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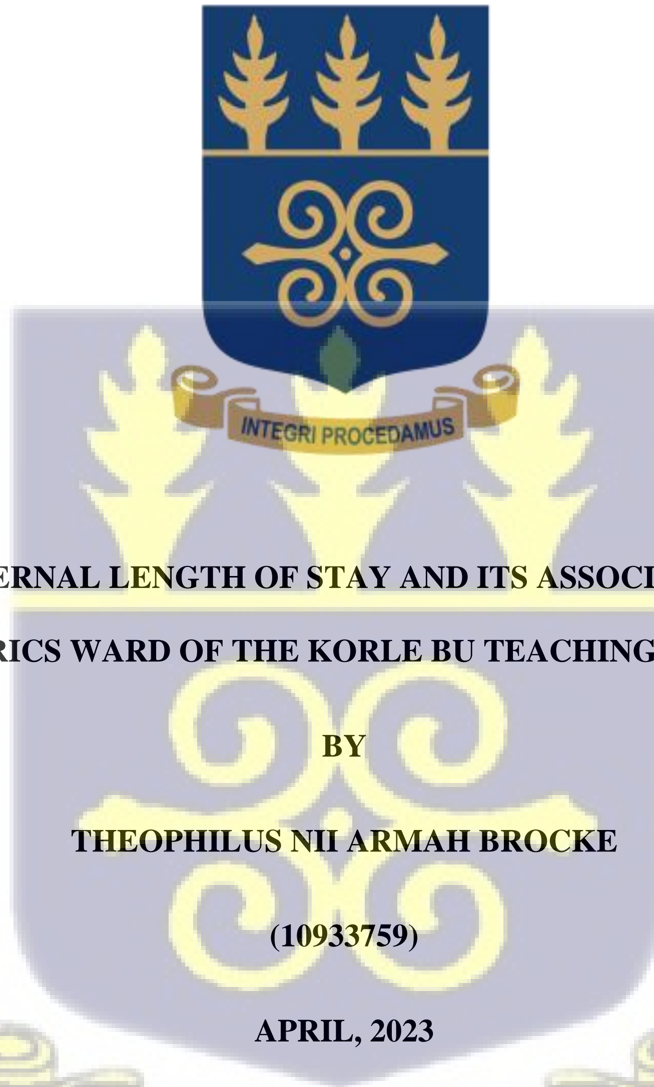

ASSESSING MATERNAL LENGTH OF STAY AND ITS ASSOCIATED FACTORS AT OBSTETRICS WARD OF THE KORLE BU TEACHING HOSPITAL

BY

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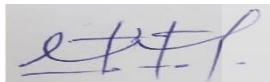
DECLARATION

I, Theophilus Nii Armah Brocke hereby declare that my research work has not been previously presented or submitted in whole or in part to any university for any other previous degree. All other works are duly acknowledged.

Candidate's signature: Supervisor's signature:



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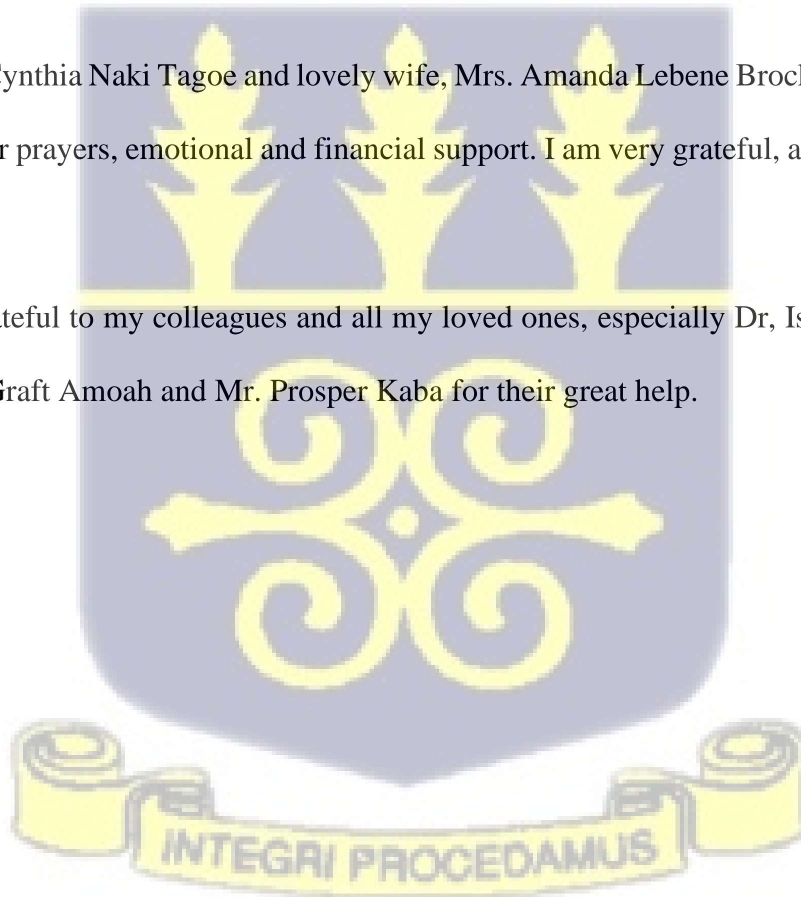

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ABSTRACT

Background: Obstetric care refers to the care provided to patients during the antenatal, intrapartum, and postpartum periods. This is the most common and costly type of hospital care for all payers and healthcare institutions in most parts of the world. According to the World Health Organization (WHO) all women should remain admitted for at least 24 hours after birth. But there is no consensus around appropriate length of stay.

Method: The study design employed was an observational retrospective study. 2142 mothers were included in the study. The data were coded, cleaned with Windows Excel 2016 and analysed using Stata IC (Version17.0). Only variables with missing values of 5% or less were used for the regression analysis. Continuous and categorical variables were summarized using means and frequency distribution respectively. Chi square was used to test the association between the variables. Bivariate and multivariate logistic regression analysis were done to determine the strength of association between the dependent and independent variables.

Results: Age was not significantly associated with LOS (AOR=1.10, 95% CI=0.98-1.03, p=0.68). Women with three pregnancies still had a lower risk of longer LOS compared to those with one pregnancy (AOR=0.55, 95% CI=0.38-0.80, p=0.002). Married women and cohabiting women still had a lower risk of longer LOS compared to single women (AOR=0.54, 95% CI=0.34-0.88, p=0.01 and AOR=0.44, 95% CI=0.27-0.64, p=0.00*, respectively). Women with secondary education still had a higher risk of longer LOS compared to those with no education (AOR=2.09, 95% CI=1.20-3.63, p=0.00*)

Recommendation: Healthcare providers should work towards improving the quality of care for obstetric patients, particularly those who are at a higher risk of longer LOS.

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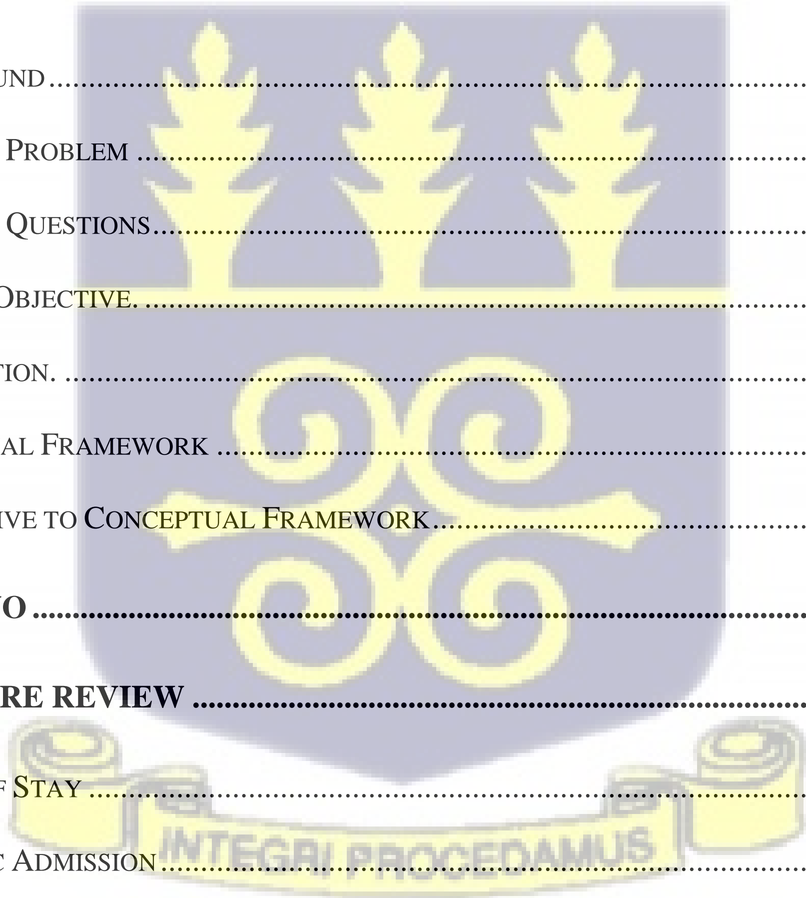

