

**DETERMINANTS OF AWARENESS OF OBSTETRIC DANGER SIGNS  
AMONG WOMEN DELIVERING AT WEBUYE COUNTY HOSPITAL,  
WESTERN KENYA**

**BY**

**SALWA MOHAMMED OMAR**

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## DECLARATION

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**SALWA MOHAMMED OMAR**

**SM/PGFM02/18**

### Declaration by the Supervisors

This thesis is submitted with our approval as university supervisors.

Sign: \_\_\_\_\_ Date: \_\_\_\_\_

**Dr. JAMES AKIRUGA AMISI**

Department of Family Medicine, Community Health and Medical Education

Moi University.

Sign: \_\_\_\_\_ Date: \_\_\_\_\_

**Dr. JEREMIAH LAKTABAI**

Department of Family Medicine, Community Health and Medical Education

Moi University.

**DEDICATION**

I dedicate my thesis to my dear husband, Kauthar Abubakar, my daughter Sarah Kauthar and my sons, Uwaymir and Dihya Kauthar.

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## ABSTRACT

**Background:** Most maternal deaths in Kenya are attributable to preventable causes that could be managed if a pregnant woman received timely and quality antenatal care. A pregnant woman and her family can identify severe conditions that endanger her during pregnancy. According to the Kenyan health and demographic survey, there has been a significant increase in facility-based antenatal care utilization in the last decade. It is unclear if higher utilization translates to better awareness of Obstetric danger signs among pregnant women.

**Objectives:** The study aimed to assess the level and determinants of awareness of obstetric danger signs among women delivering at Webuye County Hospital, Western Kenya.

**Methods:** Using a systematic sampling method, this facility-based cross-sectional study was conducted at Webuye County Hospital, Kenya, where 328 post-partum women were recruited at the postnatal ward between August 2020 and January 2021. A pretested interviewer-administered questionnaire that included socio-demographic characteristics, Obstetric characteristics, and core questions about Obstetric danger signs were used for data collection, and only spontaneous responses were recorded. The questionnaires were checked for completeness, and data was cleaned, entered, and analyzed using R software. Descriptive statistics, including the mean, median, and standard deviation, were generated for continuous variables and proportions and frequencies for categorical variables. Pearson's Chi-square test was used for associations between continuous and categorical variables. A multiple logistic regression model was used to test the significance of any associations between various study subject characteristics (categorical) and awareness of obstetric danger signs of pregnancy. In all analyses, the significance level was set at less than 0.05.

**Results:** The overall awareness (spontaneous mention of one key danger sign in each phase of pregnancy) of obstetric danger signs was 43.8%, with awareness in each step; during pregnancy, childbirth/labour, and postnatal period being 77%, 62.2%, and 65.1%, respectively. Of the ten determinants assessed, marital status and educational level were significant explanatory variables of overall awareness of Obstetric danger signs. For marital status, it was found that the odds of unmarried women being aware of danger signs was 0.47 times that of married women (AOR=0.47 95%CI: 0.25, 0.87). For educational level where the odds of awareness of obstetric danger signs among those who have a university education was 3.3 times that of women who had primary education (AOR= 3.33, 95%CI = 1.38-8.27); the odds of awareness for women with vocational education was 3.05 times higher than that of those with primary level education (AOR=3.03, 95%CI:1.50,6.38). However, there was no statistically significant difference between secondary and primary levels of education.

**Conclusion:** The findings showed that the awareness of Obstetric danger signs in pregnancy among women delivering at Webuye County Hospital was less than 50%. Being married and formally educated were significant determinants of awareness of obstetric danger signs in pregnancy.

**Recommendations:** Strengthening health education while emphasizing key danger signs among pregnant mothers in antenatal clinics. More focus should be on those without formal education and spousal/partner support.

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**ABBREVIATIONS**

<b>ANC</b>	Ante Natal Clinic
<b>AOR</b>	Adjusted Odds Ratio
<b>BEmONC</b>	Basic Emergency Obstetric and Newborn Care
<b>CEmONC</b>	Comprehensive Emergency Obstetric and Newborn Care
<b>CEMD</b>	Confidential Enquire into maternal death
<b>CI</b>	Confidence Interval
<b>COR</b>	Crude Odds Ratio
<b>HCWs</b>	Healthcare Workers
<b>IQR</b>	Inter Quartile Range
<b>IREC</b>	Institutional Research and Ethics Committee
<b>JHPIEGO</b>	Johns Hopkins Program for International Education in Gynecology and Obstetrics
<b>MD</b>	Maternal Death
<b>MMR</b>	Maternal Mortality Ratio
<b>UNFPA</b>	United Nations Population Fund
<b>USAID</b>	United States Agency for International Development
<b>USM</b>	Universiti Sains Malaysia
<b>WHO</b>	World Health Organization

## **OPERATIONAL DEFINITIONS**

- Awareness—** is synonymous with “knowledge” and refers to when respondents name a sign without being asked about that sign by name. A respondent was deemed aware if she could spontaneously mention all three key danger signs of pregnancy (Barco, 2004). However, in the study, a respondent was termed as aware if she could spontaneously mention at least one of the key obstetric danger sign.
- Overall Awareness-** a woman who spontaneously mentioned one key danger sign in all three phases of pregnancy (during pregnancy, childbirth/labour, and postnatal) identified by non-clinical personnel (Barco, 2004).
- Key Danger Signs-** are those danger signs that are common, easy to recognize, and associated with a potentially severe problem. During pregnancy (Severe vaginal bleeding, Swollen hands/face, Blurred vision ); during labour/childbirth (Prolonged labour (> 12 hours), Severe vaginal bleeding, Convulsions, Retained placenta ) and in the postpartum period (Severe vaginal bleeding, Foul-smelling vaginal discharge, High fever) (Barco, 2004).
- Obstetric Complications--** These are adverse events that occur at the time of pregnancy, childbirth, and postpartum.

## **CHAPTER ONE**

### **INTRODUCTION**

#### **1.1 Overview**

Pregnancy danger signs are warning signs that women encounter during pregnancy, childbirth, and postpartum. Pregnancy is a normal physiological process, and most pregnancies have a good outcome. However, all pregnancies involve risks to the mother and the fetus. Every pregnant woman faces the risk of sudden, unpredictable complications that could result in death or injury to herself or her infant. Hence, it is necessary to employ strategies to overcome such problems. Around 15% of all pregnant women develop a potentially life-threatening complication that calls for skilled care, and some will require a significant obstetrical intervention to survive (Bakar, Mmbaga, Nielsen, & Manongi, 2019)

Danger signs are not actual Obstetric complications but symptoms easily identified by non-clinical personnel (Asferie & Goshu, 2022). Danger signs of pregnancy refer to the life-threatening conditions women encounter (Bakar, Mmbaga, Nielsen, & Manongi, 2019).

The commonest danger signs during pregnancy that can increase the risk of maternal death include vaginal bleeding, convulsions, high fever, abdominal pain, severe headaches, and blurred vision. Other danger signs in pregnancy include the absence of fetal movements, a gush of fluid from the vagina, foul-smelling vaginal discharge, swelling of the hands or face, weakness, and difficulty breathing (Asferie & Goshu, 2022; Mwilike et al., 2018).

Key danger signs are common, easy to recognize, associated with potential complications, and classified based on when they possibly happen. The key danger signs during pregnancy include; severe vaginal bleeding, swollen hands/face, and blurred vision (Barco, 2004).

Danger signs during labour and childbirth include; prolonged labour (> 12 hours), severe vaginal bleeding, convulsions, and retained placenta (Barco, 2004). In the postpartum period, danger signs are severe vaginal bleeding, foul-smelling vaginal discharge, and high fever (Barco, 2004).

Globally, about 289,000 women die each year because of problems related to pregnancy and childbirth (Moucheraud et al., 2015). Maternal mortality remains a major challenge in developing countries (WHO, 2019). In sub-Saharan Africa, 1 out of every 16 women dies due to pregnancy-related causes. In 2015, maternal deaths in developing regions accounted for approximately 99% of global maternal deaths, with sub-Saharan Africa alone accounting for roughly 66%. Around 52% of maternal deaths are attributable to three major leading preventable causes: haemorrhage, sepsis, and hypertensive disorders (Musarandega et al., 2021; Ngonzi et al., 2016). The World Health Organization (WHO) estimated that 300 million women in developing countries suffer from short-term or long-term illnesses due to pregnancy and childbirth, leading to high maternal mortality. More than half of these deaths occur in sub-Saharan Africa (Asferie & Goshu, 2022)

The first Confidential Enquire into Maternal Death (CEMD) in Kenya was conducted between July 2015 and June 2016, covering maternal deaths in 2014.

After analyzing the underlying causes of maternal deaths (MD), 77.7% (376) were direct MDs, while 19.8% (96) were indirect MDs. Obstetric haemorrhage 39.7% (192), non-obstetric complications/indirect MD 19.8% (96), and hypertensive disorders associated with pregnancy 15.3% (74) were the most common causes of all maternal deaths (Ministry of Health Kenya, 2017).

The three leading causes of direct maternal deaths (376) were obstetric haemorrhage 51.1% (192), hypertensive disorders associated with pregnancy 19.7% (74), and pregnancy-related infection 12.5% (47). After analyzing the client-related and community-related factors, of the 335 deaths in which information was available, the most frequent patient/family-associated factors were delays in reporting to the health facility, 42.4% (142), and delayed decision-making, 32.8% (110). There were no avoidable patient/family factors in 132 (39.3%) deaths. Failure to recognize danger signs by 12.2% (21) and delay in referring by 11.0% (19) of the participants were the most frequently identified community factors associated with maternal deaths. Of the 172 maternal deaths in which information was available, no avoidable community factors were identified in 143 (83.1%) (Ministry of Health Kenya, 2017).

## **1.2 Problem Statement**

The maternal mortality rate in Kenya is still high (326/100000 DHIS2 2018) and has not attained sustainable development goal number three, developed in 2015 by the United Nations. The objective was to reduce global maternal mortality to less than 70 deaths per 100000 live births by 2030, with no individual country exceeding an MMR of 147 maternal deaths per 100000 live births. (USAID 2015). According to the District health information system of 2018, Bungoma County, the maternal mortality is about 382 deaths per 100,000 live births. Most maternal deaths were avoidable, as the healthcare solutions to prevent or manage complications were well known.



However, it also depended on when women presented at the facility for care (*Maternal Mortality Fact Sheet*, 2015).

Attributed factors that prevented women from receiving or seeking care during pregnancy and childbirth included: poverty, distance, lack of information, inadequate services, and cultural practices (*Maternal Mortality Fact Sheet*, 2015).

Little is known about the determinants impacting awareness of Obstetric danger signs in Kenya, and limited documented evidence on the level of awareness. Few studies in Kenya have suggested that awareness of obstetric danger signs was low at 4.7% (Phanice & Zachary, 2018). However, this study did not include the determinants associated with low levels of awareness.

The majority of the studies have been done in Ethiopia concluded that the level of awareness of Obstetric danger signs was poor (Gitonga, 2017), with attributed determinants being poverty, limited antenatal care attendance, and lack of awareness of obstetrics danger signs in Ethiopia (Geleto, Chojenta, Musa, & Loxton, 2019).

This study aimed to fill the gap by assessing the determinants of awareness of Obstetric danger signs among women who delivered in Webuye County Hospital.

### **1.3 Study Justification**

Studies have demonstrated that maternal mortality could be reduced if mothers were well and fully prepared for birth and early identification of complications (Mutiso, Qureshi & Kinuthia, 2008).

Most studies in Kenya concluded that the level of awareness of Obstetric danger signs among women who attend antenatal clinics was low. However, no study was conducted among postnatal women in a health facility. No similar study had been done in a health facility in Western Kenya among either antenatal or postnatal women.

This study aimed to fill the gap by assessing the mother's awareness of Obstetric danger signs among those delivering at Webuye County Hospital in western Kenya.

The findings can be used as a reference point for evaluating the services provided during antenatal clinics. Some of the key expectations from the antenatal clinics were; for pregnant mothers to receive health education on Obstetric danger signs, prepare a birth plan, and encourage delivery under a skilled attendant (Mutiso, Qureshi & Kinuthia., 2008).

Data on the factors influencing the awareness of Obstetric danger signs will be used to improve the quality of antenatal services at the facility and in the community.

The findings of this study are essential in guiding public health planners and implementers in planning and designing appropriate intervention strategies to increase women's awareness regarding obstetric danger signs.

It can also benefit the healthcare workers (HCWs) in direct contact with these women to develop the best practical ways in the hospital and community to improve service delivery and scale up the use of these services.

#### **1.4 Significance of the Study.**

The study results shall be of great importance to the Bungoma County Government since they shall need a new strategy to deal with danger signs in pregnancy regarding budgetary allocation and other resources.

The Webuye County Hospital management team shall benefit from the study by revisiting awareness sensitization strategies on danger signs among pregnant women and those in labour.

The community members will benefit from the results by getting a clear picture of the level of awareness of danger signs, thus preventing preventable maternal and neonatal mortality causes.

The healthcare workers will be able to act on an evidence-based, informed point of view when giving health education on danger signs in pregnancy to the clients and community.

### **1.5 Research Questions**

1. What is the level of awareness of Obstetric danger signs among women delivering at Webuye County Hospital?
2. What factors are associated with awareness of Obstetric danger signs among women delivering at Webuye County Hospital?

### **1.6 Objectives**

#### **1.6.1 Broad Objective**

1. To assess the level and determinants of awareness of Obstetric danger signs among women delivering at Webuye County Hospital, western Kenya.

#### **1.6.2 Specific Objectives.**

1. To assess the level of awareness of Obstetric danger signs among women delivering at Webuye County Hospital.
2. To determine the factors associated with awareness of Obstetric danger signs among women delivering at Webuye County Hospital.

## CHAPTER TWO

### LITERATURE REVIEW

#### 2.0 Overview of Literature Review

This section aims to synthesize existing literature on the determinants of awareness of Obstetric danger signs in pregnancy. The main sections covered in this section include the awareness of danger signs in pregnancy, theoretical underpinnings, and the determinants influencing the awareness of danger signs. This section will also cover the strategies to improve awareness of danger signs in pregnancy. Multiple references from different sources will be used in every section to support the information deduced from this study adequately.

In a literature review, a researcher can identify gaps that would help form the basis of further research. In addition, it provides correlations and contradictions between various thoughts and helps determine the impact of the latest existing information. Also, a literature review helps determine this research's position in the field of study (Maggio, Sewell & Artino, 2016).

#### 2.1 Awareness of Obstetric Danger Signs

According to (Mohamed, 2019), the level of awareness of Obstetric danger signs among postpartum mothers varies in different countries and regions. Early detection and auctioning of Obstetric danger sign highly influence the outcome of a pregnancy. However, health-seeking actions are determined by a pregnant woman's awareness of danger signs as they occur. Varying levels of awareness of Obstetric danger signs from different regions are demonstrated below.

In a study in Nandagudi in, India, all the women surveyed were able to mention at least three danger signs of pregnancy. These are vaginal bleeding (100%), abdominal pains (100%), and convulsions (100%). A total of 210 women attended antenatal clinics in the primary health care facilities. Out of the other reviewed danger signs, the awareness was low. For instance, awareness of fever was 37.1%, blurred vision (3.33%), per vaginal fluid leaking (1.90%), reduced foetal movements (0.95%), and loss of consciousness (0.95%).

