Yes, I think it is effective
2. No, I don’t think it is an effective way
3. I don’t really have any opinion on the issue

What do you think about the issue of following all the steps in handwashing?

1. It is a good thing
2. It is a waste of time

3c Attitude regarding Social Distancing

Do you think social distancing is an effective way to avoid getting infected with the Corona virus?

1. Yes, I think it is effective
2. No, I don’t think it is an effective way
3. I don’t really have any opinion on the issue

What other opinion do you have about social distancing, including lockdowns and curfews?

……

……

……

3d Attitude Regarding Use of Personal Protective Equipment

Do you think use of PPE is an effective way to avoid getting infected with the Corona virus?

1. Yes, I think it is effective
2. No, I don't think it is an effective way
3. I don't really have any opinion on the issue

What other opinions do you have regarding personal protective equipment?

……

……

3e. Attitude Regarding COVID-19 Vaccine

Do you think getting the COVID-19 Vaccine is a good way to avoid getting infected with the Corona virus?

1. Yes, I think it is effective
2. No, I don't think it is an effective way
3. I don't really have any opinion on the issue

What other thoughts do you have regarding the vaccine?

……

……

Are you willing to take COVID-19 vaccine?

Yes

No

Section 4: Assessment of Expectant Mother's Practice of COVID-19 infection Personal Preventive Measures

4a Practices regarding Facial Masks measures

Do you always wear a face mask when in public?

1. Yes, always
2. No
3. Sometimes

4b Practices Regarding Hand washing Measures

Do wash your hands several times a day with soap and water?

1. Yes
2. No
3. sometimes

Do you spend at least 20 seconds and follow all the hand washing steps?

1. Yes always
2. No
3. Sometimes

Do you have a handwashing unit for visitors at the entrance to your home or house?

1. Yes
2. No

If not, explain why……

Do visitors to your home observe the steps in handwashing for at least 20 seconds?

1. Yes always
2. NO, never
3. Sometimes

4c Practices regarding Social Distancing

Do you always try to maintain your distance from people when in public?

1. Yes
2. Sometimes
3. Not Really

If not, give reasons why

……

4d Practices Regarding Use of Personal Protective Equipment

Do you own Personal Protective Equipment besides the face mask?

1. Yes
2. No

Does anyone in your household own PPEs besides the face mask?

1. Yes

2. No

Is it easy to acquire the PPE for mothers in your area?

1. Yes
2. No

4e. Practice Regarding COVID 19 Vaccine

Has anyone in your household been vaccinated against COVID 19?

1. Yes
2. No

Have you been vaccinated for COVID 19?

1. Yes
2. No

If not, do you intend to be vaccinated when it is availed to you?

1. Yes
2.
3. No
4. Not Sure

If no, give reasons why

……

……

……

If yes, did you receive both the first and the second jabs?

1. Yes I received both jabs
2. No, Only the first jab

APPENDIX X: Board Of Postgraduate Studies Approval Letter

JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE & TECHNOLOGY

BOARD OF POSTGRADUATE STUDIES

Office of the Director

Tel. 057-2501804
Email: bps@jooust.ac.ke

P.O. BOX 210 - 40601
BONDO

Our Ref: H152/4071/2020

Date: 27th August 2021

TO WHOM IT MAY CONCERN

RE: EVERLYNE DELYLAH ONDIEKI – H152/4071/2020

The above person is a bonafide postgraduate student of Jaramogi Oginga Odinga University of Science and Technology in the School of Health Sciences pursuing Master of Public Health. She has been authorized by the University to undertake research on the topic: ***"Knowledge Attitude and Practice of COVID-19 Preventive Measures among Pregnant Women Attending Antenatal Clinic in Kisumu and Siaya County".***

Any assistance accorded her shall be appreciated.

Thank you.

DIRECTOR BOARD OF POST GRADUATE STUDIES
DATE
P. O. BOX 210 - 40601 BONDO

Prof. Dennis Ochuodho
DIRECTOR, BOARD OF POSTGRADUATE STUDIES

APPENDIX X1: Ethical Approval

COUNTY GOVERNMENT OF KISUMU
DEPARTMENT OF HEALTH

Telephone: 057-2020801/2020803/2020321
Fax: 057-2024337
E-mail: medsuptnpgh@yahoo.com
ceo@jaramogireferral.go.ke
Website: www.jaramogireferral.go.ke
When replying please quote

JARAMOGI OGINGA ODINGA TEACHING & REFERRAL HOSPITAL
P.O. BOX 849
KISUMU
26th October, 2021

Ref. No. IERC/JOOTRH/538/21

Date.....

RE: APPROVAL: STUDY TITLE:
KNOWLEDGE ATTITUDE AND PRACTICE OFCOVID-19 PREVENTIVE MEASURES AMONG PREGNANT WOMEN ATTENDING ANTENATAL CLINIC IN KISUMU AND SIAYA

REF: IERC/JOOTRH/538/21

TO: Principal Investigators: – Everlyne Delylah Ondieki

Dear Sir,

RE: STUDY TITLE

This is to inform you that JOOTRH IERC has reviewed and approved your above research proposal. Your application approval number is ***IERC/JOOTRH/538/21*** .The approval period is ***26th October, 2021 – 26th October, 2022.***

This approval is subject to compliance with the following requirements;

i. Only approved documents including (informed consents, study instruments, MTA) will be used
ii. All changes including (amendments, deviations, and violations) are submitted for review and approval by JOOTRH IERC.
iii. Death and life threatening problems and serious adverse events or unexpected adverse events whether related or unrelated to the study must be reported to JOOTRH IERC within 72 hours of notification
iv. Any changes, anticipated or otherwise that may increase the risks or affected safety or welfare of study participants and others or affect the integrity of the research must be reported to JOOTRH IERC within 72 hours
v. Clearance for export of biological specimens must be obtained from relevant institutions.
vi. Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. Attach a comprehensive progress report to support the renewal.
vii. Submission of an executive summary report within 90 days upon completion of the study to JOOTRH IERC.