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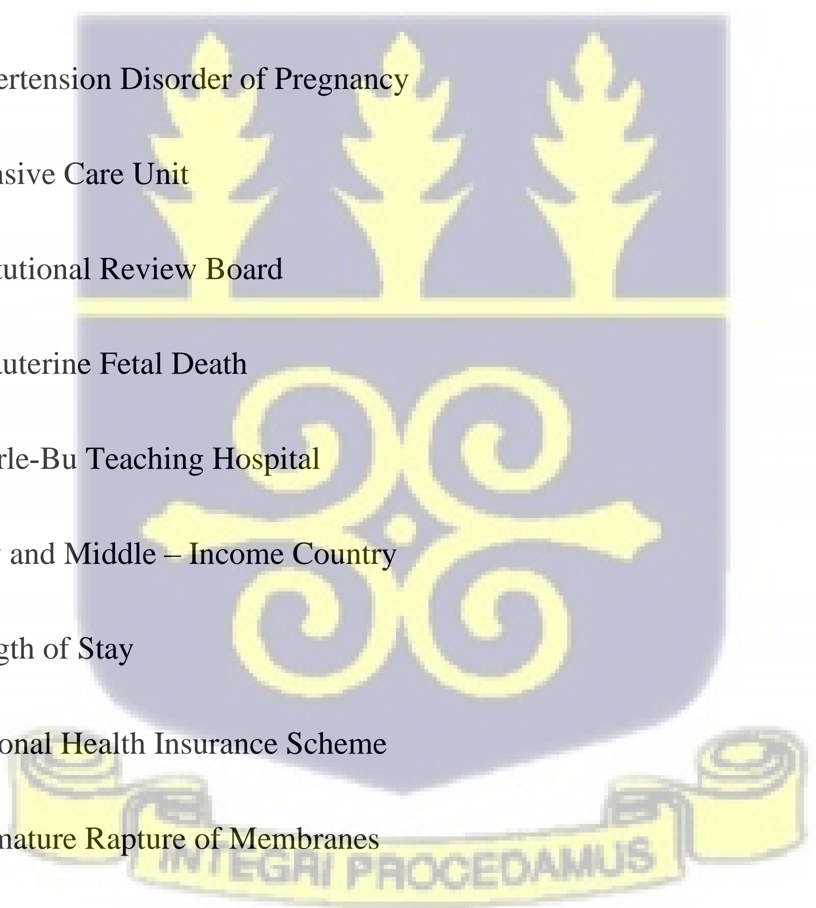

AOR	Adjusted Odds Ratio
APH	Antepartum Heamorrhage
COR	Crude Odds Ratio
CS	Cesarean Section
CI	Confidence Interval
DBP	Diastolic Blood Pressure
HDP	Hypertension Disorder of Pregnancy
ICU	Intensive Care Unit
IRB	Institutional Review Board
IUFD	Intrauterine Fetal Death
KBTH	Korle-Bu Teaching Hospital
LMIC	Low and Middle – Income Country
LOS	Length of Stay
NHIS	National Health Insurance Scheme
PROM	Premature Rapture of Membranes
SBP	Systolic Blood Pressure
SPSS	Statistical Package for the Social Sciences

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SVD Spontaneous Vaginal Delivery

UTI Urinary Tract Infections

WHO World Health Organization

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CHAPTER 1

1.0 INTRODUCTION

1.1 Background

Obstetric care refers to the care provided to patients during the antenatal, intrapartum, and postpartum periods. This is the most common and costly type of hospital care for all patients and healthcare institutions in most parts of the world (Luca Cegolon, Campbell, et al., 2019). Prediction of the length of stay (LOS) for obstetric patients during their hospitalization can help unit managers and administrators make decisions about hospital resource allocation (available beds, demand for beds, and staffing levels), enabling obstetric care improvement before, during and after childbirth (Gao et al., 2017). This is notable because better organized care can reduce the morbidity and mortality of women, as well as their newborn babies, while reducing maternity-related costs (Schaffer & Rashid, 2016). Since patients in the same unit are usually exposed to similar hospital practices, length of stay may also summarize the performance of the entire, exceedingly complex, hospital system (Baek et al., 2018).

The process of pregnancy and birth, albeit a major life event, constitute a natural, developmental, physiological stage. Although a woman's body goes through extraordinary physical changes to adapt to the needs of the growing fetus, the majority of women do so without medical concern (Hodgkinson et al., 2014). For a small percentage of women, the changes that occur trigger a cascade of events, which can lead to adverse developments including maternal morbidity and mortality. Complications during pregnancy can pose a serious risk to both maternal and fetal health. This is a major cause of increased length of hospital stay (van Otterloo et al., 2018).

Understanding the trends of LOS in obstetric conditions and the variables contributing to it can be extremely useful in counseling discussions and may help mitigate anxieties over the uncertainty

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of a hospital stay, as well as preparedness for discharge (Gao et al., 2017). Likewise, knowing the pattern of the length of stay for the newborn especially the preterm is vital in the counseling of the parents and in preparing their minds as to how long the baby can stay in the hospital. This is important both for patients and their families who often inquire about the expected duration of a hospitalization.

1.2 Research Problem

According to the World Health Organization (WHO) all women should remain admitted for at least 24 hours after birth. But there is no consensus around appropriate length of stay (World Health Organization & Special Programme of Research, 2022). Many demographic and clinical factors affect birth and subsequently affect the length of stay in hospital, which may affect availability of beds for new admissions (Lorenzoni & Marino, 2017). Maternal medical conditions like hypertension, diabetes, anaemia, postpartum hemorrhage, and sickle cell disease or neonatal complications like, respiratory distress, birth asphyxia and sepsis do affect length of stay at the hospital (Rathod & Malini, 2016a).

Longer length of stay is a major problem at the various units of many hospitals globally (Mashao et al., 2021). Ghana is no exception. The Obstetric unit at KBTH is one of the units often at its threshold due to high birth rates. However, not much understanding and fact could be found on this issue even with it being a major problem in Ghanaian healthcare facilities. Few studies have been done to address this issue in this geographical certain which is problematic as there is a need to understand the various factors that affect obstetrics and neonatal LOS in the Ghanaian health facilities (Fenny et al., 2021). This study seeks to bridge the gap in knowledge by determining the factors that affect obstetrics LOS at the Korle-Bu Teaching Hospital to inform stakeholders of realistic expectation and for maximum preparedness.

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1.3 Research Questions

- What is the estimated length of stay for various obstetrics factors of Korle Bu Teaching Hospital?
- What are the factors associated with longer length of stay at the Obstetrics Unit of the Korle Bu Teaching Hospital?

1.4 General Objective.

The main objective of this study is to determine the length of stay of mothers at Korle Bu Teaching Hospital.

1.4.1 Specific Objectives

1. To determine the average length of stay for mothers visiting the Korle Teaching Hospital for delivery.
2. To determine the Length of stay for various obstetrics factors at the Korle Bu Teaching Hospital.
3. To determine the factors associated with longer length of stay among mothers at the Korle Bu Teaching Hospital.

1.5 Justification.

This study will be significant to research, practice and policy.

To research, this study will contribute significantly to existing knowledge on Length of stay of maternal mothers and neonates at hospitals in Ghana. Considering ongoing studies in the area of length of stay, this study will add up to a niche area of tackling length of stay in Hospitals through medical conditions.