El-Nagar, Ahmed, & Belal (2017) point out that early recognition of danger signs is important to prevent complications. This study found that most women had considerable knowledge of Obstetric danger signs. The study recruited 200 women selected from 4 health facilities (50 from each) in Tanta City. The study findings revealed that the most common danger signs in pregnancy were vaginal bleeding (69.1%), severe abdominal pains (61.1%), and drainage of fluid from the vagina (47%). Also, vaginal bleeding was the most common danger sign mentioned by 30.2% of women during labour. In puerperium, the most commonly mentioned danger signs were vaginal bleeding (36.9%) and high-grade fever (29.5%).

As in the study in Egypt (El-Nagar, Ahmed & Belal, 2017), a study in Malaysia by (Zeng, Zuo, Jummat, & Keng (2015) found significant differences in Obstetric danger signs knowledge levels. The cross-sectional study in Malaysia was conducted among 178 women across 2 months from 1<sup>st</sup> January to 28<sup>th</sup> February 2015 among eligible women attending the antenatal clinic in Hospital Universiti Sains Malaysia (USM). In the study, 89.3% and 87.1% of women interviewed reported reduced and/ or absent foetal movement and anaemia (haemoglobin less than 11.0g/dl) as the major pregnancy danger signs, respectively. Also, other quoted major pregnancy danger signs in the study include vaginal bleeding (86%) and hypertension in pregnancy (80.9%).

The study revealed knowledge level of the overall obstetric danger signs among the study participants is good (48.3%), fair (28.1%), and poor (23.6%).

A study in Karachi, Pakistan (Hasan & Nisar, 2002) found low awareness of Obstetric danger signs among the women interviewed. The study recruited 329 married women of reproductive age in Rehri Goth, Karachi. The major danger signs reported in pregnancy were vaginal bleeding (39%) and convulsions (13%). In the intrapartum period, the study found the major danger signs were excessive bleeding (35%) and prolonged labour (30%). In the postpartum period were severe abdominal pains (64%), fever (47%), and excessive bleeding (24%).

Delays in seeking Obstetric care are often caused by a mother's poor awareness of the danger signs in pregnancy, contributing to high maternal morbidity and/or mortality globally. Using 2017 – 2018 data from the Democratic Republic of Congo (DRC) Service Provision Assessment survey, the assessment was done in 1380 health facilities to determine the number of danger signs women knew during pregnancy. The total sample size for the study was 4512 women. The study findings revealed that the awareness of danger signs in pregnancy was low, as almost no woman was able to mention all of the eight danger signs targeted in the study. Over two-thirds of the women surveyed were able to mention at least one danger sign, while only half mentioned at least two. Vaginal bleeding was the most mentioned danger sign among the surveyed women at 55% (Nkamba et al., 2021).

In Tanzania, 1118 women were recruited into a study to assess awareness of Obstetric danger signs. The study from November to December 2006 included eligible women who had delivered within the last 2 years in the Rifiji district.

The study revealed that 51.1% of the women interviewed knew at least one Obstetric danger sign. Based on every Obstetric phase, those who mentioned at least one danger sign include; pregnancy (26%), intrapartum (23%), and the postpartum period (40%). The most common danger signs recognized were vaginal bleeding (1 in every 4 women), anaemia, seizures, prolonged labour, and retained placenta (Pembe et al., 2009).

In a community-based cross-sectional study involving 621 postnatal mothers in Nekemte Town in Ethiopia, the knowledge of Obstetric danger signs was assessed. The study results showed that only 197 (32.3%) participants could spontaneously and correctly give at least 5 Obstetric danger signs. These participants could mention at least one danger sign in each phase of pregnancy; antepartum, intrapartum, and postpartum, exhibiting good knowledge. The most mentioned danger signs in pregnancy were vaginal bleeding (39.8%) and severe headache (33.6%). In Intrapartum, most respondents cited prolonged labour (9.2%) and postpartum fever (6.4%) as the most common dangers. However, the study also revealed that 157 (25.7%) respondents could not mention any danger signs (Regasa et al., 2020).

An institutional-based study conducted in Buea regional hospital in Cameroon among immediate postpartum women concluded that awareness of obstetric danger signs was at a rate of 73.3%. The most reported danger signs include severe bleeding (71.4%), fever (62.0%), and reduced fetal movement (60.0%) (Emeh et al., 2021).

Severe vaginal bleeding (n = 281, 68.4%), severe headache (n = 29.4%), and loss of consciousness (n = 81, 19.7%) were the most commonly mentioned pregnancy danger signs in 732 respondents in a community-based cross-sectional study done in Dale District, Ethiopia. Women, all who had delivered in the last 12 months, also mentioned delayed delivery of the placenta (n = 77, 18.7%) and (prolonged labour (n = 70, 17%) as other major Obstetric danger signs (Dangura, 2020).

Salem et al. (2018) conducted a cross-sectional study among women in their first year postpartum from August to October 2015 in Ambanja, Madagascar. It was concluded that knowledge of at least one danger sign varied from 80.9% of women knowing danger sign(s) in pregnancy to 51.9% at delivery, 50.8% at post-partum, and 53.2% in newborns.

A community-based cross-sectional quantitative study was conducted in April 2014. The sample size was 634 mothers. The respondents included women at least four months of gestational age for first-time mothers and mothers who had delivered in the past 24 months before the data collection. The study was carried out in Debre Berhan in Ethiopia. The study concluded that most (68.2%) of the study participants were found to have poor knowledge of Obstetric danger signs (Nugri et al., 2017). A 1397 respondent's community cross-sectional study in Riyadh, Saudi Arabia, showed that the respondent has sufficient knowledge of the three pregnancy danger signs evaluated. The most reported danger signs in pregnancy were swollen hands and/ or face (45%), blurred vision (39.5%), and severe vaginal bleeding (29.9%). Retained placenta (35.3%) and foul-smelling vaginal discharge (36.6%) were the most common danger signs reported intrapartum and postpartum, respectively (Abu-Shaheen et al., 2020).



In Jordan, a descriptive cross-sectional study was done among women attending prenatal care services in four public health centres using a structured questionnaire. It concluded that the awareness of danger signs and symptoms of pregnancy complications was low. In the study, 84.8% of the women interviewed were unaware of those danger signs (Okour, Alkhateeb, & Amarin, 2012).

A community-based study in Ethiopia on Obstetric danger signs revealed that among the mothers interviewed, 46.7% were knowledgeable during pregnancy, 27.8% during delivery, and 26.4% in the postpartum period. The general conclusion was that knowledge of Obstetric danger signs was low in this study area (Bililign & Mulatu, 2017). A qualitative study done in Ghana among the community using in-depth interviews and focused group discussions concluded that the communities could demonstrate a wide range of Obstetric danger signs (Aborigo et al., 2014).

Participants in a community-based study in Kinondoni municipality in Tanzania reported being aware of Obstetric danger signs. However, when asked to mention the danger signs spontaneously, 57.8% of the participants were able to mention only one to three danger signs. Among the most commonly mentioned danger signs were vaginal bleeding (81.2%), oedema (46.3%), and headache (43.6%) (Mwilike et al., 2018). Yosef and Tesfaye (2021), in a 526-participant study among women of reproductive age in Southwest Ethiopia, found that 65% of the respondents were aware of vaginal bleeding as the major pregnancy danger sign, followed by absent fetal movements (36.7%).

In a community-based cross-sectional study in Chamwino, Tanzania, only 25.2% of respondents were knowledgeable about Obstetric danger signs during pregnancy, childbirth/labour, and postpartum.

Thus, it was concluded that a low proportion of women were knowledgeable in that locality (Bintabara, Mpembeni, & Mohamed, 2017).

A study on birth preparedness done in Nairobi, Kenya, revealed that 27.9% of the study respondents were not informed about danger signs in pregnancy and 29.3% were not informed about signs of labour. Most (72%) reported being informed but could not mention the danger signs. When asked, 67% of respondents knew at least one danger sign in pregnancy, while only 6.9% knew of three or more (Mutiso, Qureshi, & Kinuthia, 2008).

An institutional-based study done in the Bureti Sub-county of Kericho County in Kenya among ante-natal mothers concluded that knowledge of women on Obstetric danger signs was low. Only 4.7% of the respondents were knowledgeable about Obstetric danger signs. There was a declining trend in the proportion of women who were knowledgeable about obstetric danger signs in pregnancy (34.2%), at birth (14.1%), and postpartum (10.1%) (Phanice & Zachary, 2018).

A community-based cross-sectional study conducted in a district of Mbarara, Uganda, concluded that 52% of women knew at least one key danger sign during pregnancy, 72% during delivery, and 72% during postpartum. Only 19% knew three or more key danger signs during the three stages of pregnancy (Kabakyenga et al., 2011).

In an institutional-based cross-sectional study conducted in Mechekele District, Ethiopia, more than half, 55.1%, of study participants were knowledgeable about the overall danger signs of Obstetric complications.

Of the respondents, 211 (52.1%), 216 (53.3%), and 188 (46.4%) were stated above the calculated mean of danger signs of Obstetrics complications during pregnancy, labour/delivery, and postpartum periods, respectively (Amenu, Mulaw, Seyoum & Bayu., 2016).

## **2.2 Factors Associated With Knowledge Regarding Obstetric Danger Signs**

Personal factors such as parity, education, marital status, maternal age, and residence contribute to the knowledge of Obstetric danger signs. Also, socio-economic factors such as occupation and family income and health-related factors such as antenatal care, number of hospital visits and place of birth contribute significantly to the knowledge levels (Bililign & Mutalu, 2017; Rashad & Essa, 2010; Phanice & Zachary, 2018). The synthesis of various determinants and their effect on knowledge levels is discussed below.

A study in Cameroon in Buea Regional Hospital involved 532 participants between June and September 2019. The study aimed to evaluate the determinants of awareness of Obstetric signs. Women who had delivered within 24hrs were interviewed. Age was found to be a significant factor in the knowledge of Obstetric danger signs, with respondents aged between 26 – 35 years having a high level of awareness (73.3%). Multigravida women were more aware of the danger signs (75.5%) than primigravida (30%). Early initiation of antenatal clinic visits and the number of visits was significantly proportional to awareness of danger signs. In this study, as in most cited studies, the most mentioned danger signs were vaginal bleeding (71.4%), fever (62.0%), and reduced movement of the fetus (Emeh et al., 2021).

Vijay, Kumare, & Yerlekar (2015) conducted a study among 100 women attending the antenatal clinics at Lata Mangeshkar Hospital in India to assess awareness of Obstetric danger signs and the determining factors.

The study findings revealed that maternal age influenced awareness of danger signs, with the maternal age between 25 – 30 years having the highest level of awareness (10.25%). A high level of education was directly proportional to a high level of awareness, with those with university degrees at 9.52%. Other factors that were related to a high level of awareness included multigravida (10.52%). Among the danger mentioned by a majority of the participants was bleeding in pregnancy (50%), severe bleeding intrapartum (50%), and also bleeding in the postpartum period (50%).

In Pakistan, a study was done among 300 pregnant women attending antenatal care in medical centres of Gadap Town in Karachi, Pakistan. The study aimed to assess the knowledge regarding obstetric danger signs among women of low socio-economic status. Out of the total study participants, 101 women were found to have good awareness. The study revealed that age was a significant factor in the knowledge of Obstetric signs among those with good awareness, with women aged between 18 - 20 years having the highest level of awareness at 44.3%. Women with secondary education had the highest level of awareness at 46.3% as opposed to those who were considered illiterate and in primary school. Housewives, those who resided in the urban centres, and those who had irregular antenatal checks at the hospital were found to possess a high level of awareness at 28.2%, 63.7%, and 42.7%, respectively (Abbasi, Raja & Sadiq, 2022).

In a community-based cross-sectional study in Wolaita Sodo town, South Ethiopia (Bolanko et al., 2021), the respondent's socio-demographic factors significantly influenced awareness of Obstetric danger signs. In the study undertaken among 740 pregnant women registered for home-free delivery, women aged between 20- 24 years, unlike those over 30, are six times more likely to have more awareness. Participants aged 25- 29 had 2.4 times more knowledge than those above 30.

Participants with low monthly income exhibited a 76% less likelihood of knowing Obstetric signs than those with high income. Also, housewives had a 50% less probability of having awareness. Primigravida women had a 91% less chance of having less awareness than multigravida.

Haleema et al. (2019), in a study in India among 170 women attending antenatal clinics in a tertiary hospital in Dakshina Kannada district, Karnataka, found that 93 participants had adequate knowledge regarding Obstetric danger signs. Women under 30 years were significantly more knowledgeable (55%) than those aged 30 years and above (52.45%). Respondents who had education beyond grade 10, housewives, and multigravida were knowledgeable at 65.1%, 55.1%, and 59.2%, respectively.

Asfaha & Gebremarian (2022), in a study of 410 participants in Tigray, Ethiopia, determined that women with an education level of diploma and above had an 86% probability of awareness of Obstetric danger signs. Married women, those with more than four pregnancies, and women aged 30 years and above during the first pregnancy had an awareness probability of 47%, 54%, and 65%, respectively. Additionally, women with more than 2 live births, those with a history of antenatal visits, and those who had delivered in a health institution have probabilities of 63%, 54%, and 27% of awareness, respectively.

A quantitative community-based cross-sectional study conducted in the Royo Koba district of Ethiopia among women who delivered in the last 12 months concluded that education influences awareness of danger signs. For instance, mothers with secondary or above education level increased the odds of knowledge about danger signs during pregnancy and postpartum (Bililign & Mulatu, 2017).

A community-based cross-sectional study conducted among women who delivered in the last 12 months in southern Ethiopia in the Dale district found that factors associated with knowledge of Obstetric danger signs of post-partum and childbirth include urban residence and mother's secondary or above education level (Dangura, 2020). An institutional-based study in Egypt stated that age significantly impacted knowledge of danger signs. Observation from the study showed that 78.3% were aged 35 or more years old, and they exhibited poor awareness regarding such Obstetric danger signs (Rashad & Essa, 2010).

A study in rural Tanzania observed that increased awareness of obstetric danger signs was more common among older women. This finding was attributed to their experiences of previous pregnancies or community events (Pembe et al., 2009). These findings contradicted Phanice et al.'s (2018) research, which found that age was not associated with knowledge of obstetric danger signs.

A study done in India concluded that increased maternal age had a significant association with obstetric danger signs among the study population. The study was carried out among 170 women attending antenatal care and also found out that having secondary education (n = 61), first (n = 73) and second (n = 78) pregnancy, and those in the last trimester (n = 111) had more awareness than the alternate groups. The study also revealed that those who resided in the rural area (n = 109) and those who did not have a previous risk pregnancy (n = 122) had more obstetric danger signs awareness (Felix, Devi & Manobharathi, 2018).

In a study done in North West Ethiopia, grand multi-parity influenced the knowledge of post-natal mothers more than primigravida (Amenu et al., 2016).

Education was another common globally studied factor that impacted knowledge regarding Obstetric danger signs. A study in Kericho County, Kenya, showed that a greater proportion of women with secondary school education and above were more knowledgeable of Obstetric danger signs than their counterparts with primary school education and below (Phanice & Zachary, 2018).

An institutional-based study in Egypt showed that education positively affected awareness of Obstetric danger signs. Therefore, only 11.1 % of university graduates were unaware of Obstetric danger signs compared to more than two-thirds (69.2%) of illiterate. The difference was statistically significant between the level of awareness and education (Rashad & Essa, 2010). A community-based study in rural Tanzania found that the majority of women who had higher awareness of Obstetric danger signs had secondary education or higher compared to those who had incomplete or no formal education (OR = 5.8; 95% CI: 1.8–19) (Pembe et al., 2009).