1

viii. In case the study site is JOOTRH, kindly report to Chief Executive Officer before commencement of data collection.

Prior to commencing your study, you will be expected to obtain a research license from National Commission for Science, Technology and Innovation (NACOSTI) https://research-portal.nacosti.go.keand also obtain other clearances needed.

Yours sincerely

28 OCT 2021

NANCY MAKUNDA – SECRETARY
JOOTRH – IERC
KISUMU

APPENDIX X11: NACOSTI Permit

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: 796103

Date of Issue: 18/November/2021

RESEARCH LICENSE

This is to Certify that Ms.: EVERLINE DELYLAH ONDIEKI of Jaramogi Oginga Odinga University of Science and Technology, has been licensed to conduct research in Kisumu, Siaya on the topic: KNOWLEDGE ATTITUDE AND PRACTICE OF COVID-19 PREVENTIVE MEASURES AMONG PREGNANT WOMEN ATTENDING ANTENATAL CLINIC IN KISUMU AND SIAYA COUNTIES for the period ending : 18/November/2022.

License No: NACOSTI/P/21/14088

796103

Applicant Identification Number

Director General
NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Verification QR Code

NOTE: This is a computer generated License. To verify the authenticity of this document, Scan the QR Code using QR scanner application.

APPENDIX X111: Siaya County Approval

REPUBLIC OF KENYA

COUNTY GOVERNMENT OF SIAYA

Department of Health and Sanitation

Correspondence should be addressed to:
The County Government of Siaya
Email: siayachd@gmail.com
In reply please quote:

County Health Headquarters
Adjacent to JCC Church
P.O. Box 597 – 40600
SIAYA

REF: CGS/CHD/RESEARCH/VOL.IV(162) **16th December, 2021**

- All Medical Officers of Health
- Medical Superintendents
  Rwambwa Sub-county Hospital, Bondo Sub-county Hospital, Yala Sub-county Hospital, Ambira Sub-county Hospital
- Ongielo Model Health Center

KNOWLEDGE ATTITUDE AND PRACTICE OF COVID19 PREVENTIVE MEASURES AMONG PREGNANT WOMEN ATTENDING ANTENATAL CLINIC IN KISUMU AND SIAYA COUNTIES

Ms EVERLINE DELYLAH ONDIEKI, of Jaramogi Oginga Odinga University of Science and Technology and Principal Investigator, has been licensed to conduct the above referenced research in our County for the period ending: 18th November, 2022 by The National Commission For Science, Technology & Innovation (NACOSTI), vide License No: NACOSTI/P/21/14088 and Jaramogi Oginga Odinga Teaching and Referral Hospital's Institution Ethics and Review Committee (IERC), vide Ref:No. IERC/JOOTRH/538/21

The study aims to determine the knowledge attitude and practice of COVID-19 preventive measures among pregnant women with the goal of improving knowledge and infection prevention practices among them. She will consider all pregnant women attending antenatal clinic in five health facilities in Siaya County.

This is to notify you that the Study has been approved by the office of the undersigned. Kindly accord her all the necessary support.

COUNTY DIRECTOR OF HEALTH
SIAYA COUNTY
16 DEC 2021
P.O. Box 597-40600, SIAYA.

Dr. Felix Tindi
Ag. County Director of Health

CC: The CECM – Health and Sanitation
The Ag. Chief Officer of Health

APPENDIX X1V: Kisumu County approval

REPUBLIC OF KENYA

COUNTY GOVERNMENT OF KISUMU

Telegrams: "PRO (MED)"
Tel: 254-057-2020105
Fax: 254-057-2023176
E-mail: kisumucdh@gmail.com

Director of Public Health, Preventive/
Promotion and Environmental Health
P.O. Box 721 – 40100,
Kisumu.

DEPARTMENT OF HEALTH &SANITATION

Our Ref: GN 133 VOL.IX/(50) **Date:** 25th November, 2021

To:

All SCMOHs

Med Supts.- Chulaimbo Ahero, Kombewa, Lumumba, Masogo & Katito SCH

RE: APPROVAL TO CONDUCT RESEARCH IN KISUMU COUNTY

The department has reviewed and approved this research titled **'Knowledge Attitude and Practice of Covid-19 Preventive Measures among Pregnant Women attending Antenatal Clinic in Kisumu and Siaya Counties'**

This principal investigator for this research activity is **Everlyne Delylah Ondieki**.

Kindly accord her all the necessary support.

COUNTY DIRECTOR
OF HEALTH
KISUMU

Fredrick Oluoch
County Director Public Health & Sanitation
Kisumu County

CC. Principal investigator: **Everlyne Delylah Ondieki**

From the office of Director of Public Health, Preventive/Promotion and Environmental Hea