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To policy makers, this study will provide an opportunity for hospital administrators to provide the requisite support in the area of provision of enough beds in hospital. The government will also be aware of areas that need expansion and renovation and provide necessary support.

The findings of this study will also increase the awareness and knowledge of administrators and clinicians of the Hospital about the admission rate and the length of stay of patients.

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1.6 Conceptual Framework

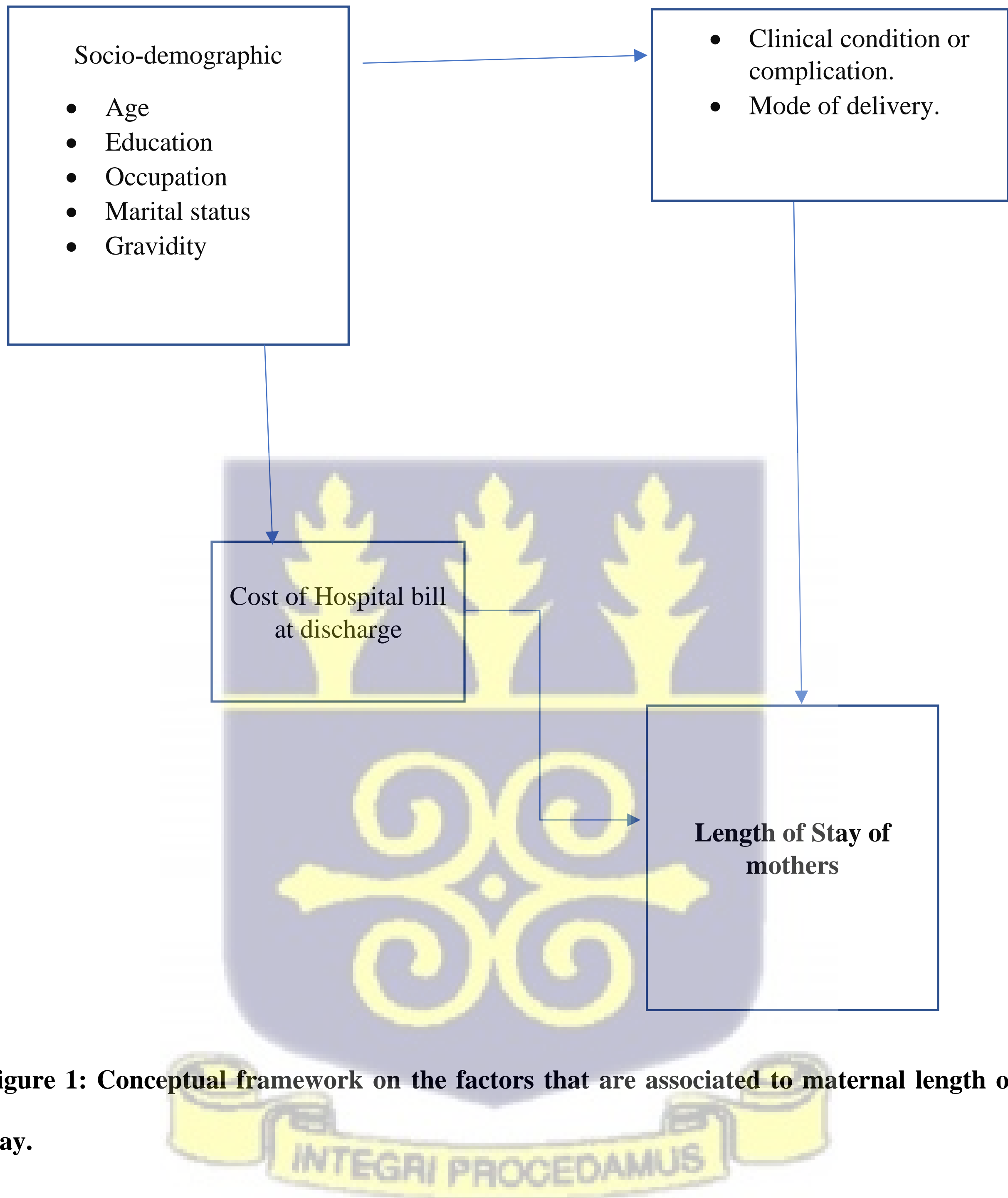

Figure 1: Conceptual framework on the factors that are associated to maternal length of stay.

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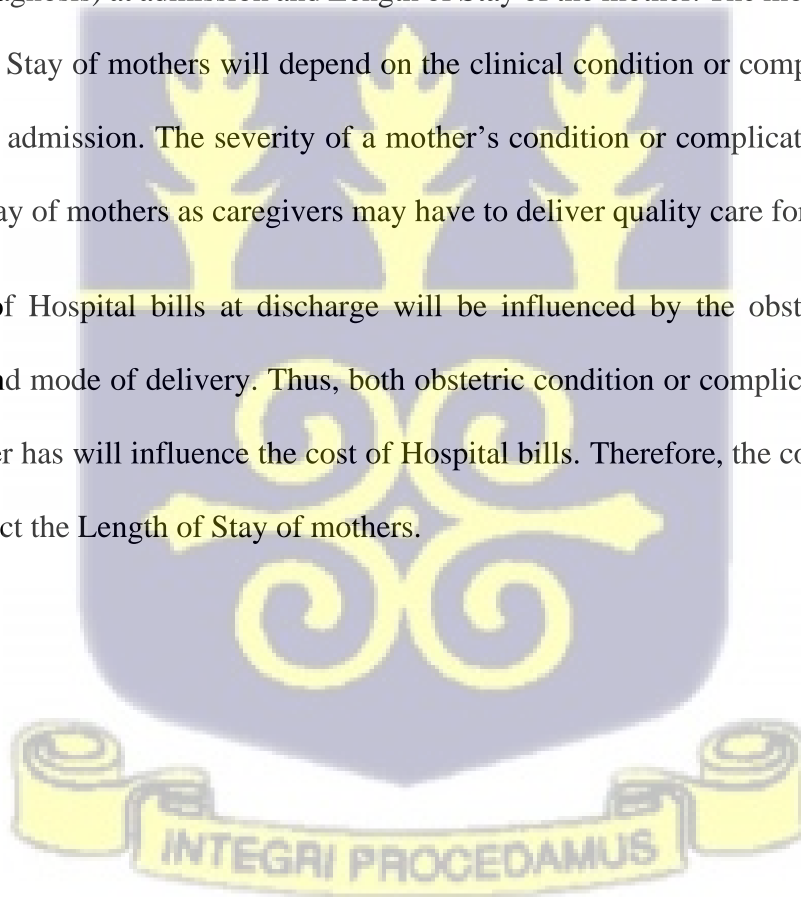
1.6.1 Narrative to Conceptual Framework

The above framework attempts to explain the various factors that influence the Length of Stay of mothers. Accessing the Length of Stay of mothers is shaped directly and indirectly by the demographics of mothers such as age, level of education and occupation. Worldwide, socio-demographic characteristics have been recognized to influence the Length of Stay of mothers and neonates in developing countries. The model demonstrates how the age, level of education and occupation can influence the Length of Stay of mothers at the Hospital.

The framework also illustrates a direct and indirect relationships between the clinical condition or complication (diagnosis) at admission and Length of Stay of the mother. The most important cause of the Length of Stay of mothers will depend on the clinical condition or complications that will be diagnosed on admission. The severity of a mother's condition or complications may increase the Length of Stay of mothers as caregivers may have to deliver quality care for patients.

Also, the cost of Hospital bills at discharge will be influenced by the obstetric condition or complications and mode of delivery. Thus, both obstetric condition or complications and type of delivery a mother has will influence the cost of Hospital bills. Therefore, the cost of Hospital bill will directly affect the Length of Stay of mothers.



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CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Length of Stay

At the beginning of the 20th century, home births were the norm and hospital deliveries were very rare. Women started to deliver in hospital during World War 2 (WW2), in facilities near the military areas where their respective partners were training (Davis, 2014). This trend continued in the decades following WW2, with standard length of stay after childbirth (LOS) increasing up to 10 days (Cegolon et al., 2020). In the seventies some hospitals in the United State of America (USA) started to assess the health of mothers and newborn for eligibility to return home within 12–24 hours after childbirth, with a midwife on call for domiciliary care up to 3 days for 2 weeks post discharge (Benahmed et al., 2017b).