A study among post-natal mothers in North West Ethiopia concluded that mothers who attended more than secondary school were more knowledgeable about Obstetric danger signs than those without schooling. Similarly, mothers whose husbands finished more than secondary school was more likely to be knowledgeable than those whose husbands had not attended formal school (Amenu et al., 2016). Most married women were also more knowledgeable about obstetric danger signs than unmarried (Phanice & Zachary, 2018).

A community-based cross-sectional study in the Aleta Wondo district in southern Ethiopia found that being in a marital union was independently associated with mentioning at least two danger signs of pregnancy during labour. Being married was significant (Hailu, Gerbremariam & Alemseged, 2011).

An institutional-based study in Egypt found that working women exhibited good awareness, with the level of awareness correlating with occupation (Rashad & Essa, 2010). In an Ethiopian study, other factors of significance in the knowledge of Obstetric danger signs of pregnancy included the mother's occupation; (Bililign & Mulatu, 2017), family income (Amenu et al., 2016), and family size (Rashad & Essa, 2010).

A greater proportion of those who had their first ANC visit within their first trimester was significantly more informed of Obstetric danger signs than those who booked ANC in the second or third trimester. Therefore, the trimester a mother initiated ante natal care was significantly associated with knowledge of danger signs (Phnaice & Zachary, 2018). Previous delivery in a health institution and use of ANC during pregnancy were associated with knowledge of Obstetric danger signs of post-partum and child birth among women who delivered in the last 12 months in the Dale district in southern Ethiopia (Dangura, 2020).

In rural Tanzania, the number of antenatal visits greatly increased awareness of Obstetric danger signs. Those with four or more ANC visits were more aware of danger signs, independent of the gestational age of ANC clinic booking (Pembe et al., 2009). A study done in India by William et al.; found that in his study population, there was no significant association between awareness of Obstetric danger signs and ANC visits (Felix, Devi & Monabharathi, 2018).

According to an Ethiopian study among postnatal mothers, it was observed that antenatal follow-up during their last pregnancy influenced their knowledge of Obstetric danger signs significantly more than those who had no ANC follow-up (Amenu et al., 2016).



Place of delivery made women get exposed to their personal experiences. Mothers who gave birth to their child at a health facility were two times more knowledgeable about Obstetric danger signs than those who gave birth at home. These findings were deduced from a community study conducted in Ethiopia (Bililign & Mulatu, 2017).

In a study in Indonesia (Wulanadari & Laksono, 2020), several factors were found to determine the awareness of danger signs. The study was carried out among 85,832 women of child bearing age (15 – 49 years) to analyse the determinants of knowledge of pregnancy danger signs. The study findings revealed that 54.1% of the respondents live in urban areas compared to 45.9% of those living in rural areas. Also, women aged 35 – 39 years, as those of 40 – 44 years, had similar awareness levels of 23.1%. In this study, respondents with secondary education exhibited more awareness, with over half (53.2%) of those with secondary education having good awareness. Also, married women and those living with their partners had a high awareness probability (94.6%). Furthermore, multiparous women were more aware (72.3%) than primigravida, who had low awareness levels (11.3%). Access to the media was found to increase awareness levels with at least once a week television access leading to an 85.6% awareness level.

### **2.3 Interventions to Improve Awareness of Obstetric Danger Signs**

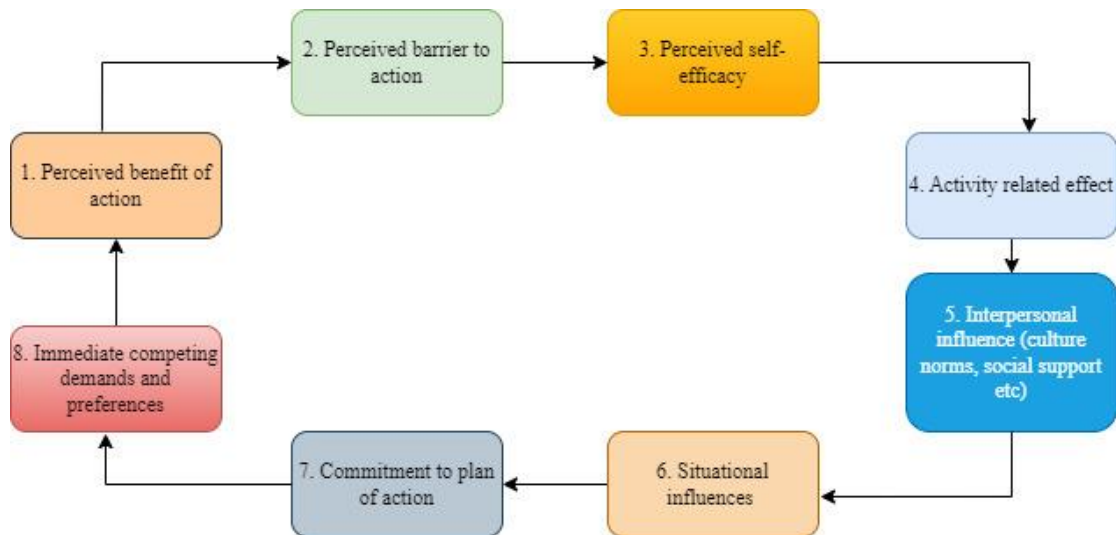
As has been demonstrated, the awareness of danger signs in pregnancy is a good predictor for action that is crucial in preventing Obstetric complications. Multiple studies have shown that pregnant mothers' awareness of the danger signs is significantly low (El-Nagar, Ahmed & Belal, 2017; Nkamba et al., 2021). Also, multiple determinants have been demonstrated to affect the awareness level.

Therefore, it is important to implement strategies that will increase this awareness and prevent complications. The goal is to reduce maternal and infant mortality and deliver good pregnancy outcomes (Bolanko et al., 2021; Emeh et al., 2021).

Dayyani, Lou, & Jepsen (2022) opine that health promotion was developed in the public health domain in the 1980s to develop a more inclusive approach to health care between care providers and clients. The World Health Organization describes health promotion as “The process of enabling people to increase control over and improve their health to reach a state of complete physical, mental and social well-being”. Health promotion in antenatal care aims to empower women to understand and take control of their health fully and that of the pregnancy (Kumar & Preetha, 2012; Smith, Portela & Marston, 2017).

Developing a health promotion model is important in antenatal care. The health promotion model was developed by Pender in 1982, with the latest revision in 2002. The model encompasses three areas that can be used to assess health promotion behaviours. These are “personal characteristics and experiences”, “behaviour-specific cognition and affect”, and “behavioural outcome” (Aqtam & Darawwad, 2018).

According to (Syed-Abdul, Gabarron, & Lau, 2016), a health promotion model explains the factors that underlie an individual’s motivation to engage in health-promoting behaviours. It also serves to understand individuals’ interaction with the physical and interpersonal environment in their attempt to improve health. As per the model, a person is supposed to take an active role and full responsibility in health and overcoming environmental influences in maintaining health. The constructs of a health promotion model based on the eight behaviour-specific beliefs used in the target for behaviour change interventions are shown in the figure below.



**Figure I: Health promotion model (Syed-Abdul, Gabarron, &Lau, 2016)**

In the study of (Shamanewadi, Pavithra & Madhukumar, 2020), an assessment was done on awareness of danger Obstetric dangers signs before and after health education. The study revealed that after the provision of health education by the principal investigator using the local language, the same questionnaire was administered after one month. The pre-test score was a mean awareness level of 22.3, while the post-test scores were 24.85 showing a statistically significant rise in awareness. The health education was conducted with the help of banners, flip charts, and the distribution of pamphlets as opposed to plain lectures.

The study demonstrated the effect of health promotion in Tanzania (Masoi & Kibusi, 2019). The study employed an interactive mobile messaging alert system in Dodoma in a quasi-experimental study. Four hundred and fifty women attending the first antenatal care clinic at less than 20 weeks gestation were selected for the study. Of these, 300 were exposed to the usual health education in the clinic. The other group comprising 150 participants, were enrolled in an interactive system using mobile messaging where they received key messages on danger signs and birth preparation in an individualized arrangement.

Masoi & Kibusi (2019) demonstrated in the post-test that following the intervention on the 150 participants, they showed a 77.3% higher knowledge level than the control group (48%). They also showed a 70.7% higher birth preparedness level than the control 29.7%. Therefore, the interactive messaging alert was proven to be an important tool in health promotion among pregnant women regarding danger signs and birth preparedness.

## **2.4 Conceptual Framework**

Jabareen (2009) opines that a conceptual framework presents a theoretical structure that outlines the principles and rules to govern a particular topic of interest. Waldt (2020) & Adom, Hussein, & Agyem (2018) add that the conceptual framework provides a roadmap for presenting all the variables and their relationships. It helps in the differentiation of independent and dependent variables. Any changes in the independent variable will often result in a change in the dependent variable. Therefore, the outcome of the dependent variables relies on the manipulation of the independent variables.

In this study, the independent variables were: Socio-demographic characteristics of the study participants, such as age, marital status, nearest health facility, religion, residence, level of education, and economic status determined by the employment status and income level. The other independent variables were: Obstetric characteristics such as parity, previous pregnancies and their outcomes or complications, history of antenatal (ANC) follow-up, and access to the media. The Obstetric danger signs were considered intervening variables that moderated the outcome of the dependent variables. The awareness of Obstetrics danger signs was determined by the ability of the participant to spontaneously mention one key danger sign in each phase of pregnancy; this was the dependent variable.

The figure below shows the relationship between the dependent and independent variables.

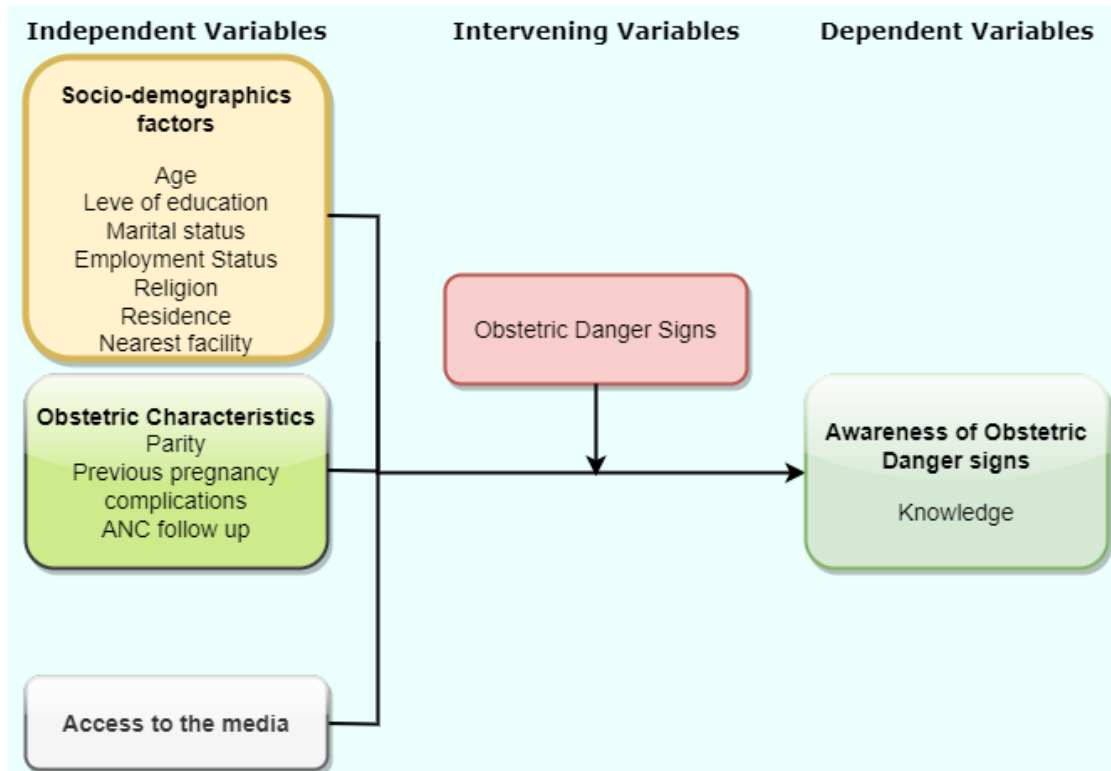


Figure II: Conceptual framework(B. Mwilike et al., 2018 & Geleto et al., 2019)

## **CHAPTER THREE**

### **3.0 METHODOLOGY**

#### **3.1 Introduction**

This chapter presents the methods that were adopted in the study. These include study location, research design, population, eligibility criteria, sample, and sampling techniques, data collection methods and procedure, study variables, data management, statistical analysis, and ethical consideration.

#### **3.2 Study Location**

Webuye County Hospital is an urban health facility in the western region of Kenya in Webuye sub-Location, Webuye Location, Webuye west Sub-County in Bungoma County. According to its annual operating plan for the 2015–2016 financial year, it had a catchment population of 98 494 people and 21 669 women of reproductive age (15–49 years). It provides basic and emergency obstetric and newborn care (BEmONC and CEmONC) services and a maternal and child health clinic. There are about 1700 new visits and 4000 revisits to the ANC yearly and an average of 350 monthly deliveries. Approximately 15% of deliveries are caesarian section, and Eight per cent of the monthly deliveries are referral-in from other nearby facilities.

#### **3.3 Research Design**

The study was a hospital-based descriptive cross-sectional study aimed to ascertain the determinants of awareness of Obstetric danger signs among women delivering in Webuye County Hospital.

### **3.4 Target Population**

The target population for this study tailed the postpartum women who delivered in Webuye County Hospital within the data collection period between August 2020 and January 2021.

### **3.5 Eligibility Criteria.**

#### **3.5.1 Inclusion.**

Women in the postpartum period who had delivered at the time of data collection (between August 2020 and January 2021) were considered based on those who delivered within 24 hours for vaginal delivery and 72 hours for operative delivery, consented to participate in the study and were clinically stable.

#### **3.5.2 Exclusion**

Postpartum women who were critically ill/clinically unstable and needed emergency clinical care were excluded from the study.

### 3.6 Sample and Sampling Techniques

The Sample size was estimated using the Fisher formula: for quantitative studies.

$$N = \frac{z^2 P (1 - P)}{d^2}$$

Whereby;

N- Sample size

d-The standard error in the study, which is 5%

P- Proportion of women who were aware of danger signs during pregnancy = 31% (B. E. Mwilike, 2013)

Z- The normal standard deviation of 1.96 corresponds to a 95% confidence interval.

Substituting;

$$N = \frac{1.96^2 \times 0.31 (1 - 0.31)}{0.05^2} = 328$$

The second objective is determining the factors associated with awareness of obstetric danger signs among women delivered at Webuye County Hospital.

A formula by Peduzzi et al. 1996 was adopted to calculate the sample size to assess factors associated with the outcome of interest (awareness of Obstetric danger signs).

$$N = \frac{10k}{p}$$

Where

N –minimum number to be included

K- Is the number of covariants (number of the independent variable)

P- Proportion of women who were aware of danger signs during pregnancy = 31% (Mwilike, 2013)



10 is a constant

Substitution of the formula

$$N = \frac{10 \times 10}{0.31} = 322.5$$

$$N = 323$$

The 10 factors included; age, educational level, employment, marital status, religion, residence, parity, antenatal follow-up, the presence of any complications, and nearest health facility.