The most widely used definition of early discharge (ED) after childbirth worldwide was formalized by the American Academy of Pediatrics (AAP) and the American College of Obstetricians and Gynecologists (ACOG) in 1992 as a LOS less than 48 hours post spontaneous vaginal deliveries (SVD) and less than 96 hours post cesarean section (CS) (Cegolon et al., 2020). Early discharge of mothers and newborn has increased dramatically in several high-income countries over the past 10–15 years (Ford et al., 2012). However, LOS postpartum remained a contentious feature of obstetric treatment, sparking an ongoing discussion not only about its effects on the health of mothers and newborns but also on health policies, state laws, and the operation of the various health care systems (Cegolon et al., 2020) Evidence on the impact of ED on healthy mothers and term newborns (≥37 weeks) after a vaginal delivery (VD) is still inconclusive and little is known of the characteristics of those discharged early (Benahmed et al., 2017a).

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Understanding the factors that affect LOS, which has become a crucial indicator of the effectiveness of health care delivery, could help reduce health care costs, improve the provision of obstetric care, and contain untoward events linked to co-morbidities and complications necessitating re-admission (van Otterloo et al., 2018).

The goal of global initiatives to reduce maternal and perinatal mortality is to guarantee that all women have access to trained birth attendants, which is almost the same as campaigning for hospital delivery over home birth (Ayele et al., 2019). Some countries, for example Malawi and Hungary, have even mandated that all births take place in facilities (Dixon, 2013; Kumbani et al., 2013). This skilled birth attendant/facility delivery strategy was developed due to the realization that the majority of potentially fatal complications cannot be predicted or prevented, and that labor and the first 24 hours after delivery are the most dangerous times for both mothers and their unborn children (Dixon, 2013). This plan intends to position pregnant women and new mothers in an area where emergency treatment can be quickly provided, if necessary, by a qualified healthcare professional. It seems poorly thought out not to ensure that pregnant women and their newborns stay in facilities long enough to be properly monitored and treated, especially given the epidemiologic risk profile and the efforts many families make to get to facilities in the first place (Kumbani et al., 2013).

Even though it is based on flimsy evidence, the World Health Organization (WHO) does suggest that all women stay in facilities for at least 24 hours after giving birth. Despite this advice, we believe that women frequently leave or are forced to leave facilities without waiting for important postpartum checkups. Additionally, most low- and middle-income nations have struggled to obtain more than poor coverage when attempting to implement postnatal home visiting programs to carry out these postpartum checks or as an alternative when women give birth at home (World Health

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Organization, 2013). We do not anticipate that all women or newborns will require the same length of stay following delivery; those who have difficulties or are more vulnerable usually need longer stays, unless they pass away or are transferred to another facility (Campbell et al., 2016). But even if the length of appropriate stays will vary, some stays will be "too short" or "too lengthy" in comparison to the actual necessity. These stays may lead to adverse health outcomes, dissatisfaction, or increased costs. Short stays, in particular, can leave insufficient time for complications to be detected, diagnosed, or treated, which can increase morbidity and mortality and also insufficient time for facilities to educate or support women, which can reduce maternal confidence or result in breastfeeding issues, maternal depression, or dissatisfaction with care (Campbell et al., 2016). Longer stays may expose patients to unfavorable facility conditions, increasing their risk of nosocomial infections, sleep disturbances, or inadequate newborn feeding support. These can weaken family ties, paternal involvement, or maternal trust. Additionally, they may exacerbate sibling conflict, nursing issues, or mother discontent (Campbell et al., 2016).

In Western countries, there is a trend to shorten the postpartum length of stay in hospital driven by cost containment, hospital bed availability and a movement toward demedicalization of childbirth (Benahmed et al., 2017a). Early postpartum discharge for healthy mothers and newborns was implemented in addition to shorter hospital stays to encourage a more family-centered approach to childbirth and also to allow for greater father involvement, reduced sibling rivalry, improved rest and sleep for the mother, decreased exposure of the mother and newborn to nosocomial infections, increased maternal confidence in caring for the child, and finally, less conflicting breastfeeding advice (Lindblad et al., 2021). However, concerns about premature discharge arose due to potential negative effects, such as delays in identifying and treating maternal morbidities and neonatal pathologies, earlier weaning, a lack of professional support, a higher prevalence of

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postpartum depression, and an increase in hospital readmissions for both mothers and infants (Benahmed et al., 2017a). Consequently, early postpartum discharge varies from 12 to 72 h depending on the country (Benahmed et al., 2017a).

Caesarean sections necessitate longer hospital stays and more complicated postnatal care (Luca Cegolon, Mastrangelo, et al., 2019). When vaginal deliveries are not possible or there are life-threatening hazards to the mother or the infant, cesarean sections (CS), one of the most popular and well-established obstetric surgical procedures globally, are performed (Tura et al., 2018). However, there are health concerns associated with CSs for the mother and the newborn, including surgical site infections, venous thrombo-embolism, shock, bleeding, and early childhood anemia (Luca Cegolon, Mastrangelo, et al., 2019). Furthermore, women who give birth by cesarean section typically need more time to recover than those who give birth through vaginal delivery (VD) which results in a significant increase in the cost of medical treatment (Negrini et al., 2021). Several tactics have been suggested to lower the needless expenses of childbirth-related medical care. One of these is the length of hospital stay (LOS), which has been recognized as a crucial quality measure of obstetric treatment and hospital performance effectiveness. If all else were equal, shorter LOS would result in lower hospital bills for patients and quicker returns home (Luca Cegolon, Mastrangelo, et al., 2019).

2.2 Obstetric Admission

According to recent demographic data, more and more women of reproductive age are presenting with serious comorbidities (Farr et al., 2017). This tendency may be brought on by rising maternal ages at first pregnancies, which have been seen in developed nations during the past few decades. Because of this, pre-existing condition-carrying women are more likely to experience peripartum difficulties during pregnancy, and some of these women commonly need to be admitted to the

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critical care unit. Based on socioeconomic situation, admission requirements, ICU bed availability, and access to a high dependency unit, the percentage of the obstetric population requiring admission to the varies across nations. It ranges from 0.08 to 0.76 % of deliveries in developed countries and 0.13 to 4.6 % in developing countries (Sadler et al., 2013). The mortality rate in these patients is high and ranges from 0 to 4.9 % in developed and 2–43.63 % in developing countries. Hypertensive disorders and obstetric hemorrhage are the two commonest risk factors for ICU admission. The other risk factors are sepsis, cardiac disease, and severe anemia (Rathod & Malini, 2016b).

Pollock (2010) reported an overall incidence of obstetric ICU admission of 2.7 per 1000 deliveries, equating to 1 admission per 370 deliveries. In another study, it was observed that an admission rate of 6.4 per 1000 deliveries, corresponds to 1 admission per 156 deliveries (Farr et al., 2017). The two most common indications for obstetric ICU admission found in a study was preeclampsia 28.8% followed by obstetric hemorrhage 24.7%. Early detection of high-risk obstetric patients and referral to tertiary health care center, close collaboration between obstetricians, intensive care specialists and anesthetists; and adequate resuscitation and supportive care sequel to ICU admission will go a long way in reducing the prevalence of maternal morbidity and mortality (Bajwa & Bajwa, 2012)

2.3 Obstetric Re-Admissions

Obstetric re-admissions may be of increasing clinical importance. Overall risk for postpartum re-admission is increasing, with a recent study finding an increase from 1.7% in 2004 to 2.2% in 2011 (Clapp et al., 2016). Recommendations for postpartum care have recently been updated by the American College of Obstetricians and Gynecologists, who state that in order to "optimize the health of women and infants, postpartum care should become an ongoing process, rather than a

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single encounter, with services and support tailored to each woman's individual needs." (Wen et al., 2021). In an effort to lower the risk of readmission and unfavorable postpartum maternal outcomes, conventional postpartum care methods are being reexamined (Aziz et al., 2019). An important consideration in optimizing postpartum care is appropriately characterizing maternal risk (Wen et al., 2021). Previous studies have identified a range of risk factors for re-admission, including advanced age, socioeconomic status, chronic comorbidities, multiple gestations, cesarean delivery, and other high risk pregnancy conditions (DiTosto et al., 2021). Maternal race is a major risk factor for adverse obstetric outcomes, and a number of previous analyses have addressed disparities in overall risk for severe morbidity and mortality (Howell et al., 2016). A better understanding of how race is associated with postpartum risk may be useful in risk stratification and designing improvements in maternal care (Aziz et al., 2019). Re-admission rates are correlated with payment for specific medical and surgical disorders and are used as a quality measure. Although their use has been suggested, obstetric maternal re-admissions have not undergone a thorough study as a quality indicator (Clapp et al., 2017).