Comparing the sample size for the first and the second objective, the final sample size obtained was **328 women**.

A systematic random sampling technique was used to recruit consenting study participants.

The sample interval was calculated (k) as =

Total number of women delivering in Webuye County Hospital in 6 months (time of data collection)

The number needed in the sample

$$= \frac{2100}{328} = 6$$

Every 6th client was chosen, and the first client interviewed was randomly selected between the first and the sample interval. This was done using a guide from the daily delivery register. These variables were

The delivery register, usually kept at the maternity unit, was used to recruit participants for the study. The delivery register usually contains the following information; serial number, inpatient number, name of the patient, mode of delivery, and delivery outcome.

The first client interviewed was recruited randomly by choosing a number between 1 and 6 (sample interval). There after every 6<sup>th</sup> participant who met the inclusion criteria was chosen from the register until a sample of size target of 328 was obtained. If the starting point was 3, the sequence was 3, 9, 15, 21, 27.....

In case a participant declined, the next number in the register was chosen, and the sequence continued from that number with a sample interval of 6.

An interviewer-structured questionnaire was used to collect the required information. Only spontaneous responses were recorded for the open-ended questionnaires. No leading questions were used.

### **3.7 Data Collection Methods and Procedure**

A patient file review was done to ascertain and verify the state in which the participant was admitted to the facility, her mode of delivery, and the delivery outcome. Some obstetric and socio-demographic characteristics were obtained, recorded, and later verified with the participant.

A structured questionnaire was adopted from a safe motherhood questionnaire developed by the Maternal Neonatal Program of Johns Hopkins Program for International Education in Gynecology and Obstetrics (JHPIEGO), an affiliate of John Hopkins University (Johns Hopkins Programme for International Education in Gynaecology and Obstetrics/Maternal and Neonatal Health, 2004) (Annex 2).

The questionnaire had different parts

Part 1: Socio-demographic characteristics; age; education; employment; husband's education; monthly income; family size; marriage duration.

Part 2: Obstetric Characteristics: gravidity, parity, abortions, antenatal follow-up, and presence of any complications.

Part 3: Core questions about knowledge of obstetric danger signs in pregnancy. Only spontaneous responses were recorded. In addition, the women were asked about the source(s) of information on danger signs.

After being refined by the principal investigator, the tool was translated into Kiswahili and back into English with the help of a certified Swahili teacher.

### **3.8 Validity and Reliability**

Reliability is the degree to which an assessment tool example questionnaire, produces stable and consistent results. In contrast, validity refers to how well the test accurately measures what it purported to measure in the case of the questionnaire. These were achieved by pre-testing the questionnaire at the postnatal units, with participants not included in the study. Pre-testing was done during the development of the proposal. Most studies adopted and bridged the tool from the JHPIEGO “birth preparedness and complication readiness tool” sample questionnaires from safe motherhood questionnaires.

### **3.9 Study Variables**

The variables of this study are:

*Independent variable:*

- a. Socio-demographic characteristics: age; education (both mother and husband); employment; monthly income; marital status; religion; residence
- b. Obstetric characteristics: parity; antenatal follow-up; place of delivery; the presence of any complications, and accessibility to a health facility
- c. Exposure to media

*Dependent variable:*

- a. Awareness of obstetric danger signs- Participants were asked to name spontaneously the Obstetric danger signs they knew during pregnancy, delivery, and the postpartum periods. Later their answers were matched to a list of key Obstetric danger signs defined for each phase of pregnancy.

### **3.10 Data Management and Statistical Analysis.**

#### **3.10.1 Data Management**

The questionnaires were checked daily for completeness, legibility, and consistency before entry to ensure missed data was recollected.

The collected data were categorized, coded, computerized, tabulated, and analyzed using Microsoft excel and later exported to R software for analysis.

#### **3.10.2 Data Analysis**

A respondent was coded as aware if the respondent could spontaneously mention any of the three key danger signs during pregnancy.

Descriptive statistics such as measures of central tendency (including mean and median) and measures of spread (standard deviation) were carried out for continuous variables. Frequencies and percentages were carried out for categorical variables. Later results were presented using Tables.

In inferential statistics, Pearson's Chi-square test was used to test any associations between study subjects' characteristics (categorical variable) and knowledge of Obstetric danger signs of pregnancy since the outcome data is binary. In cases where the cell count was small Fisher exact test was used. While for continuous variables, the Kruskal-Wallis test was used.

Multiple logistic regressions were done following bivariate analysis to assess the strength of association among the variables adjusting for other variables. Crude and adjusted odds ratios were calculated and presented in a table. In all analyses, a p-value less than 0.05 was considered significant.

### **3.11 Study Limitations**

1. The study shared the limitation of a cross-sectional study design. It isn't easy to demonstrate the cause-and-effect relationship.
2. Because the study and recruitment of participants were done in a hospital setup in a post-natal ward, postnatal mothers who delivered at home missed out.
3. Nonresponse bias – this was minimized by the investigator administering the questionnaire directly to the sampled study participants.

### **3.12 Ethical Consideration**

Ethical clearance for the study was obtained from the institutional research and Ethics committee of Moi University. FAN: 0003532

A research authorization permit was obtained from the hospital management team of Webuye County Hospital to allow data collection from the hospital for the study.

The participants were treated with respect and courtesy. Clients that required immediate care were attended to without delay or progression of the interview.

Participants were informed of the right to decline to participate in the study or to withdraw consent to participate at any time.

Informed consent was obtained before administering the questionnaire to those who had agreed to participate.

Mothers below 18 years were considered emancipated minors; hence, they could sign a consent form (Kenyan ethical guidelines).

Confidentiality of research data was ensured.

## CHAPTER FOUR

### RESULTS

#### 4.1 Overview

This chapter highlights the key findings on the determinants of awareness of obstetric danger signs among women delivering at Webuye County Hospital, Western Kenya. Three hundred and thirty-two mothers met the inclusion criteria and were enrolled in the study.

#### 4.2 Socio-demographic Characteristics of the Respondents

There were a total of 332 mothers who participated in the study. The mean age was 26 years (IQR: 15, 45). The majority of the women, 221 (66.6%), were married and had a secondary level of education 146 (44%). Only 61 (18.45%) were in paid employment, and almost all women were Christians, 308 (93%). 228 (68.9%) participants resided in rural areas, 150 (45.3%) reported that the closest facility was a dispensary, and 320 (96.4%) reported access to media. Among the married participants, the mean age of the husband was 34 years ( $SD=6$ ), and 80 (24%) had a secondary level of education. 109 (49.3%) of husbands were in formal employment (Table 1).

**Table 1: Socio-demographic Characteristics of Respondents**

<b>Variable</b>	<b>Freq (%)</b>
	<b>N=332</b>
<b>Age (yrs)</b>	
Mean (SD)	25.901 (6.714)
Range	15.000 - 45.000
<b>Marital status</b>	
Married	221 (66.6%)
Not married	111 (33.4%)
<b>Education level</b>	
Primary	57 (17.2%)
Secondary	146 (44.0%)
Vocational	86 (25.9%)
University	43 (13.0%)
<b>Employment</b>	
Agriculture	73 (22.0%)
Paid employee	61 (18.4%)
Self-employed	70 (21.1%)
Not working	46 (13.9%)
Housemaid	82 (24.7%)
<b>Religion</b>	
Muslims	24 (7.2%)
Christian	308 (92.8%)
<b>Husband age</b>	<b>N=221</b>
Mean (SD)	34.07 (6.34)
Range	21.00 - 53.00
<b>Husband education level</b>	<b>N=221</b>
Primary	17 (7.7%)
Secondary	80 (36.2%)
Vocational	64 (29.0%)
University	60 (27.1%)
<b>Husband occupation</b>	
Paid employee	109 (49.3%)
Self-employed	57 (25.7%)
Not working	8 (3.6%)
Houseboy	3 (1.4%)
Agriculture	44 (20.0%)
<b>Village</b>	
Urban	104 (31.3%)
Rural	228 (68.7%)
<b>Nearest facility</b>	
Dispensary	150(45.2%)
Health centre	79 (23.8%)
Hospital	103 (31.0%)
<b>Access to mass media</b>	
Yes	320 (96.4%)
No	12 (3.6%)



### 4.3 Obstetrics-Related Characteristics and Health Service-Related Factors

The mean age at first pregnancy was 22 years (SD=3.5); 160 (48.2%) were pregnant for the first time, 157 (47.3%) respondents had been pregnant two to four times, and 15(4.5%) had been pregnant five or more times. Very few participants reported a history of abortion, 26 (7.8%) and 23(6.9%) regarding a pregnancy that resulted in a stillbirth. Only 55 (16.6%) reported having experienced complications in their previous pregnancies (Table 2).

**Table 2: Obstetric Characteristics of Respondents**

<b>Variable</b>	<b>N=332 Freq (%)</b>
<b>Age at first marriage</b>	
Mean (SD)	22.49 (3.50)
Range	15.00 - 36.00
<b>Number of pregnancies</b>	
1	160 (48.2%)
2-4	157 (47.3%)
5 +	15 (4.5%)
<b>Number of deliveries</b>	
Mean (SD)	1.95 (1.21)
Range	1.00- 7.00
<b>Number of pregnancies resulting in Live birth</b>	
Mean (SD)	1.87 (1.13)
Range	1.00 - 7.00
<b>Number of pregnancies resulting in a stillbirth</b>	
1	23 (6.9%)
2	4 (1.2%)
3	1 (0.3%)
NA	304 (91.6%)
<b>Hx of abortion</b>	
Yes	26 (7.8%)
No	306 (92.2%)
<b>Complication</b>	
Yes	55 (16.6%)
No	277 (83.4%)

In regards to the current pregnancy, Out of 332 participants, 324 (97.6%) reported having attended ANC during the current pregnancy, with 137(41%) attending in the first trimester and 243(73%) attending four or more ANC visits, 141(42.3%) visited dispensary for their ANC. Almost all the participants indicated that they attended ANC for checkups 314 (94.6%), while others visited for various reasons, including illness. In the study, 226(68.1%) reported receiving maternal health messages during ANC visits. (Table 3)

**Table 3: Current Pregnancy Status**

<b>Variable</b>	<b>N=332 Freq (%)</b>
<b>ANC</b>	
Yes	324 (97.6%)
No	8 (2.4%)
<b>Gestation attendance of 1<sup>st</sup> ANC</b>	
<12weeks	137(41.3%)
13-27weeks	181(54.5%)
>28weeks	14 (4.2%)
<b>Number of ANC visits</b>	
1	7 (2.1%)
2	34 (10.2%)
3	48 (14.5%)
4+	243 (73.2%)
<b>Place ANC</b>	
Dispensary	141 (42.5%)
Health centre	72 (21.7%)
Hospital	119 (35.8%)
<b>Purpose attend ANC</b>	
For check-up	314 (94.6%)
Other	18(5.4%)
<b>Given message during ANC</b>	
Yes	226 (68.1%)
No	106 (31.9%)

#### **4.4 Awareness of Obstetric Danger Signs (Pregnancy, Child birth, and Postpartum)**

Out of 332 interviewed participants, it was observed that 256 (77.1%) were aware of at least one of the danger signs during pregnancy, and 206 (62.2%) were aware of one of the danger signs during labour/delivery. In contrast, 216 (65.1%) were aware of one danger sign during the post-natal period. Overall, 145 (43.8%) were aware of a danger sign in each of the three phases of childbirth.

##### **4.4.1 Awareness of Obstetric Danger Signs Occurring During Pregnancy**

Two hundred fifty-six (77.1%) mothers knew of danger signs during pregnancy. Hence; the following are mentioned danger signs during pregnancy, 244(73.5%) vaginal bleeding,59(17.8%) convulsion,131(39.5%) severe headache,27(8.1%) blurred vision,149(44.9%) severe abdominal pain,40(12%) difficulty of breathing,53(16%) fever,84(25.3%) edema on face or leg, 80(24.1%) persistent vomiting and 57(17.2%) no fetal movement(Table 4).

##### **4.4.2 Awareness of Obstetric Danger Signs Occurring During Labour/Delivery.**

Two hundred six (62.2%) of the mothers were aware of danger signs that can happen during labour and delivery. Moreover, the number of women who reported danger signs, 111(33.4%) reported severe headache, 113(34.0%) labour for more than 12 hours, 144(43.4%) heavy bleeding, 51(15.4%) high fever, 40(12.0%) retained placenta, 116(34.9%) vaginal bleeding, 66(19.9%) abnormal fetal position, 18(5.4%) convulsion as danger signs that might occur during labour and delivery (Table 4).

#### 4.4.3 Awareness of Obstetric Danger Signs Occurring during the Post-natal Period

Two hundred and sixteen (65.1%) mothers were aware of dangerous signs after childbirth. In addition, 40 (12.0%) reported convulsion, 207(62.3%) vaginal bleeding, 39(11.7%) fast or difficulty of breathing, 73(22.0%) high fever, 68(20.5%) too weak to get out of bed, 189(56.9%) abdominal pain, 30(9.0%) breast swollen red or tender breast or sore, 8(2.4%) foul smelling lochia and 10(3.0%) blurred vision as the danger signs that might occur during postnatal period (Table 4).

**Table 4: Awareness of the Danger Signs of Pregnancy, Labour/Delivery, and Post-natal.**

Danger signs	Pregnancy N=256 (%)	Labour/deliver y N=202 (%)	Post natal N=216 (%)
Vaginal bleeding	244(73.5%)	116(34.9%)	207(62.3%)
Abdominal pain	149(44.9%)	NA	189(56.9%)
No/Reduced fetal movement	57(17.2%)	NA	NA
Swelling of hands faces &legs	84(25.3%)	NA	NA
Blurred vision	27(8.1%)	NA	10(3.0%)
Breathing difficulty	40(12.0%)	NA	39(11.7%)
Severe headache	131(39.5%)	111(33.4%)	NA
Fever	53(16.0%)	51(15.4%)	73(22.0%)
Convulsion	59(17.8%)	18(5.4%)	40(12.0%)
Labour more than 12hr	NA	113(34.0%)	NA
Abnormal fetal position	NA	66(19.9%)	NA
Excessive bleeding	NA	144(43.4%)	NA
Retained Placenta	NA	40(12.0%)	NA
Foul smelling lochia	NA	NA	8(2.4%)
persistent vomiting	80(24.1%)	NA	NA
breasts swollen, red or tender breasts or sore	NA	NA	30(9.0%)
too weak to get out of bed	NA	NA	68(20.5%)

\*NA-not applicable, meaning the danger sign mentioned is not one of the signs in that phase of pregnancy.