2.4 Reasons for Admission

The percentage of obstetric population requiring admission to the ICU is different in different countries based on the socioeconomic status, criteria for ICU admission, availability of ICU beds, and availability of a high dependency unit (Rathod & Malini, 2016b). It ranges from 0.08 to 0.76 % of deliveries in developed countries and 0.13 to 4.6 % in developing countries (Sadler et al., 2013). The mortality in these patients is high and ranges from 0 to 4.9 % of ICU admissions in developed and 2–43.63 % in developing countries (Ibrahim et al., 2015). Hypertensive disorders and obstetric hemorrhage are the two commonest risk factors for ICU admission. The other risk factors are sepsis, cardiac disease, and severe anemia (Rathod & Malini, 2016b)

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Hypertensive disorders of pregnancy (HDP) are a major cause of maternal morbidity and mortality (Seyom et al., 2015). These generally involve hypertension related conditions occurring primarily during pregnancy or may be pre-existing and persist during and or after pregnancy (Berhan & Endeshaw, 2015). Generally, HDP are said to complicate 5-10% of pregnancies and account for 10-15% of maternal deaths globally (Vest & Cho, 2012). Recent data suggests that the increasing incidence of HDP is partly due to an increasing trend in obesity worldwide (Priso et al., 2015).

Furthermore, the resultant worrisome maternal morbidity and mortality from HDP shows some disproportionate distribution geographically, as majority of these maternal deaths are found to occur in low and middle income countries (LMICs) (Priso et al., 2015). Preeclampsia is a HDP in which there is hypertension (systolic blood pressure (SBP) ≥140mmHg and or diastolic blood pressure (DBP) ≥90mmHg) and proteinuria occurring after 20 weeks gestation, measured on two different occasions at least 4 to 6hours apart in women previously known to be normotensive (Kintiraki et al., 2015). In severe preeclampsia, SBP (DBP) is ≥160 (110) mmHg in the presence of proteinuria. When convulsion occurs in the presence of these features, the condition is known as eclampsia (Vest & Cho, 2012). Amongst others, preeclampsia is known to be a disorder of nulliparity, but multi parous pregnant women with new partners have been shown to have a similar elevated risk for development of preeclampsia like nulliparous women. A study in northern Cameroon found teenage status, illiteracy, nulliparity and family or personal history of hypertension as risk factors for HDP(Priso et al., 2015). It should be noted that the adverse effects of preeclampsia and eclampsia are not only limited to the mother but also to the foetus with several complications ranging from intra-uterine growth restriction to intra-uterine foetal death. Several theories exist on the pathogenesis of preeclampsia, but at present, it is suggested that the placenta is the primary agent in the development of preeclampsia, hence, removal of the placenta (by

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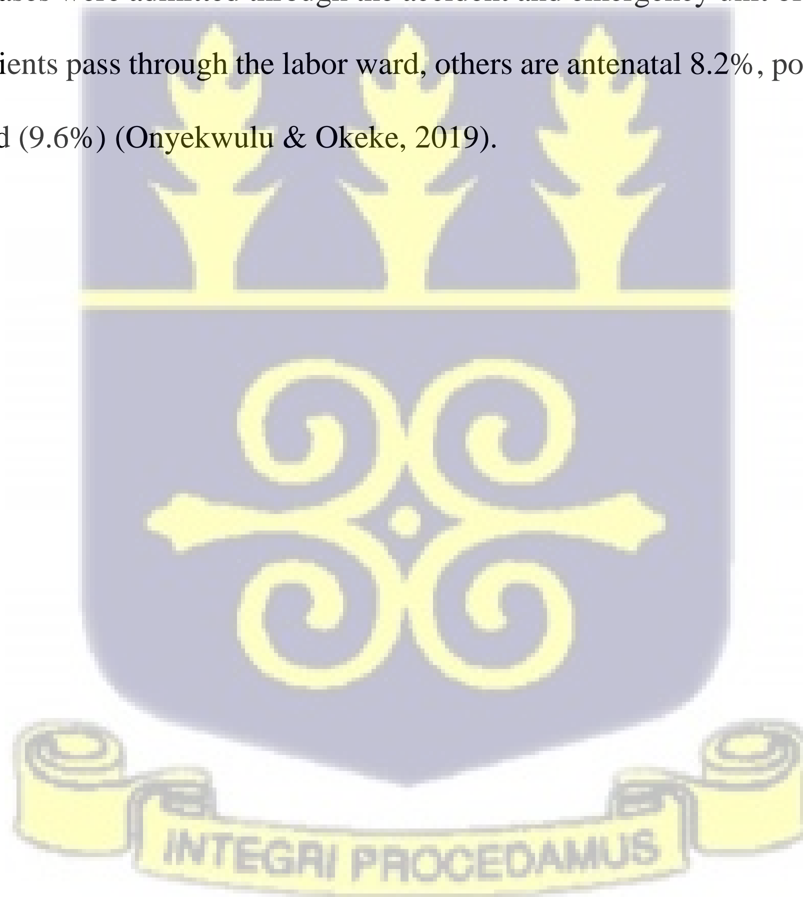
termination of the pregnancy) is the sole method of treating the condition (Priso et al., 2015). Studies continue to suggest the increasing burden of HDP around the world making it a growing public health problem (Seyom et al., 2015).

A study found that the commonest obstetric cases admitted into the ICU were (pre) eclampsia 28.8% followed by obstetric hemorrhage 24.7%. Ruptured ectopic pregnancy constituted 11% of obstetric admissions; together with obstetric hemorrhage produced majority of obstetric ICU admissions related to maternal hemorrhage (35.7%). Miscellaneous conditions included thyrotoxicosis, acute severe asthma, anesthetic complication and diabetes mellitus (n=2). Majority (37%) of these cases were admitted through the accident and emergency unit of the hospital while 26.8% of the patients pass through the labor ward, others are antenatal 8.2%, postnatal (8.2%) and special care ward (9.6%) (Onyekwulu & Okeke, 2019).



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CHAPTER THREE

3.0 METHODOLOGY

3.1 Study Design

The study took the approach of a retrospective cohort research to determine the LOS of mothers at the Korle Bu Teaching Hospital.

3.2 Study Site

The study was conducted at the Obstetrics Unit of the Korle Bu Teaching Hospital (KBTH). The Korle Bu Teaching Hospital is situated in Accra, the capital city of Ghana. This Hospital was established in 1923, by the British Colonial Governor, Sir Gordon Guggisburg as a hospital to serve the people of Accra. The Greater Accra Region presently has an estimated population of 3.9 million people. With a steady growth from a 192-bed facility to a 2000-bed facility, the KBTH is now the principal national referral center, serving a country of an estimated 30 million individuals. The Korle Bu Teaching Hospital is the largest hospital in West Africa and the third largest in Africa, serving as a major referral point for the West African sub region. There is an average annual delivery of about 8275. The Obstetrics Unit serves as a major referral point with an average daily attendance of almost 116 patients. It is a 24 hours' clinic which is made up of six maternity wards, two labour wards and two theater rooms with bed capacity of 257 which renders treatment services to all pregnant women. The clinic provides outpatient services, antenatal clinic. and has an emergency care unit where patients are detained and referred to the wards if not fully recovered. It has over 11,357 registered patients. The clinic has a laboratory and a pharmacy unit. The laboratory investigations carried out includes haematology, chemistry, urinalysis tests and a blood bank that does grouping and cross matching for blood transfusion.

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3.3 Study Population

The study population comprised of all pregnant women admitted and discharged between 1st January, 2020 and 31st December 2020 at the Obstetrics Unit of the KBTH.

3.3.1 Inclusion and Exclusion Criteria

- Inclusion criteria

All mothers admitted during pregnancy and discharged between 1st January 2020 and 31st December 2020 with or without their babies are potentially eligible for recruitment into the study.

- Exclusion criteria

Excluded were mothers without enough information on their days of stay for retrospective review. Also, mothers who were admitted due to complications in pregnancy but did not deliver and were discharged were excluded.

3.3.2 Sampling and Sample size.

Selection of legible cases from January 2020 to December 2020. Study included all cases of mothers presented at the Obstetrics ward of the Korle Bu Teaching Hospital using data from the electronic health record. Incomplete and missing data were excluded.

3.4 Study Variables

The variables were divided into dependent and independent variables.

3.4.1 Dependent Variables

The dependent variable was Length of stay. LOS (measured in days) was calculated by subtracting the date of birth from the date of hospital discharge.(Cegolon et al., 2019).

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3.4.2 Independent Variables

The independent variables were age, marital status, occupation, level of education, gravidity, mode of delivery, obstetric condition and cost.

Table 3.1 describes the dependent and independent variables, their operational definition, type and scale of measurement.

Table 3.1 Study variables, operational definition, type and scale of measurement

NO	Variable	Operational Definition	Type of Variable	Scale of Measurement
A		DEPENDENT VARIABLES		
		Length of Stay		
1.	Shorter	Measuring the number days spent on admission (< =4 days)	Categorical	Ratio
2.	Longer	Measuring the number days spent on admission (>4 days)	Categorical	Ratio
B		INDEPENDENT VARIABLES		
1.	Age	How old is the patient as at the time of data extraction (in years)	Continuous	Ratio
2.	Marital status	Individual forms a couple relationship with another person	Categorical	Nominal

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		living in the same residence, and the nature of that relationship		
3.	Level of Education	The highest completed qualification in any field of study	Categorical	Ordinal
4.	Occupation	Individual profession	Categorical	Nominal
5.	Gravida	Any pregnancy, regardless of duration, including present pregnancy in the study	Continuous	Ratio
6.	Mode of Delivery	Individual had spontaneous vaginal delivery or caesarean section	Categorical	Nominal
7.	Obstetric condition	Any problem linked to pregnancy or birth	Categorical	Nominal
8.	Cost	The price paid to acquire health service	Continuous	Ratio

3.5 Data Collection Procedure

Datasets were retrieved from the hospital database. Secondary data were extracted from the 2019/2020 maternal deliveries for the study. The raw data consisted of the socio-demographic characteristics, antenatal and postnatal visits, delivery details, date of admission, date of delivery

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and date of discharge, parity, gravidity, mode of delivery, NHIS details (Government and Private agencies), drug cost, service cost. Some of the entries were categorical (ordinal/nominal) and others numerical (concrete/discrete) based on the type of variable. The raw data was reconstructed through variable selection, data cleaning and transformation to obtain the final dataset for the study. Variables of interest that addressed the study objectives were extracted using the Excel worksheet. The extracted data were coded and cleaned using SPSS. All variables of interest were recoded into categorical data.

3.6 Data Management and Analysis

There was a total of 4589 data set available on the Microsoft access document derived from the Biostatistics department in the year 2021. Due to lack of a primary key in all the excel data set, only data set with common primary key were selected. During the cleaning of data, missing data analysis was performed to determine random of selected variable. Most of the variables were missing at random. So, deletion of these variables was done. A total of 2975 were left after deletion. Length of stay was sorted to determine variables with missing length of stay. More than 85% of cost data was missing so this variable was eliminated from the analysis. After removing data with missing LOS, a total of 2142 participants were left. Proportion of missing values in the analysis was less than 5%. Hence the remain variables were coded and used for data analysis.

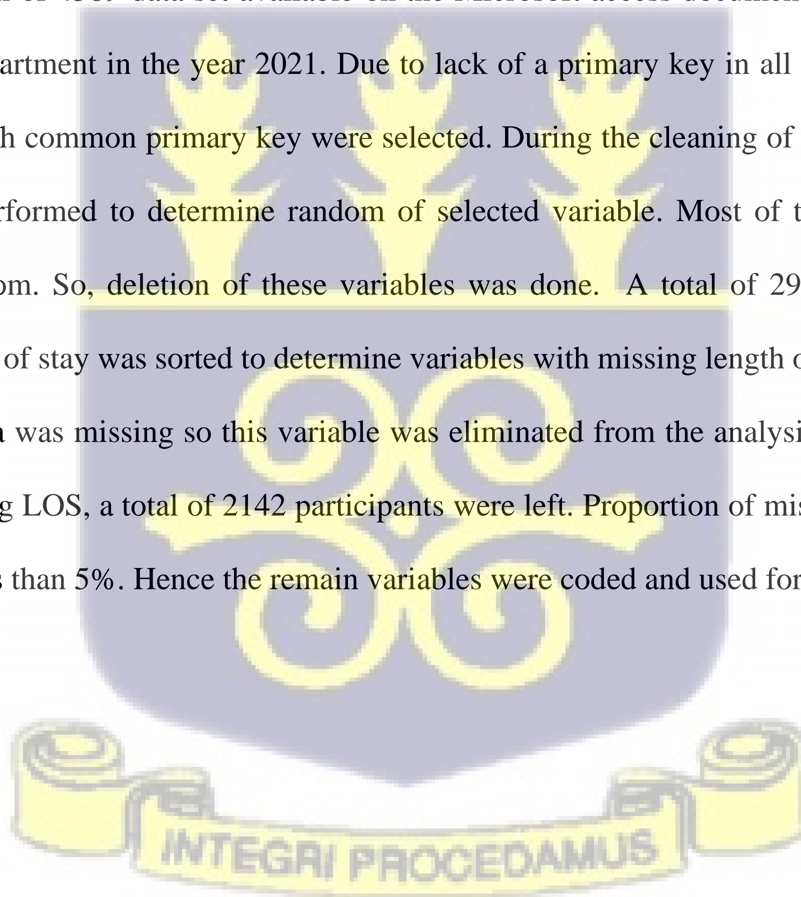

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Table 3.2 Variables and codes assigned to each variable.

Variables	Codes assigned
Age group	
<35	**1**
>35	**2**
Gravidity	
1	**2**
2	**3**
3	**4**
4	**5**
>4	**6**
Marital Status	
Single	**1**
Married	**2**
Cohabiting	**3**
Education Level	
No education	**1**
Primary	**2**
Secondary	**3**
Vocation	**4**
Tertiary	**5**
Occupation	
Formal	**1**
Informal	**2**
Student	**3**
Unemployed	**4**
Mode of Delivery	
CS	**1**
SVD	**2**
Length of stay	
Short	**0**
Long	**1**

Analysis of Data

The coded and cleaned data was exported to Stata 17 for further analysis.

Descriptive statistics (frequency, percentages, mean and standard deviation) was used to analyze socio-demographic and clinical data. Distribution of conditions and it related length of stay (mean) was determined. Average total LOS was also determined.

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Chi-square test of independence was performed to establish association between length of stay and independent variables. Further logistics regression with Crude odds ratio and adjusted odds ratio was performed to determine the associated risk factors of longer length of stay. Statistical significance was set at 0.05. Results were presented in Graphs (Pie chart and box plots), tables and narrations.

3.7 Confidentiality and anonymity

All information obtained was treated with utmost confidentiality. Confidentiality and anonymity were assured. The identity of subject personal details was protected as no name or photograph was taken. The data was stored in a computer password protected and data was in a secured cloud network accessible by the principal investigator. The collected data in the pro forma shall be analyzed and thereafter destroyed at the end of the one-year study period.

3.8 Data storage and usage

All collected data was given a unique identification number. Data entered from questionnaire to computer will always be password-protected and stored on an external storage device. Data will be properly stored and use only for the purpose of the study over the time of the study period.

3.9 Conflict of interest

The study is purely academic devoid of any conflict of interest. The research was carried out without any form of bias and findings reported appropriately.

3.10 Dissemination of findings

The process and findings from the study will be disseminated to University of Ghana School of Public Health as a dissertation, Adabraka Health Directorate, Obstetrics and Gynaecology Department, Korle Bu Teaching Hospital and conference presentations.