#### **4.5 Determinants of Awareness of Obstetric Danger Signs**

Crude analysis was done of the socio-demographic, health services, and obstetric variables on each phase of pregnancy and the overall awareness of obstetric danger sign through bivariate logistic regression. A variable was said to be significant if it had a p-value  $<0.05$  (table 5, table 6. Table 7 & table 8)

##### **4.5.1 Determinants of Awareness of Obstetric Danger Signs: During Pregnancy**

Bivariate analysis showed that marital status ( $p= 0.036$ ), education level ( $p=<0.001$ ), and access to mass media ( $p= 0.003$ ) were statistically significantly associated with knowledge of at least one danger sign during pregnancy (Table 5). Specifically, a higher proportion of married women were knowledgeable about danger signs than women who were not married (80.5% vs. 70.3%). In terms of education level, those with a primary level of education had the lowest proportion aware of danger signs during pregnancy compared to the other levels of education. Access to media was also associated with awareness of danger signs, with those who reported access having a higher proportion of awareness, 78.4%, compared to 41.7% among those with no access. (Table 5)

**Table 5: Determinants of Awareness of Obstetric Danger Signs: During Pregnancy**

Variable	Aware of danger sign		p-value
	No (N=76) Freq (Row %)	Yes (N=256) Freq (Row %)	
<b>Age (yrs)</b>			0.076 <sup>1</sup>
Median	24.00	26.00	
Q1, Q3	17.75, 30.00	21.00, 31.00	
<b>Marital status</b>			0.036 <sup>2</sup>
Married	43 (19.5%)	178 (80.5%)	
Not married	33 (29.7%)	78 (70.3%)	
<b>Education level</b>			< 0.001 <sup>2</sup>
Primary	27 (47.4%)	30 (52.6%)	
Secondary	32 (21.9%)	114 (78.1%)	
Vocational	11 (12.8%)	75 (87.2%)	
University	6 (14.0%)	37 (86.0%)	
<b>Employment</b>			0.080 <sup>2</sup>
Agriculture	15 (20.5%)	58 (79.5%)	
Paid employee	11 (18.0%)	50 (82.0%)	
Self-employed	17 (24.3%)	53 (75.7%)	
Not working	6 (13.0%)	40 (87.0%)	
Housemaid	27 (32.9%)	55 (67.1%)	
<b>Religion</b>			0.447 <sup>2</sup>
Muslims	7 (29.2%)	17 (70.8%)	
Christian	69 (22.4%)	239 (77.6%)	
<b>Village</b>			0.284 <sup>2</sup>
Urban	20 (19.2%)	84 (80.8%)	
Rural	56 (24.6%)	172 (75.4%)	
<b>Nearest facility</b>			0.362 <sup>2</sup>
Dispensary	39 (26.0%)	111 (74.0%)	
Health centre	17 (21.8%)	61 (78.2%)	
Hospital	19 (18.4%)	84 (81.6%)	
<b>Access to mass media</b>			0.003 <sup>3</sup>
Yes	69 (21.6%)	251 (78.4%)	
No	7 (58.3%)	5 (41.7%)	
<b>Parity</b>			0.935 <sup>3</sup>
Para1	36 (22.5%)	124 (77.5%)	
Para2-3	36 (22.9%)	121 (77.1%)	
Para4+	4 (26.7%)	11 (73.3%)	
<b>Complications</b>			0.363 <sup>2</sup>
Yes	10 (18.2%)	45 (81.8%)	
No	66 (23.8%)	211 (76.2%)	
<b>ANC</b>			0.886 <sup>3</sup>
Yes	74 (22.8%)	250 (77.2%)	
No	2 (25.0%)	6 (75.0%)	

<sup>1</sup> Kruskal Wallis Test, <sup>2</sup> Chi-square test, <sup>3</sup> Fishers' exact test

#### **4.5.2 Determinants of Awareness of Obstetric Danger Signs: During Labour/Delivery.**

The analysis showed that age ( $p=0.017$ ), marital status ( $p=0.003$ ), education level ( $p=0.001$ ), occupation ( $p=0.001$ ), and access to mass media ( $p<0.001$ ) were statistically significantly associated with knowledge of at least one danger sign during labour (Table 6).

The median age of those aware of the obstetric danger signs (26.5 years) was higher than those unaware (23 years). A higher proportion of married women (67.9%) were aware of danger signs during labour/delivery compared to women that were not married (50.9%). Women with university education and vocational level were more aware of danger signs than those with a secondary or primary level of education. A higher proportion of women employed or in agriculture were more aware of danger signs during labour/delivery than women who were not working or self-employed. Women who reported access to media had a higher proportion of awareness, 64.1%, compared to 9.1% among those with no access.

**Table 6: Determinants of Awareness of Obstetric Danger Signs: During Labour**

<b>Variable</b>	<b>Aware of danger sign</b>		<b>p-value</b>
	<b>0 (N=125)</b>	<b>1 (N=206)</b>	
	<b>Freq (Row %)</b>	<b>Freq (Row %)</b>	
<b>Age (yrs)</b>			0.002 <sup>1</sup>
Median	23.00	26.50	
Q1, Q3	19.00, 30.00	22.00, 31.00	
<b>Marital status</b>			0.003 <sup>2</sup>
Married	71 (32.1%)	150 (67.9%)	
Not married	54 (49.1%)	56 (50.9%)	
<b>Education level</b>			0.001 <sup>2</sup>
Primary	29 (50.9%)	28 (49.1%)	
Secondary	64 (44.1%)	81 (55.9%)	
Vocational	22 (25.6%)	64 (74.4%)	
University	10 (23.3%)	33 (76.7%)	
<b>Employment</b>			0.001 <sup>2</sup>
Agriculture	19 (26.0%)	54 (74.0%)	
Paid employee	14 (23.0%)	47 (77.0%)	
Self-employed	29 (41.4%)	41 (58.6%)	
Not working	24 (52.2%)	22 (47.8%)	
Housemaid	39 (48.1%)	42 (51.9%)	
<b>Religion</b>			0.076 <sup>2</sup>
Muslims	5 (20.8%)	19 (79.2%)	
Christian	120 (39.1%)	187 (60.9%)	
<b>Village</b>			0.296 <sup>2</sup>
Urban	35 (33.7%)	69 (66.3%)	
Rural	90 (39.6%)	137 (60.4%)	
<b>Nearest facility</b>			0.295 <sup>2</sup>
Dispensary	62 (41.3%)	88 (58.7%)	
Health centre	24 (30.8%)	54 (69.2%)	
Hospital	39 (38.2%)	63 (61.8%)	
<b>Access to mass media</b>			< 0.001 <sup>3</sup>
Yes	115 (35.9%)	205 (64.1%)	
No	10 (90.9%)	1 (9.1%)	
<b>Parity</b>			0.160 <sup>2</sup>
Para1	67 (42.1%)	92 (57.9%)	
Para2-3	51 (32.5%)	106 (67.5%)	
Para4+	7 (46.7%)	8 (53.3%)	
<b>Complications</b>			0.708 <sup>2</sup>
Yes	22 (40.0%)	33 (60.0%)	
No	103 (37.3%)	173 (62.7%)	
<b>ANC</b>			0.988 <sup>3</sup>
Yes	122 (37.8%)	201 (62.2%)	
No	3 (37.5%)	5 (62.5%)	

<sup>1</sup> Kruskal Wallis Test, <sup>2</sup> Chi-square test, <sup>3</sup> Fishers' exact test



#### **4.5.3 Determinants of Awareness of Obstetric Danger Signs: During Post-natal**

The analysis showed that marital status ( $p=0.025$ ), education level ( $p<0.001$ ), occupation ( $p<0.001$ ), residence ( $p=0.020$ ), and access to mass media ( $p=0.019$ ) were statistically significantly associated with knowledge of at least one danger sign during the postnatal period (Table 7).

The median age among women who were aware of post-natal danger signs was higher (26 years) than those who were unaware (23 years). A higher proportion of married women were aware compared to those who were not married (69.2% vs. 56.8%). Regarding education, the proportion of women aware of danger signs increased with the advancement in education. A higher proportion of women employed or in agriculture were aware of danger signs during the post-natal period compared to women who were not working or self-employed. A higher proportion of women residing in an urban village (74%) were aware of danger signs compared to those in rural villages (61%). Women who reported access to media had a higher proportion of awareness, 66.2%, compared to 33.2% among those with no access.

Table 7: Determinants of Awareness of Obstetric Danger Signs: During Postnatal

Variable	Aware of danger sign		p-value
	0 (N=116)	1 (N=216)	
	Freq (Row%)	Freq (Row%)	
<b>Age (yrs)</b>			0.038 <sup>1</sup>
Median	23.000	26.000	
Q1, Q3	19.000, 31.000	21.000, 30.250	
<b>Marital status</b>			0.025 <sup>2</sup>
Married	68 (30.8%)	153 (69.2%)	
Not married	48 (43.2%)	63 (56.8%)	
<b>Education level</b>			< 0.001 <sup>2</sup>
Primary	32 (56.1%)	25 (43.9%)	
Secondary	55 (37.7%)	91 (62.3%)	
Vocational	20 (23.3%)	66 (76.7%)	
University	9 (20.9%)	34 (79.1%)	
<b>Employment</b>			< 0.001 <sup>2</sup>
Agriculture	15 (20.5%)	58 (79.5%)	
Paid employee	9 (14.8%)	52 (85.2%)	
Self-employed	35 (50.0%)	35 (50.0%)	
Not working	17 (37.0%)	29 (63.0%)	
Housemaid	40 (48.8%)	42 (51.2%)	
<b>Religion</b>			0.051 <sup>2</sup>
Muslims	4 (16.7%)	20 (83.3%)	
Christian	112 (36.4%)	196 (63.6%)	
<b>Village</b>			0.020 <sup>2</sup>
Urban	27 (26.0%)	77 (74.0%)	
Rural	89 (39.0%)	139 (61.0%)	
<b>Nearest facility</b>			0.219 <sup>2</sup>
Dispensary	58 (38.7%)	92 (61.3%)	
Health centre	28 (35.9%)	50 (64.1%)	
Hospital	29 (28.2%)	74 (71.8%)	
<b>Access to mass media</b>			0.019 <sup>3</sup>
Yes	108 (33.8%)	212 (66.2%)	
No	8 (66.7%)	4 (33.3%)	
<b>Parity</b>			0.909 <sup>2</sup>
Para1	56 (35.0%)	104 (65.0%)	
Para2-3	54 (34.4%)	103 (65.6%)	
Para4+	6 (40.0%)	9 (60.0%)	
<b>Complications</b>			0.106 <sup>2</sup>
Yes	14 (25.5%)	41 (74.5%)	
No	102 (36.8%)	175 (63.2%)	
<b>ANC</b>			0.878 <sup>3</sup>
Yes	113 (34.9%)	211 (65.1%)	
No	3 (37.5%)	5 (62.5%)	

<sup>1</sup> Kruskal Wallis Test, <sup>2</sup> Chi-square test, <sup>3</sup> Fishers' exact test

#### **4.5.4 Determinants of Overall Awareness of Obstetric Danger Signs**

A bivariate analysis of the variables showed that age ( $p=0.019$ ), marital status ( $p<0.001$ ), education level ( $p<0.001$ ), occupation ( $p<0.001$ ), religion ( $p=0.019$ ), residence ( $p=0.044$ ) and access to mass media ( $p=0.018$ ) were statistically significantly associated with knowledge of at least one danger sign in each of the three periods (Table 8).

Specifically, one unit increase in age was associated with 1.04 odds of awareness of danger signs. For women who were not married, the odds of awareness were 0.44 times that of women who were married. There was a statistically significant difference in the odds of awareness when we compared women with vocation/ university to primary. Women with higher education had higher odds of awareness. However, there was no statistically significant difference between women with secondary and primary school education. Christian women had 0.36 odds of awareness compared to Muslims. Employed women and those in agriculture had statistically significantly higher odds of awareness than women who were not employed. However, no statistically significant difference existed between those in self-employment/housemaids and those not working. The odds of awareness among those with access to media was 8.8 times that of women without access to media.

Table 8: Determinates of Overall Awareness of Obstetric danger signs

Variable	Aware of danger signs		COR	95%CI
	No (N=186) Freq (Row %)	Yes (N=145) Freq (Row %) P-value		
<b>Age (yrs)</b>				
	25.17 (7.13)	26.90 (5.99)	1.04	1.01, 1.07
<b>Marital status</b>				
Married	110 (49.8%)	111 (50.2%)	1	
Not married	76 (69.1%)	34 (30.9%)	0.44	0.27, 0.71
<b>Education level</b>				
Primary	39 (68.4%)	18 (31.6%)	1	
Secondary	96 (66.2%)	49 (33.8%)	1.11	0.58, 2.16
Vocational	35 (40.7%)	51 (59.3%)	3.16	1.58, 6.50
University	16 (37.2%)	27 (62.8%)	3.66	1.61, 8.59
<b>Employment</b>				
Not working	30 (65.2%)	16 (34.8%)	1	
Agriculture	31 (42.5%)	42 (57.5%)	2.54	1.20, 5.55
Paid employee	21 (34.4%)	40 (65.6%)	3.57	1.62, 8.14
Self-employed	46 (65.7%)	24 (34.3%)	0.74	0.34, 1.63
Housemaid	58 (71.6%)	23 (28.4%)	0.98	0.45, 2.16
<b>Religion</b>				
Muslims	8 (33.3%)	16 (66.7%)	1	
Christian	178 (58.0%)	129 (42.0%)	0.36	0.14, 0.85
<b>Village</b>				
Urban	50 (48.1%)	54 (51.9%)	1.61	1.01, 2.58
Rural	136 (59.9%)	91 (40.1%)	1	
<b>Nearest facility</b>				
Dispensary	89 (59.3%)	61 (40.7%)	0.8	0.48, 1.33
Health centre	41 (52.6%)	37 (47.4%)	1.06	0.58, 1.91
Hospital	55 (53.9%)	47 (46.1%)	1	
<b>Access to mass media</b>				
Yes	176 (55.0%)	144 (45.0%)	8.18	1.54, 151
No	10 (90.9%)	1 (9.1%)	1	
<b>Parity</b>				
Para1	93 (58.5%)	66 (41.5%)	1	
Para2-3	83 (52.9%)	74 (47.1%)	1.26	0.81, 1.96
Para4+	10 (66.7%)	5 (33.3%)	0.7	0.21, 2.08
<b>Complications</b>				
Yes	30 (54.5%)	25 (45.5%)	1.08	0.60, 1.94
No	156 (56.5%)	120 (43.5%)	1	
<b>ANC</b>				
Yes	182 (56.3%)	141 (43.7%)	0.77	0.18, 3.33
No	4 (50.0%)	4 (50.0%)	1	

<sup>1</sup> T- Test, <sup>2</sup> Chi-square tests, <sup>3</sup> Fishers' exact test

### **Multivariate Analysis**

The significant variables in the bivariate analysis were included in a multiple logistic regression model to assess the adjusted effect. The results are shown in Table 9 below.

After adjusting for the other variables, a unit increase in age was associated with 0.98 odds of awareness of obstetric danger signs. However, this increase was not statistically significant (AOR=0.98, 95%CI: 0.94, 1.03 p-value 0.05). Unmarried women had an average odds of awareness of 0.47 times lower than those of married women (AOR=0.47 95%CI: 0.25, 0.87). The odds of awareness of obstetric danger signs among those who have university education was 3.3 times that of women who had primary education (AOR= 3.33, 95CI%= 1.38, 8.27); also women with vocational education, their odds of awareness was 3.05 times that of women with primary education (AOR=3.03, 95%CI:1.50,6.38). There was no statistically significant difference between secondary and primary levels of education, holding other factors constant.

**Table 9: Multivariate logistic regression for Determinants of Overall Awareness of Obstetric Danger Signs.**

<b>Characteristic</b>	<b>AOR</b>	<b>95% CI</b>	<b>p-value</b>
Age	0.98	0.94, 1.03	0.500
<b>Marital status</b>			
Married	1		
Not married	0.47	0.25, 0.87	<b>0.017</b>
<b>Education level</b>			
Primary			
Secondary	1.16	0.60, 2.33	0.700
Vocational	3.05	1.50, 6.38	<b>0.002</b>
University	3.33	1.38, 8.27	<b>0.008</b>
<b>Religion</b>			
Muslims	1		
Christian	0.42	0.16, 1.03	0.066
<b>Village</b>			
Rural	1		
Urban	1.04	0.61, 1.75	0.900

## CHAPTER FIVE

### 5.0 DISCUSSION

The researcher set out to conduct a study to determine the level and the determinants of awareness of Obstetric danger signs among postnatal mothers in Webuye County Hospital. The motivation to undertake this study was based on the understanding that the awareness of danger signs significantly influences pregnancy outcomes. Pieces of evidence deduced from previous studies have underscored the importance of awareness of obstetric danger signs on the health of the pregnancy and the mother. Several factors have been found to influence the awareness discussed below. The primary data collected by the researcher in this study was adequate to respond to the set study objectives. The findings from the primary data, in this study, in some instances, concurred with the literature evidence, while in some other instances, there were disparities.

#### 5.1 Level of Awareness of Obstetric Danger Signs

The findings of this study revealed that less than half of the women interviewed had overall knowledge about Obstetric danger signs (n = 145, 43.8%). For this study, the overall awareness was considered if a participant could mention at least one key danger sign, as cited in (Barco, 2004), in each obstetric phase. (El-Nagar, Ahmed, & Belal, 2017 & Mohammed, 2019) pointed out that low awareness of danger signs is a risk factor for the late detection of complications. These could vary the outcome of a pregnancy. This study's findings evidenced that mothers had varying knowledge levels in the study area. While the overall knowledge was below average, it was noted from the study that knowledge levels varied in each stage of the pregnancy. The findings revealed that the awareness level during pregnancy was 77.1% (n = 256), during birth 62.0% (n = 206), and postpartum 65.0% (n = 216).

The findings of Kabakyenga et al. (2011) in Uganda showed an even lower overall awareness level (19%) than this study's findings. The Ugandan Study was carried out among women who had delivered within 12 months and pregnant women outside the hospital setting as opposed to this study which was carried out solely among postnatal women in the hospital settings, which could contribute to the difference in awareness. This study's findings showed a difference in awareness levels among mothers than those found in cited studies. These include studies in Bureti Sub-County of Kericho (Phanice & Zachary, 2018), Nairobi (Mutiso, Qureshi & Kinuthia, 2008) in Kenya, and Chamwino, Tanzania, where the overall awareness level was worse at 4.7%, 6.9%, and 25.2% respectively. This could have been attributed to the fact that in this study, a big majority of respondents (97.6%) had attended an antenatal visit, with a majority (54.5%) attending their first antenatal visit in the second trimester. Also, 68.1% of the respondents reported receiving a health message during the antenatal visit, contributing to the significantly favourable awareness levels.

In pregnancy, the most common danger signs mentioned in this study include vaginal bleeding (73.5%), abdominal pains (44.9%), and severe headache (39.5%). The findings of Regasa et al. (2020) in Ethiopia showed a reduced awareness of vaginal bleeding (39.8%) and almost similar awareness of severe headaches (33.6%) as danger signs compared to the findings of this study. In labour, the most mentioned danger signs included excessive bleeding (43.4%), prolonged labour (34%), and severe headache (33.4%). Lastly, in post-partum, they were vaginal bleeding (62.3%), abdominal pains (56.9%), and high fever (22%).

This study's most common danger signs were consistent with most evaluated studies' findings. In pregnancy, vaginal bleeding was considered the most worrisome danger sign, as was evidenced in a majority of the studies evaluated, including El-Nagar,



Ahmed, & Belal., 2017) in Egypt (Zeng, Zuo, Jummat, & Keng., 2015), Hassan & Nisar (2002) & Dangura (2020). In this study and referenced studies, most women mentioned vaginal bleeding in pregnancy as it was considered life-threatening to the mother and a major risk of pregnancy loss (Barco, 2004; Nkamba et al., 2021).

In congruence with the significance of vaginal bleeding, Mwilike et al. (2018) noted that it is a major danger sign that increases the risk of maternal death. This could also explain why most of the respondents in this study considered it of the highest concern.

However, the findings of this study differed from those (Abu-Shaheen et al., 2020), where swollen hands and blurred vision were the most mentioned danger signs in pregnancy. Also, (Zeng, Zuo, Jummat, & Keng., 2015), in a Malaysian study, found that reduced and/or absent fetal movements and low haemoglobin levels were the most common danger signs in pregnancy at 89.3% and 87.1%, respectively, suggesting that most women were afraid of losing their pregnancy than anything else. Vaginal bleeding was the third mentioned danger sign in the Malaysian study at 86%.

While most studies cited concurred with this study on vaginal bleeding as the most mentioned danger signs intrapartum and post-partum, several studies (Pembe et al., 2009; Hasan & Nisar, 2002) showed varying results on the most mentioned danger signs. This finding was consistent with the varying awareness levels in each obstetric stage.

Findings in this study revealed that most mothers (62.2%, n = 202) were aware of the possible danger signs that could occur in labour and delivery. Excessive bleeding was considered the most common danger sign (43.4%, n = 144), while prolonged labour was considered the second common danger sign (34%, n = 113) as per the findings of this study. El-Nagar, Ahmed, and Belal (2017) found vaginal bleeding as the most common danger sign during labour and delivery at 30.2%, while (Regasa et al., 2020) found prolonged labour at 9.2% as the commonest. Pembe et al. (2009) found prolonged labour and retained placenta as the commonest danger signs intrapartum.

During the post-partum period, this study revealed that most respondents (62.3%, n = 207) had proven awareness of danger signs that could occur. As found in most studies, the most common danger sign was vaginal bleeding (62.3%, n = 207), followed by abdominal pains (56.9% = 189). In sharp contrast to the findings of this study, Phanice & Zachary (2018), in a study in Kericho County, only found that a very small number of respondents (10.1%) were aware of danger signs in the postnatal period. However, a study in Uganda (Kabakyenga et al., 2011) showed almost similar levels of awareness as this study, with a majority (72%) showing impressive knowledge levels. Also, (Amenu, Mulaw, Seyuonm, & Bayu (2016) also demonstrated average knowledge levels (46.4%) were almost closer to the findings in this study.

According to a study by (Hibstu & Siyuom, 2017) in Yirgacheffe, Ethiopia, nearly half of the participants (46.2%) reported being aware of vaginal bleeding as a major danger sign in post-partum, concurring with the findings of this study. Also, a quarter of the respondents (25.4%) reported difficulty in breathing, and 23.7% reported severe headache as the other major signs in the post-partum period, contrary to the findings of this study. Only 2.9% of the respondents were aware of convulsion as a danger sign in the post-partum period.

These differences could be attributed to time differences, study duration, socio-cultural differences, and the study population. In addition, the differences could result from study methods, logistic parameters, and maternal health service quality. Lastly, the differences in health policy, intervention strategy, and the different operational definitions of awareness in the studies could have played a part in the variations.

## **5.2 Determinants of Awareness of Obstetric Danger Signs**

It was evidenced in this study that several factors were critical in determining the respondent's level of awareness of Obstetric danger signs. Whether as a single factor or in combination, it has been proven that understanding will better assist in devising mechanisms to overcome them to raise awareness. The analysis of variables in this current study using bivariate logistics regression showed that various variables were significant in the causation of an effect on awareness levels in each phase of pregnancy.

The study finding revealed that respondents' age influences awareness levels. Respondents between the ages of 22 – 31 exhibited the highest level of awareness compared to their counterparts. These findings correlated with those of (Vijay, Kumare, 7 Yerlekar (2015), who found respondents between 25 – 30 years had high awareness levels. Similarly, (Bolanko et al., 2021) found more awareness among women between 20 – 24 years and 25 – 29 years compared to those over 30 years by six times and 2.4 times, respectively. This could have been attributed to the high-level exposure to the media among the age group. However, studies by (Abbasi, Raja, & Sadiq, 2022) in Pakistan found the levels of awareness were high among women aged between 18 – 20 years and (Emeh et al., 2021) among those aged 26 – 35 years. Also, (Asfaha & Gebremarian, 2022) found those above 30 years of age have a 65% more probability of awareness than their counterparts.

About an average number of married women (50.2%) had the highest level of awareness compared to 49.8%, who showed low levels of awareness. Only about a third of the women who were not married (30.9%) showed significant awareness levels. Spousal support in marriage was considered a major factor contributing to women's awareness of danger signs.

The findings of this study concur with those of (Asfaha & Gebremarian, 2022 & Phanice & Zachary, 2018), who found married women were more knowledgeable. Also, in (Emeh et al. 2016), mothers whose husbands had more than secondary education were more aware. Similarly, this study concurred with (Alemeged 2011), who found that being in a marital union was an independent predictor of increased knowledge levels.

This study evidenced that a women's education was significantly proportional to awareness levels. For instance, 62.8% of women with a university education were knowledgeable, as opposed to 31.6% of those with only primary education. Also, it was noted that a majority (59.3%) of those who had attained vocational were more knowledgeable. These findings conformed to the findings of most of the reviewed studies, including (Vijay, Kumare, & Yerlekar, 2015, Abbasi, Raja, & Sadiq 2022, & Amenu et al., 2016). High education level was found to correlate with a better understanding of health messages given regarding danger signs.

The study findings regarding the respondent's occupations found almost similar knowledge levels among women who were paid employees and those working in the agricultural sector, with probability levels of 65.6% and 57.5%, respectively. Those who were not working were found to have the lowest awareness probability levels (34.8%).

The literature reviewed found varying results. For instance, (Haleema et al. 2019 & Abbasi, Raja & Sadiq, 2022) found that housewives exhibited high knowledge levels at 65.1% and 28.2%, respectively, as opposed to the findings of this study. However, (Bolanko et al., 2021) found that housewives had a 50% less probability of awareness than other groups.

In this study, most respondents had their husbands' occupations as paid employees (49.3%). Okuor, Alkhateeb, & Amarin (2012) confirmed that a spouse's occupation was vital in influencing a mother's awareness of danger signs.

The more enlightened the spouse, based on education level, which is conversely related to occupation, the greater probability that a mother was aware of danger signs. Spouses with highly educated husbands were more likely to be more educated and receptive to health messages provided in the health facility. In an Ethiopian study, respondents whose husbands had attained secondary education and above had 2.52 odds (AOR 1.08 – 5.91; CI = 95%) of awareness of danger signs as opposed to those whose husbands could not read and write (Yosef & Tesfaye, 2021).

There was a significant difference in the probability of awareness among those who resided in urban areas (51.9%, n = 54) and those who resided in rural areas (40.1%, n = 91). However, (Dangura 2020; Abbasi, Raja, & Sadiq, 2022) found urban residence a significant factor in knowledge levels attributable to proximity to health facilities and access to health education avenues and materials. Getachew<sup>1</sup> et al. (2022) also concurred with other evaluated studies that those living in urban areas had better and easy access to health information and maternal health services. It was found that rural areas had limitations in accessing these vital requirements, with low media access.

The probability of awareness among those with access to media in this study was less than average (45.0%) compared to very low levels (9.1%) among those without access to media. However, this showed that access to media was a significant factor in awareness among the interviewed respondents. In harmony with this study, (Geleto, Chojenta, Musa, & Loxton, 2019), in the systematic literature review analysis, evidenced that access to media significantly improved awareness levels. Access to media was found to improve women's decision-making and greater motivation to seek maternal health services, consequently leading to improved awareness.

As demonstrated in this study, the mother's parity was significantly proportional to her awareness level. Respondents with 2 to 3 children had the highest probability of awareness at 47.1%. Respondents with four children or more had the lowest probability (33.3%), which was consistent with increasing maternal age that had depicted low awareness levels as was found in (Pembe et al., 2009, Amenu et al. 2016, & Oguntunde et al., 2021). The study found no great difference in probabilities of awareness among women who had previous pregnancy complications (45.5%) and those who had never experienced them (43.5%). Although most women interviewed had attended antenatal clinics (n = 323; 97.3%), there was no big statistical difference in probabilities of awareness among the two groups, with levels of 43.7% and 50.0%, respectively.

Hibstu & Siyuom's (2017) study in Ethiopia found out; respondents who had closer access (<30min walk) to a health facility were more likely to be knowledgeable than those who had to walk more than 30 min on foot. This provided evidence that health facility access is important in enhancing awareness levels.

While access may not be the only determinant of awareness, (Nkamba et al., 2021) in Congo found that delivering health messages to mothers in the health facilities was the backbone for improved awareness. However, it was observed that it was more impactful to have individualized health education than when it was delivered to mothers as a group.

Although our study did not evaluate the distance to the health facility, it was demonstrated that access to a health facility conferred an above-average probability of awareness irrespective of the health facility level. For instance, those accessing a health centre had the highest awareness levels (69.2%).

In comparison, those who had access to a hospital and dispensary had awareness levels of 61.8% and 58.7%, respectively. Getachew<sup>1</sup> (2022), in harmony with other studies, noted that those who have closer health facility access (< 30 min walk) had better odds of awareness of danger signs. Geleto, Chojenta, Musa, & Loxton (2019) concurred that health facility access was a crucial determinant of awareness.

## CHAPTER SIX

### 6.0 CONCLUSION AND RECOMMENDATIONS

#### 6.1 Conclusions

Based on the findings of this study:

It can be concluded that the overall awareness of Obstetric danger signs of pregnancy among women delivering in Webuye County Hospital was less than 50% hence making the level of knowledge in this urban area to be low. Determinants of overall awareness of Obstetric danger signs of pregnancy included: age, marital status, education level, occupation, religion, residence, and access to mass media. Significant determinants of overall awareness of Obstetric danger signs of pregnancy are marital status and educational level (vocational and university). These findings provided insight information on women's knowledge of Obstetric danger signs in the urban area, which could help in designing appropriate interventions and as a base for further exploratory studies in other parts of the country.

Most women were aware of Obstetric danger signs during pregnancy compared to the other two phases (childbirth and labour & postnatal).

Marital status, education level, and access to mass media were significant determinants of awareness of Obstetric danger signs during pregnancy. Age, marital status, education level, occupation, and access to mass media were significant determinants associated with awareness of Obstetric danger signs during labour and delivery. Marital status, education level, occupation, residence, and access to mass media were significant determinants associated with awareness of Obstetric danger signs during the post-natal period.



## **6.2 Recommendations**

The findings of this study evidenced that the level of awareness was less than average in the study area. Since respondents with low literacy levels were found to have low awareness levels, the study recommends focused identification and emphasis on health education in this group. This intervention will have a significant impact on improving the awareness of danger signs in all phases of pregnancy.

This study recommends enhancing health education in all contacts with pregnant mothers with a key emphasis on key danger signs in all phases of the pregnancy. Visual materials such as flyers, banners, pamphlets, and flipcharts can be beneficial in achieving this objective. In addition, the study recommends incorporating key danger signs in maternal and child health booklets while encouraging families to read and understand them.

It is also imperative to note that frequent antenatal clinic attendance helps improve awareness of danger signs and thus should be encouraged. Exposure to health messages through electronic media, such as carrying health programs in local media outlets and social media, and electronic media, such as short text messages, are recommended for improved awareness of danger signs.

It is imperative to note that spousal support proved to confer a significant impact on the awareness of danger signs. The study, therefore, recommends advocating for partner/spousal support/participation throughout ante-natal visits to help improve awareness of obstetric danger signs.

Further research is required to assess the impact of related factors on awareness of obstetric danger signs. Also, additional research is required to develop intervention measures and assess their impact on improving awareness of obstetric danger signs.