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3.11 Ethical Issues

Approval for the study was obtained from the Ethical and Protocol Review Committee of the Korle-Bu Teaching Hospital Institutional Review Board (KBTH-IRB). Permission was obtained from the Head of Department of Obstetrics and Gynaecology, Korle Bu Teaching Hospital**.**

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CHAPTER FOUR

4.0 RESULTS

During the study period, there were 4589 mothers who had delivered and discharged. A total of 2975 mother's data were assessed. However, 2176 mothers met the inclusion criteria. The study flowchart is presented in (Fig.2)

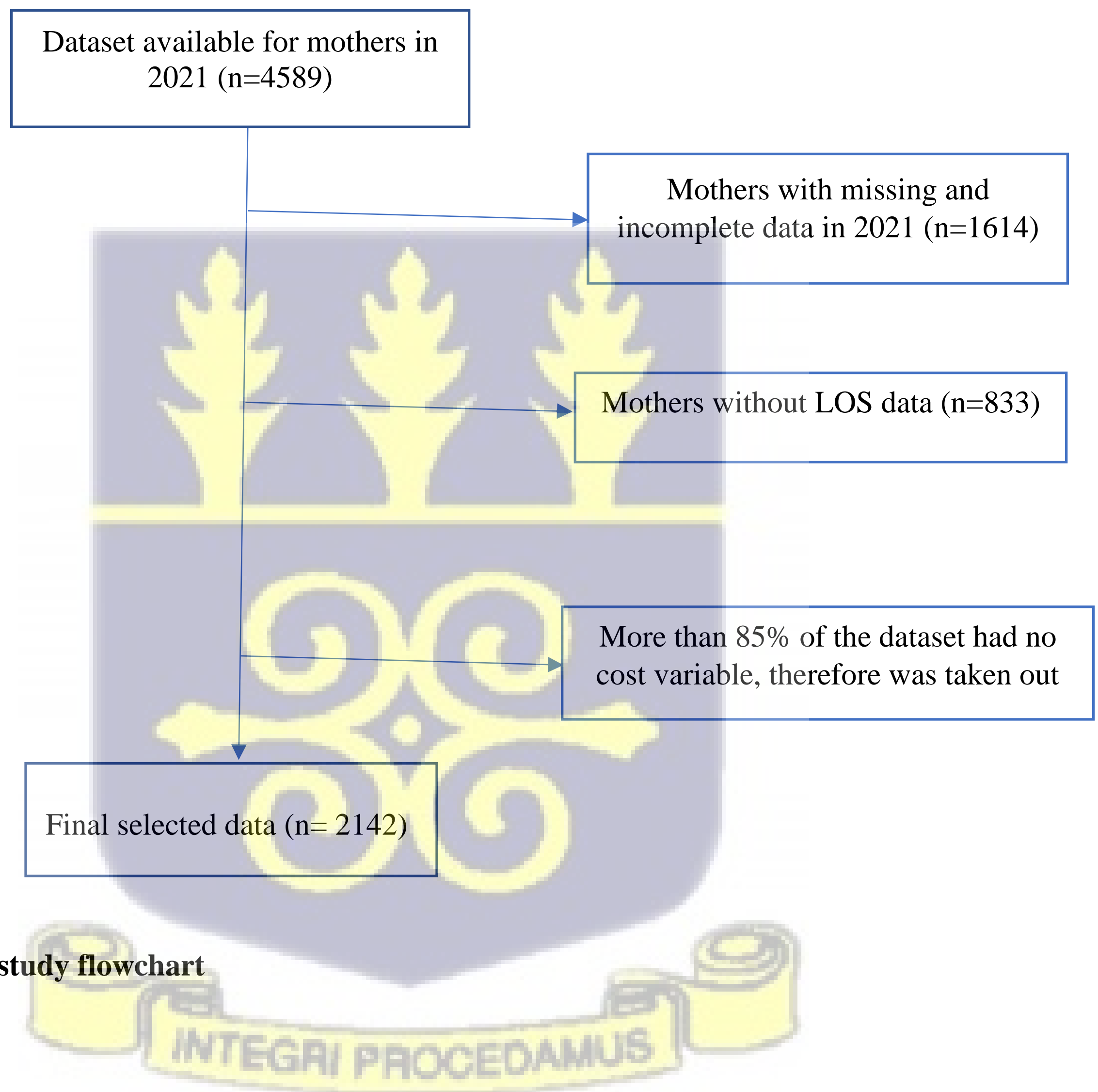

Figure 2: The study flowchart

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4.1 Descriptive Characteristics of Pregnant women at the Obstetrics Unit of the Korle Bu Teaching Hospital (2021).

The study included 2142 mothers who delivered at the Obstetrics unit of the Korle Bu Teaching Hospital. The average age of mothers was 34 years. The majority of participants were >35 years old (76%) with the largest gravidity group of one pregnancy (25%), Most participants were married (78%). Secondary (29%) and vocation (28%) were the most common education levels attained by the participants. Informal workers (61%) comprised the largest occupation group and formal workers (28%). The smallest groups were students (3%) and unemployed (9%) (Table 4.1).

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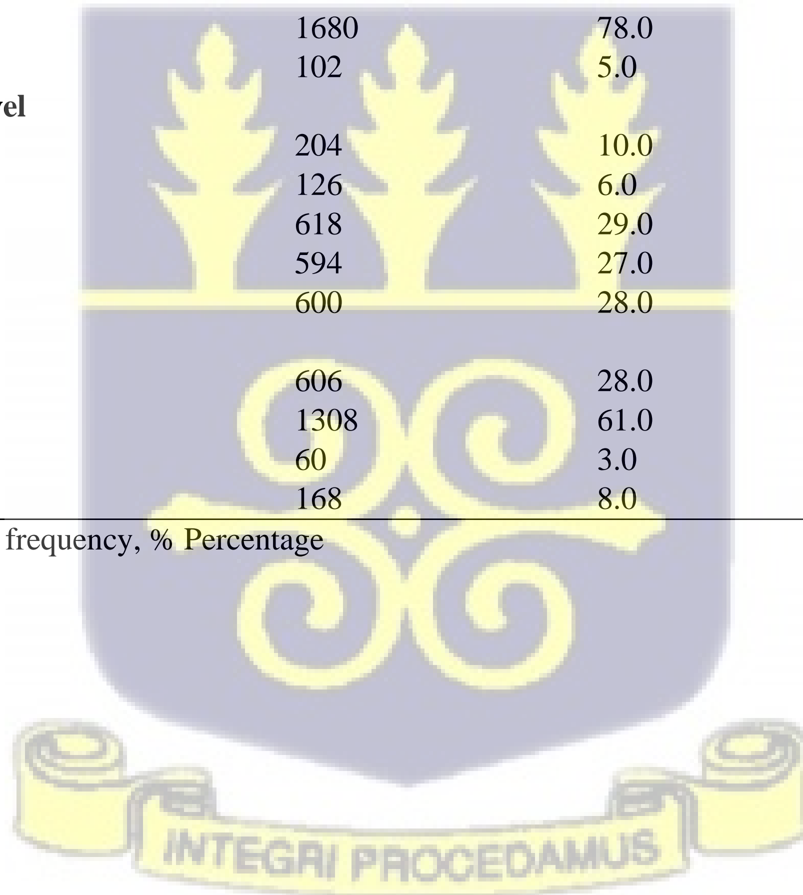
Table 4.1 Descriptive Characteristics of Pregnant women at the Obstetrics Unit of the Korle Bu Teaching Hospital (2021).

Variable	Frequency (N)	Percentages (%)
Age group		
<35	1626	76.0
>35	516	24.0
Gravida		
1	528	25.0
2	474	22.0
3	366	17.0
4	378	18.0
>4	390	18.0
Marital Status		
Single	360	17.0
Married	1680	78.0
Cohabiting	102	5.0
Education Level		
No education	204	10.0
Primary	126	6.0
Secondary	618	29.0
Vocation	594	27.0
Tertiary	600	28.0
Occupation		
Formal	606	28.0
Informal	1308	61.0
Student	60	3.0
Unemployed	168	8.0

Abbreviation: N frequency, % Percentage



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4.2 Distribution of Clinical Conditions of Pregnant women at the Obstetrics Unit of the Korle Bu Teaching Hospital (2021).

The table 4.2 presents the distribution of participants with different medical conditions at the Obstetrics unit of the hospital. Among the pregnant women, majority of them reported at the facility with Latent phase in labour which constitute the highest frequency of (26.9%). Hypertension was the next most common condition among the participants, comprising (24.1%) of the sample. Other conditions such as Previous CS, postdate and PROM had frequencies ranging between 6.2% and 10.4%.