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## APPENDICES

### Appendix 1: Informed Consent.

#### CONSENT FORMS

My name is ..... I am working as a data collector for the study being conducted in Webuye County Hospital by DR SALWA MOHAMMED, who is studying in this facility on determinants of awareness of obstetric danger signs among women delivering at Webuye County Hospital Kenya for her master's degree at Moi University, the college of health and medical sciences. I kindly request you to lend me your attention to explain the study and its benefits.

#### **1. The study/project title**

Determinants of awareness of obstetric danger signs among women delivering at Webuye County Hospital, Western Kenya.

#### **2. Purpose/aim of the study**

The finding of this study can be used as a guide for healthcare providers and health institutions to take the appropriate intervention. It will also be used for the regional health bureaus to plan and set strategies and expand services for health information dissemination. Moreover, this study aims to write a thesis as a partial requirement for fulfilling a Master's program in family medicine for the principal investigator.

#### **3. Procedure and duration**

I will be interviewing postpartum mothers using a questionnaire to provide me with pertinent data that is helpful for the study. There are 44 questions to answer, and the duration is 50 minutes; I will fill out the questionnaire by interview.



#### **4. Risks and benefits**

The risk of participating in this is minimal but a few minutes from the mother's time. There would not be any direct payment for reviewing in this study. The findings from this research will reveal important information for institutions, hospitals, and health planners.

#### **5. Confidentiality**

The information that will be provided will be kept confidential. There will be no information that will identify the participants in particular. The study's findings will be general for the study community and will not reflect anything particular to a person. The questionnaires will be coded to exclude showing names. No reference will be made in oral or written reports that could link participants to the research.

#### **6. Rights**

Participation in this study is entirely voluntary. The participants have the right to declare whether to participate in this study. If they decide to participate, they have the right to withdraw from the study at any time, and this will not label them for any loss of benefits to which they otherwise are entitled. They do not have to answer any question that they do not want to answer.

#### **7. Contact Address**

If there are any questions or inquiries at any time about the study or the procedures, please get in touch with **Principal investigator** Dr Salwa Mohammed Omar by e-mail: [salwa.mohd.sm@gmail.com](mailto:salwa.mohd.sm@gmail.com) Mobile phone: 0722946073 or you may contact the Institutional Research and Ethics Committee (IREC) of **Moi University at IREC, Moi Teaching & Referral Hospital building, 2nd floor. Door No. 219, P.O. Box 3-30100, Eldoret, Kenya. Office line: 0787723677. Email: [irec@mtrh.or.ke](mailto:irec@mtrh.or.ke). Website: [irec.or.ke](http://irec.or.ke).**

You may also anonymously report your concerns or complaints through the above contacts for IREC. You will be given a copy of this form to keep for your records

### **8. Declaration of informed, voluntary consent**

I have read/was read to me the participant information sheet. I have clearly understood the purpose of the research and the procedures. The risks and benefits, confidentiality issues, the rights of participating, and the contact address for any queries. I have been allowed to ask questions about things that may have been unclear. I was informed that participants have the right to withdraw from the study at any time or not to answer any question they do not want. I am also informed that the hospital has the right to stop conducting this study if any misdeeds and unethical procedures are observed during the data collection process on the hospital's premises. Therefore, I declare my voluntary consent with my initials (signature).

Name and signature of the participant.....

Name and signature of data collector .....

*The researcher will keep this consent form for at least three years beyond the end of the study.*

## Appendix 2: English Version Questionnaire

Questionnaire number ...../.....

s/ no .	Questions	Responses
<b>Socio-demographic Information's</b>		
1	How old are you?	_____age in years
2	What is your religion?	1. Muslims 2. Christian 3. Other (specify)_____
3	What is your current marital Status?	1. Married 2. Divorced/ Separated 3. Widowed 4. Single 5. Other (specify)-----
4	What is your occupation?	1. <i>Agriculture</i> <ul style="list-style-type: none"> <li>○ Farming/Livestock keeping</li> <li>○ Fishing</li> <li>○ Mining</li> </ul> 2. <i>Paid employee</i> <ul style="list-style-type: none"> <li>○ Government or parastatal</li> <li>○ Private</li> </ul> 3. <i>Self-employed (Not in agriculture/livestock)</i> <ul style="list-style-type: none"> <li>○ With employees</li> <li>○ Without employees (e.g., bodaboda)</li> <li>○ Unpaid family helper in a business</li> </ul> 4. <i>Not working</i> <ul style="list-style-type: none"> <li>○ And available for work (e.g., casual workers on sugar farms)</li> <li>○ And not available for work</li> </ul> 5. <i>Housemaid</i> <ul style="list-style-type: none"> <li>○ Student</li> <li>○ Unable to work/sick/disabled</li> <li>○ Other (Specify)</li> </ul>
5	How much money do you make monthly from your salary and other sources?	1. Below KES 1,999 2. Between KES 2,000 and 3,999 3. Between KES 4,000 and 5,999 4. Over KES 6,000
6	What is your completed educational Status?	1. none 2. primary 3. secondary

		4. vocational 5. university
7	What is your Husband's age?	_____ age in years
8	What is your husband's educational Status?	1. none 2. primary 3. secondary 4. vocational 5. university
9	What is your husband's occupation?	<p>1. <i>Agriculture</i></p> <ul style="list-style-type: none"> <li>○ Farming/Livestock keeping</li> <li>○ Fishing</li> <li>○ Mining</li> </ul> <p>2. <i>Paid employee</i></p> <ul style="list-style-type: none"> <li>○ Government or parastatal</li> <li>○ Private</li> </ul> <p>3. <i>Self-employed (Not in agriculture/livestock)</i></p> <ul style="list-style-type: none"> <li>○ With employees</li> <li>○ Without employees (e.g., bodaboda)</li> <li>○ Unpaid family helper in a business</li> </ul> <p>4. <i>Not working</i></p> <ul style="list-style-type: none"> <li>○ And available for work (e.g., casual workers on sugar farms)</li> <li>○ And not available for work</li> </ul> <p>5. <i>Housemaid</i></p> <ul style="list-style-type: none"> <li>○ Student</li> <li>○ Unable to work/sick/disabled</li> <li>○ Other (Specify)</li> </ul>
10	How many people share a meal with you daily, or the number of people living in the same household?	_____
11	Village	1. Urban 2. Rural
12	How far is the nearest health facility (where antenatal care is available) from your house?	-----minutes (on foot) _____ minutes (by motorcycle)
13	What is the nearest public health facility?	1. Dispensary 2. Health Centre 3. Hospital 4. Others(specify)_____
14	Do you have access to mass media?	1. Yes 2. No
15	If yes, what do you use?	1. Radio 2. TV

		3. Newspaper 4. Internet 5. Other (specify)s_____
	<b>Previous history of obstetric</b>	
16	Age at first marriage	_____
17	How many times in total have you become pregnant?	_____
18	How many times in total have you given birth?	_____
19	How many of your pregnancies resulted in a baby that was born Alive?	_____
20	How many of your pregnancies resulted in a baby that was born Dead?	_____
21	Do you have a history of abortion(s)?	1. yes 2, no
22	If yes, how many times?	_____
23	Were there any complications/health problems during any of your previous pregnancies?	1. Yes (specify)----- 2. No
	<b>Current pregnancy</b>	
24	Did you attend an antenatal clinic during this pregnancy?	1. Yes 2. No
25	If yes, at what gestational age did you attend your first clinic	_____ months
26	If yes, how many times did you attend the antenatal clinic?	_____
27	If yes, where did you go? (TICK ALL APPLICABLE)	1. Dispensary 2. Health Centre 3. Hospital 4. Others(specify)_____
28	If yes, what was the purpose of the attendance? (Tick all applicable)	1. For check-up 2. I am sick 3. Other (specify)s_____
29	Were you given any messages about pregnancy when you attended the antenatal clinic?	1. yes 2. no
30	What message(s) were you given during antenatal care?	_____
31	If yes, who gave you the messages at the antenatal clinic?	1. Healthcare provider 2. Another patient in the antenatal clinic 3. Other specify.....
	<b>Knowledge about obstetric danger signs</b>	
32	Have you heard about any complications that can happen with pregnancy?	1. Yes 2. No

33	If yes, from whom have you heard?	1. Healthcare provider 2. Read from the ANC booklet 3. Friends 4. Others specify .....
34	Do you know the danger signs of health problems during pregnancy?	1. Yes 2. No
35	If yes, can you mention them? (Mark x by asking what else you know)	1. vaginal bleeding <input type="checkbox"/> 2. Convulsions <input type="checkbox"/> 3. severe headaches <input type="checkbox"/> 4. blurred vision <input type="checkbox"/> 5. severe abdominal pain <input type="checkbox"/> 6. Difficult breathing <input type="checkbox"/> 7. High fever <input type="checkbox"/> 8. Swelling of face and leg. <input type="checkbox"/> 9. Persistent vomiting <input type="checkbox"/> 10. No fetal movements <input type="checkbox"/> 11. Others specify-----
36	Do you know the danger signs of health problems during labour and delivery?	1. Yes 2. No
37	If yes, can you mention them?	1. Severe headache <input type="checkbox"/> 2. Labour more than 12 hr <input type="checkbox"/> 3. Heavy bleeding <input type="checkbox"/> 4. High fever <input type="checkbox"/> 5. Retained placenta <input type="checkbox"/> 6. Vaginal bleeding <input type="checkbox"/> 7. Abnormal fetal position <input type="checkbox"/> 8. Convulsion <input type="checkbox"/> 9. Others specify-----
38	Do you know the danger signs of health problems after childbirth?	1. Yes 2. No
39	Do you know the danger signs of health problems after childbirth?	1. Vaginal bleeding <input type="checkbox"/> 2. Convulsions <input type="checkbox"/> 3. Fast or difficult breathing <input type="checkbox"/> 4. High fever <input type="checkbox"/> 5. Too weak to get out of bed <input type="checkbox"/> 6. Abdominal pain <input type="checkbox"/> 7. Breasts swelled red or tender breasts or sore <input type="checkbox"/> 8. Foul-smelling lochia <input type="checkbox"/> 9. Blurred Vision <input type="checkbox"/> 10. Other (specify)s_____
40	Where will you go if these danger signs happen?	1. Doing nothing 2. Consult a friend or a relative 3. Self-care/treatment 4. Hospital 5. Traditional birth attendants

### **Appendix 3: Swahili Version of the Consent.**

#### **FOMU YA IDHINI**

Jina langu ni ..... .. Ninafanya kazi kama mkusanyaji wa data ya utafiti huo unaofanywa katika hospitali ndogo ya Webuye na DR SALWA MOHAMMED ambaye anasoma katika kituo hiki juu ya viashiria vya uhamasishaji wa dalili za hatari ya kuzuia mimba miongoni mwa wanawake wanaojifungua katika hospitali ya kaunti ya Webuye Kenya, kwa digrii ya bwana wake katika Chuo Kikuu cha Moi, chuo cha Sayansi ya afya na matibabu. Ninakuomba nipe mkopo kwako ili kukuelezea kuhusu utafiti huo na faida zake.

1.Kichwa cha masomo / mradi.Dhibitisho la uhamasishaji wa dalili za hatari ya kuzuia mimba kati ya wanawake wanaowakabidhi katika hospitali ya kaunti ya webuye, magharibi mwa Kenya.

2.Kusudi / kusudi la utafiti.Upataji wa utafiti huu unaweza kutumika kama mwongozo kwa watoa huduma ya afya na taasisi ya afya kuchukua uingiliaji unaofaa. Itatumika pia kwa ofisi ya afya ya mkoa kupanga na kuweka mikakati na kupanua huduma kuhusu usambazaji wa habari ya afya. Kwa kuongezea, lengo la utafiti huu ni kuandika nadharia kama mahitaji ya sehemu ya kutimiza mpango wa Master katika dawa ya kifamilia kwa mchunguzi mkuu.

3.Utaratibu na muda.Nitawahoji akina mama wa baada ya kujifungua kwa kutumia dodosa ili kunipatia data inayofaa ambayo ni muhimu kwa utafiti huo. Kuna maswali 44 kujibu na muda ni dakika 50 ambapo nitajaza dodosa kwa kuhojiana nao

4. Hatari na faida. Hatari ya kushiriki katika hii ni ndogo sana. Lakini dakika chahche kutoka kwa wakati waakina mama. Hakutakuwa na malipo yoyote ya moja kwa moja ya kukagua katika utafiti huu. Lakini, matokeo ya utafiti huu yataonyesha habari muhimu kwa taasisi, kwa hospitali Na kwa wapangaji waafya.

5. Usiri. Habari ambayo itatolewa itawekwa siri. Hakutakuwa na habari ambayo itabaini washiriki hasa. Upataji wa utafiti utakuwa wa jumla kwa jamii ya utafiti na haitaonyesha kitu chochote cha mtu binafsi. Dodoso litakuwa na kadi ya kuwatenga kuonyesha majina. Hakuna kumbukumbu yoyote itatolewa katika ripoti za mdomo au zilizoandikwa ambazo zinaweza kuwaunganisha washiriki kwenye utafiti.

6.Haki.Ushiriki wa utafiti huu ni wa hiari kabisa. Washiriki wana haki ya kutangaza kuhusika au la katika utafiti huu. Ikiwa wataamua kushiriki, wana haki ya kujiondoa kutoka kwa masomo wakati wowote na hii haitaleti lebo kwa upotezaji wowote wa faida ambazo walipewa haki. Sio lazima kujibu swali lolote ambalo hawataki kujibu.

7. Anwani ya Mawasiliano. Ikiwa kuna maswali yoyote au kuuliza wakati wowote juu ya utafiti au taratibu, tafadhali wasiliana na: Upelelezi mkuu Dr Salwa Mohammed barua pepe: salwa.mohd.sm@gmail.com Simu ya Mkononi. simu: 0722946073 au unaweza kuwasiliana na Kamati ya Tathmini na Maadili ya Taasisi (IREC) ya Chuo Kikuu cha Moi katika IREC, jengo la Hospitali ya Moi kufundisha na rufaa, ghorofa ya 2. Mlango Na. 219, P.O. Sanduku 3-30100, Eldoret, Kenya. Mstari wa ofisi: 0787723677. Barua pepe: irec@mtrh.or.ke.Website: irec.or.ke. Unaweza pia kuripoti wasiwasi wako au malalamiko yako bila majina kupitia anwani zilizo hapo juu za IREC. Utapewa nakala ya fomu hii kuweka kwa rekodi zako

8. Azimio la ya hiari ya habari.Nimesoma/ilisomewa karatasi ya habari ya mshiriki. Nimeelewa wazi madhumuni ya utafiti, taratibu ,hatarinafaida ,maswala ya usiri, haki



za kushiri kina anwani ya mawasiliano ya maswali yoyote. Nimepewa nafasi ya kuuliza maswali kwa vitu ambavyo vinaweza kuwa haijulikani wazi. Niliarifiwa kuwa washiriki wanahaki ya kujiondoa kwenye masomo wakati wowote au la kujibu swali lolote ambalo hawataki. Ninaarifiwa pia kuwa hospitali inayo haki ya kukomesha uchungzi huu kufanywa ikiwa makosa yoyote nataratibu zisizo na maadili zinazingatiwa wakati wa machakatowau kusanyajiwa data katika majengo ya hospitali. Kwahivyo ,nina tangaza idhini yangu ya hiari waanzilishi wangu.(saini)

Jina na saini ya mshiriki.....

Jina na saini ya ushuru data.....

Fomu hii ya idhini itahifadhiwa na mtafiti kwa angalau miaka mitatu zaidi ya mwisho wa masomo.

## Appendix 4: Swahili Version Questionnaire

### DODOSA LA MAHOJIANO

Nambari ya dodoso ...../.....

s/ no .	Maswali	Majibu
<b>Habari ya kijamii</b>		
1	Una miaka mingapi?	_____umrikatikamiaka
2	Dini yako ni nini?	4. Waislamu 5. Mkristo 6. Nyingine (taja)_____
3	Je! Ni nini hali yako ya ndoa sasa?	1. Kuolewa 2. Kugawanywa / Kutengwa 3. Mjane 4. Moja 5.Nyingine (bayana) -----
4	Kazi yako ni nini?	1.Agriculture o Ukulima / Mifugo o Uvuvi o Madini 2.Mfanyikazi o Serikali au parastatal o Binafsi 3.Uajiriwa (siokatikakilimo / mifugo) o Na wafanyikazi o Bila wafanyikazi (k.m. bodaboda) o Msaidizi wa familia anayelipwa katika biashara 4.Hafanyi kazi o Na inapatikana kwa kazi (k.awafanyakazi wa kawaidaka mashamba la sukari) o Na haipatikani kwa kazi  5.mama wanyumbani o Mwanafunzi o Haiwezi kufanya kazi / mgonjwa / mlemavu Nyingine (Taja)
5	Je! Wewe hufanya pesa ngapi kwa mwezi kutoka kwa mshahara wako na vyanzo vingine?	1. Below KES 1,999 2. Between KES 2,000 and 3,999 3. Between KES 4,000 and 5,999 4. Over KES 6,000
6	Je! Elimu yako imekamilika hadi kiwango gani?	1. hapana 2. msingi 3. sekondari 4.vocational

		5.chuo kikuu
7	Umri wa Mume wako ni ngapi?	_____umri katika miaka
8	Je!kiwango cha elimu ya mume wako imefika wapi?	1. hapana 2. msingi 3. sekondari 4.vocational 5.chuo kikuu
9	Mume wako anafanya kazi gani?	1.Agriculture o Ukulima / Mifugo o Uvuvi o Madini 2.Mfanyikazi o Serikali au parastatal o Binafsi 3.Uajiriwa (siokatikakilimo / mifugo) o Na wafanyikazi o Bilawafanyikazi (k.m. bodaboda) o Msaidiziwafamiliaanayelipwakatikabiashara 4.Hafanyi kazi o Na inapatikanakwakazi (k.awafanyakaziwakawaidakamashamba la sukari) o Na haipatikanikwakazi o Mpumbajiwanyumba 5.msaidizi wanyumbani o Mwanafunzi o Haiwezikufanyakazi / mgonjwa / mlemavu Nyingine (Taja)
10	Ni watu wangapi wanaoshiriki chakula na wewe kila siku au idadi ya watu wanaoishi katika nyumba moja?	_____
11	Kijiji	3. Mjini 4. Vijijini
12	Je! Kituo cha afya karibu na nyumba yako iko umbali gani?	----- dakika (kwa miguu) _____ dakika (na mzunguko wa gari)
13	Je! Kituo cha afya cha umma kilicho karibu ni gani?	1. 1. Dispensary 2. Kituo cha Afya 3. Hospitali 4.Wengine (taja) _____
14	Je! Unayo ufikiajiwa media za watu wengi?	3. Ndio 4. Hapana
15	Ikiwandio, unatumianini?	6. 1. Redio

		7. 2. TV 8. 3. Gazeti 9. Nyingine (taja) s _____
	<b>Historia ya awali ya uzazi wa mpango</b>	
16	Umri kwenye ndoa ya kwanza	_____
17	Je! Mara ngapi kwa jumla ukawa mjamzito?	_____
18	Je! Ni mara ngapi kwa jumla uliyozaa?	_____
19	Je! Ni ngapi ujauzito wako uliosababisha mtoto aliyezaliwa akiwa ako hai?	_____
20	Je! Ni ngapi ujauzito wako uliosababisha mtoto aliyezaliwa amekufa?	_____
21	Je! Una historia ya kumaliza mimba?	1.ndio 2. hapana
22	Ikiwa ndio mara ngapi?	_____
23	Je! Kulikuwa na shida / shida ya kiafya Wakati wa ujauzito uliopita?	3. ndio (specify)----- 4. hapana
	<b>Mimba ya sasa</b>	
24	Je! Ulihudhuria kliniki ya uke katika ujauzito huu?	3. Ndio 4. hapana
25	Ikiwa ndio, katika umri gani wa ujauzito ulihudhuria kliniki yako ya kwanza	_____miezi
26	Ikiwa ndio, ni mara ngapi?	_____
27	Ikiwa ndio, ulienda wapi? (BONYEZA ZOTE ZINAZOFAA)	1. Dispensary 2. Kituo cha Afya 3. Hospitali 4. Wengine (taja) _____
28	Ikiwa ndio, kusudi la mahudhurio lilikuwa nini?	4. Kwakuangaliakawaida 5. Mimi nimgonjwa 6. Nyingine (taja) s _____
29	Ulipewa ujumbe wowote kuhusu ujauzito?	1.ndio 2. hapana
30	Ulipewa ujumbe gani?	_____
31	Ikiwa ndio, ni nani aliyekupa ujumbe?	1. 2. 3.
	<b>Ujuzi juu ya ishara za hatari za uzazi</b>	
32	Je! Umesikia juu ya shida zozote ambazo zinaweza kutokea na ujauzito?	3. Ndio 4. hapana

33	Ikiwa ndio, umesikia kutoka kwa nani?	1. 2. 3. 4.
34	Je! Una jua dalili hatari za shida za kiafya wakati wa ujauzito kuanza?	3. Ndio 4. hapana
35	Ikiwa ndio, unaweza kuzitaja? (Weka alama x kwa kuuliza ni nini kingine unajua)	1. kutokwa na damu kwauke 2. kushutuka 3. maumivu makali ya kichwa 4. Maono yasiyo faa 5. maumivu makali yatumbo 6. Ugumu wa kupumua 7. Homa kubwa 8. Kuvimba kwa uso, miguu. 9. Kuendelea kutapika 10. Hakuna harakati za fetasi 11. Watu wengine wanabainisha -----
36	Je! Una jua dalili hatari za shida za kiafya wakati wa kuzaa?	3. Ndio 4. Hapana
37	Ikiwa ndio unaweza kuzitaja?	1. Kuumwa kichwa kali 2. Kuumwa zaidi ya 12 hr 3. Kutokwa na damu sana 4. Homa kubwa 5. Placenta iliyo hifadhiwa 6. Nafasi isiyo yakawaida ya fetasi 7. Wengine hubaini -----
38	Je! Una jua dalili za hatari za kiafya baada ya kuzaliwa kwa mtoto ?	3. Ndio 4. Hapana
39	Ikiwa ndio unaweza kuzitaja?	1. Kutokwa na damu kwa vaginal 2. Convulsions 3. Kupumua kwa haraka au ngumu 4. Homa kubwa 5. dhaifu sana kutoka kitandani 6. maumivu ya tumbo 7. Matiti yameja anyekundu au laini, au vidonda 8. Lochia yenye harufu mbaya 9. Maono Blur 11. Nyingine (taja) s
40	Je! Utakwenda / kufanya nini ikiwaishara hizi za hatari zitatokea?	1. Kufanya chochote 2. Wasiliana na rafiki au jamaa 3. Kujitumza/matibabtu wenyewe 4. Hospitali 5. Wahudumu wa jadi wa kazaliwa



### Appendix 6: Pretest Results and Conclusion

<b>VARIABLE</b>	<b>MEAN/PROPORTIONS</b>
<b>SOCIODEMOGRAPHICS</b>	
Age of the mother (mean)	25.3 years
Age groups	
15-19 years	15%
20-24 years	6%
25-29 years	35%
30-34 years	15%
above 35years	5%
Marital status (married)	85%
Religion (Islam)	5%
Occupation of the mother (agriculture)	50%
Income	
below KSH 1,999	15%
Between KSH 2,000-3,999	40%
Between KSH 4,000-5,999	10%
Above KSH 6000	5%
Education level of the mother (secondary)	65%
Age of the husband (mean)	32 years
Age groups	
15-19 years	0%
20-24 years	12%
25-29 years	6%
30-34 years	47%
Above 35 years	35%
Education level of the husband (secondary)	55%
Occupation of the husband (employed)	50%
People living in the same household	
below 4	50%
Between 5-8	40%
Between 9-12	10%
Residence (urban)	25%
Mean time to travel to facility	40min
Motor cycle	20min
Nearest public health facility (dispensary)	75%
Access to mass media	100%
Frequent use (radio)	60%
<b>PREVIOUS OBSTETRIC HISTORY</b>	
<b>VARIABLE</b>	<b>MEAN/PROPORTIONS</b>
Age at first marriage (mean)	19 years
Total number of pregnancies	
1	35%
2—4	55%
Above 5	10%
Number of times given birth	
1	35%
2—4	65%
Above 5	0%
Babies born alive	
1	37%
2	11%
3	37%
4	15%
Babies born dead	25%

Women with a history of abortion --yes	25%
One pregnancy loss	75%
History of complication (none)	75%
<b>CURRENT PREGNANCY</b>	
<b>VARIABLE</b>	<b>PROPORTION</b>
Attendance to ANC- - NO	5%
The gestation of the first visit below three months	11%
Between 4 months -6months	74%
Between 7 months --9 months	15%
Number of ANC visits	
1	12%
2—4	53%
5—6	34%
Place attended ANC (dispensary)	42%
Reason for attendance (check-up)	89%
Health messages given	75%

75% of the women sampled had been given health messages. The nurse providing health care services to these women gave the health messages. However, common messages reported were on nutrition during pregnancy, knowing their HIV status, child care, and malaria prevention. 5% of the sample women stated that danger sign was mentioned; however, they could not say them. All the women involved in the study were in the post-natal wards after delivery before being discharged.

98%, 60% & 60% of the sampled women had heard of the danger signs of pregnancy, labour, and after childbirth, respectively. A commonly mentioned danger signs in all three phases was heavy vaginal bleeding 25%, 46% & 42% were the typical response proportions of the answers obtained. Other common danger signs include; severe abdominal pains, no fetal movement, severe headache during labour, difficulty breathing, and high fevers.



**Conclusion**

The women interviewed were mainly married, literate, and had a high attendance of antenatal clinics with multiple visits, which made them have numerous contacts with a health care provider. Despite having various contacts with the health care providers during their antenatal visits, the mothers interviewed could not spontaneously mention all the key obstetric danger signs of the phases of pregnancy, labour, and after childbirth.

**Appendix 7: Budget.****Estimated Budget**


No	ITEMS	QUANTITY	COST per UNIT Kshs	TOTAL(Kshs)
	<b>STATIONARY and EQUIPMENT</b>			
1	Foolscap	2 reams	300	600
2	Printing papers	5 reams	450	2250
3	Ballpoints	2 packet	20	800
4	Pencils	5	20	100
5	Erasers	5 pieces	5	25
6	Notebooks	5	50	250
8	Pocket files	5	50	250
9	Staples	1 packet	200	200
	<b>RESEARCH PROPOSAL DEVELOPMENT</b>			
10	Printing of draft proposal	10 copies	500/copy	5000
11	Printing final proposal	7 copies	500/copy	3,500
12	Binding Research proposal	7 copies	200/copy	1,400
13	IREC FEE			2,000
	<b>THESIS DEVELOPMENT</b>			
14	Printing of draft thesis	10 copies	1000/copy	10,000
15	Binding thesis (hardcover)	7 copies	500/ copy	3,500
16	Photocopy schedule & consent	300pages	3/page	900
	<b>FIELDWORK</b>			
17	Research Assistant	1 person	25,000	25,000
	<b>COMMUNICATION</b>			
18	Phone, E-mail, and Internet searches	-	-	40,000
19	Consultancy (statistician)	-	-	30,000
20	Dissemination costs	-	-	20,000
	<b>GRAND TOTAL</b>			145,775

The investigator will fund the budget.

**Appendix 8: Timelines/Work Plan.**


YEAR	2019	2019-2020	2020	2020	2020-2021	2021	2021-2022	2022-2023
MONTH	JAN-OCT	NOV-JAN	FEB-MAR	JULY-AUG	AUG-JAN	FEB-APR	AUG-OCT	OCT-MAR
Proposal writing with supervisor								
Pilot study								
Approval by IREC								
Sensitization of staff in the labour ward and post-natal ward								
Pilot study								
Data collection								
Data entry and analysis								
Thesis report writing								
Defence								

## Appendix 9: IREC Approval



**MOI TEACHING AND REFERRAL HOSPITAL**  
P.O. BOX 3  
ELDORET  
Tel: 33471023

**INSTITUTIONAL RESEARCH AND ETHICS COMMITTEE (IREC)**



**MOI UNIVERSITY**  
COLLEGE OF HEALTH SCIENCES  
P.O. BOX 4606  
ELDORET  
Tel: 33471223  
30<sup>th</sup> January, 2020

Reference: IREC/2019/270  
**Approval Number: 0003532**

Dr. Salwa Mohammed Omar,  
Moi University,  
School of Medicine,  
P.O. Box 4606-30100,  
**ELDORET-KENYA.**

INSTITUTIONAL RESEARCH & ETHICS COMMITTEE

30 JAN 2020

APPROVED

P. O. Box 4606-30100 ELDORET

Dear Dr. Omar,

**DETERMINANTS OF AWARENESS OF OBSTETRIC DANGER SIGNS AMONG WOMEN DELIVERING AT WEBUYE COUNTY HOSPITAL, WESTERN KENYA**

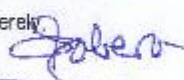
This is to inform you that **MU/MTRH-IREC** has reviewed and approved your above research proposal. Your application approval number is **FAN:0003532**. The approval period is **30<sup>th</sup> January, 2020 – 29<sup>th</sup> January, 2021**.

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 **MU/MTRH-IREC**.
- 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 **MU/MTRH-IREC** 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 **MU/MTRH-IREC** 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 **MU/MTRH-IREC**.

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

Sincerely,



**DR. S. NYABERA**  
DEPUTY-CHAIRMAN  
INSTITUTIONAL RESEARCH AND ETHICS COMMITTEE

cc	CEO - MTRH	Dean - SOP	Dean - SCM
	Principal - CHS	Dean - SCM	Dean - SCC

**Appendix 10: Approval from Webuye County Hospital.**

Dr Salwa Mohammed omar  
Moi University,  
School of Medicine  
P.O. BOX 4606  
ELDORET -KENYA.  
29-oct -2019.

The Hospital Administrator,  
Through,  
The Medical superintendent,  
Webuye County Hospital,  
P.O.BOX 25,  
Webuye.  
BUNGOMA-KENYA.

*Permission granted by 70  
since the findings will  
be hospital management.*  
10/6/2020



Dear sir/madam,

RE: APPROVAL TO CONDUCT A STUDY AT WEBUYE COUNTY HOSPITAL

I am a resident in family medicine at MOI University, I hereby write to request for an approval to conduct a study on: **DETERMINANTS OF AWARENESS OF OBSTETRIC DANGER SIGNS AMONG WOMEN DELIVERING AT WEBUYE COUNTY HOSPITAL, WESTERN KENYA**, which shall be conducted in the post natal ward.

Attached is a copy of the IREC approval document approval number FAN:003532.

Thank you.

Sincerely,

Dr Salwa Mohammed Omar.