Clinical conditions that were less found among pregnant women were low lying placenta (0.6%), excessive vomiting (0.8%) and malaria in pregnancy (0.8%) (Table 4.2).

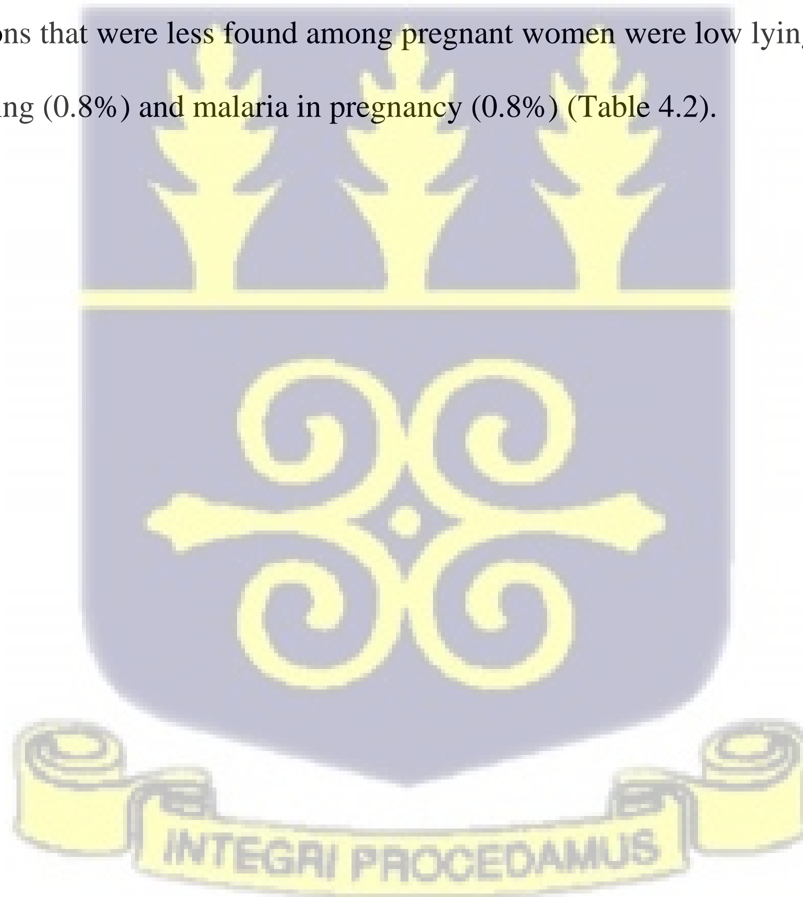

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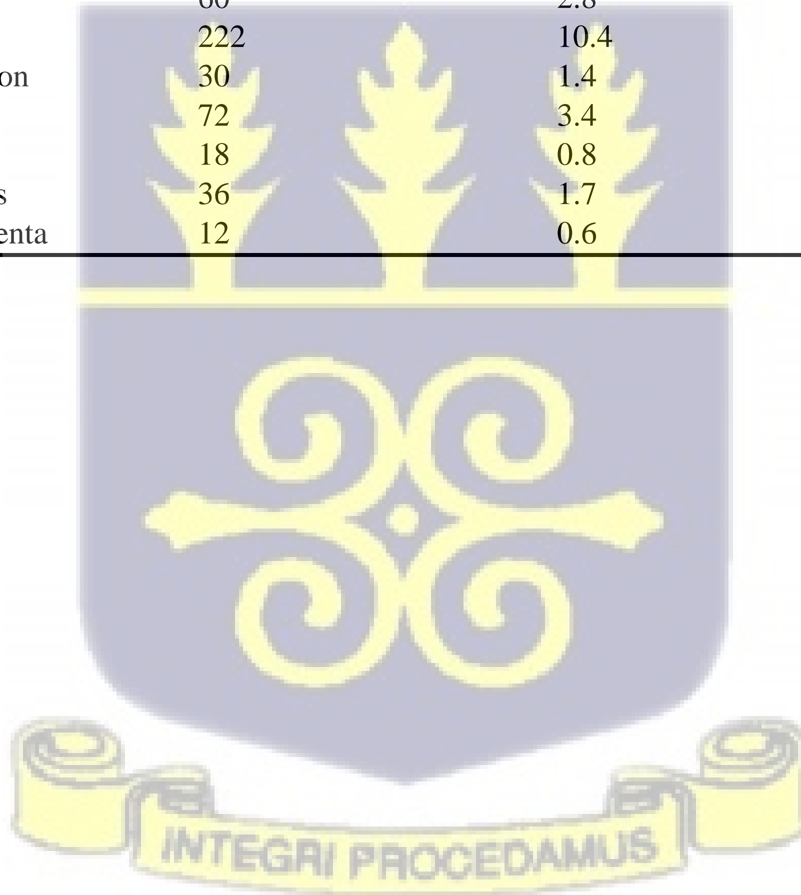
Table 4.2 Distribution of Clinical Conditions of Pregnant women at the Obstetrics Unit of the Korle Bu Teaching Hospital (2021).

Conditions	Distribution of participants	
	Frequency	Percentage (%)
Previous CS	144	6.7
Acute gastroenteritis	24	1.1
Sickle cell	60	2.8
Anaemia	72	3.4
APH	30	1.4
Hypertension	516	24.1
Degenerate fibroid	48	2.2
Excessive vomiting	18	0.8
Latent phase	576	26.9
Malaria	18	0.8
Postdate	132	6.2
Preterm labour	60	2.8
PROM	222	10.4
Threaten abortion	30	1.4
UTI	72	3.4
IUFD	18	0.8
Puerperal sepsis	36	1.7
Low lying placenta	12	0.6



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4.3 Characteristics of Pregnant women at the Obstetrics Unit of the Korle Bu Teaching Hospital (2021) and respective LOS.

The data provides the mean length of stay (LOS) and standard deviation for different variables, such as age group, gravida, marital status, education level, and occupation. Participants >35 year had a high length of stay (mean=7.5 days) than those below 35 years (mean=5.7 days). Participants with Gravida 1 had the lowest length of stay (mean=5.2 days) Table (4.3).

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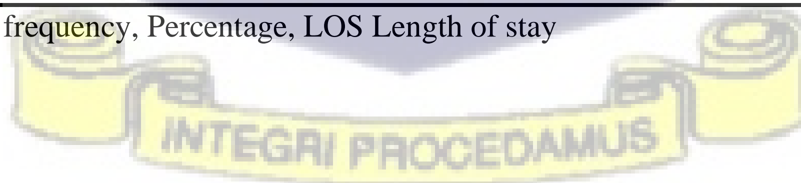
Table 4.3 Characteristics of Pregnant women and respective LOS at the Obstetrics Unit of the Korle Bu Teaching Hospital (2021)

Variable	LOS Mean (SD)
Age group	
<35	5.71(5.4)
>35	7.50(6.70)
Gravida	
1	5.20(5.16)
2	6.42(6.85)
3	6.07(5.79)
4	6.65(6.00)
>4	5.91(4.92)
Marital Status	
Single	5.60(4.99)
Married	6.06(5.94)
Cohabiting	6.53(6.10)
Education Level	
No education	5.21(4.44)
Primary	5.81(5.97)
Secondary	5.68(4.97)
Vocation	6.13(6.15)
Tertiary	6.52(6.54)
Occupation	
Formal	6.47(6.63)
Informal	5.82(5.61)
Student	4.40(2.99)
Unemployed	6.36(4.51)

Abbreviation: N frequency, Percentage, LOS Length of stay



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4.4 Proportion of Clinical Conditions of Pregnant women and their related Length of Stay at the Obstetrics unit of the Korle Bu Teaching Hospital

The table 4.4 presents the participants with different medical conditions and their length of stay in the hospital. Hypertension was with a mean length of stay of 6.95 days and a standard deviation of 6.34. APH had the longest mean length of stay at 14.40 days with a standard deviation of 14.25. Other conditions such as sickle cell, anaemia, and threaten abortion had mean lengths of stay ranging from 7.33 to 9.78 days. Latent phase had a mean length of stay of 4.98 days and a standard deviation of 4.20. Overall, the mean length of stay varied from 2.67 to 14.40 days with varying standard deviations (Table 4.4).

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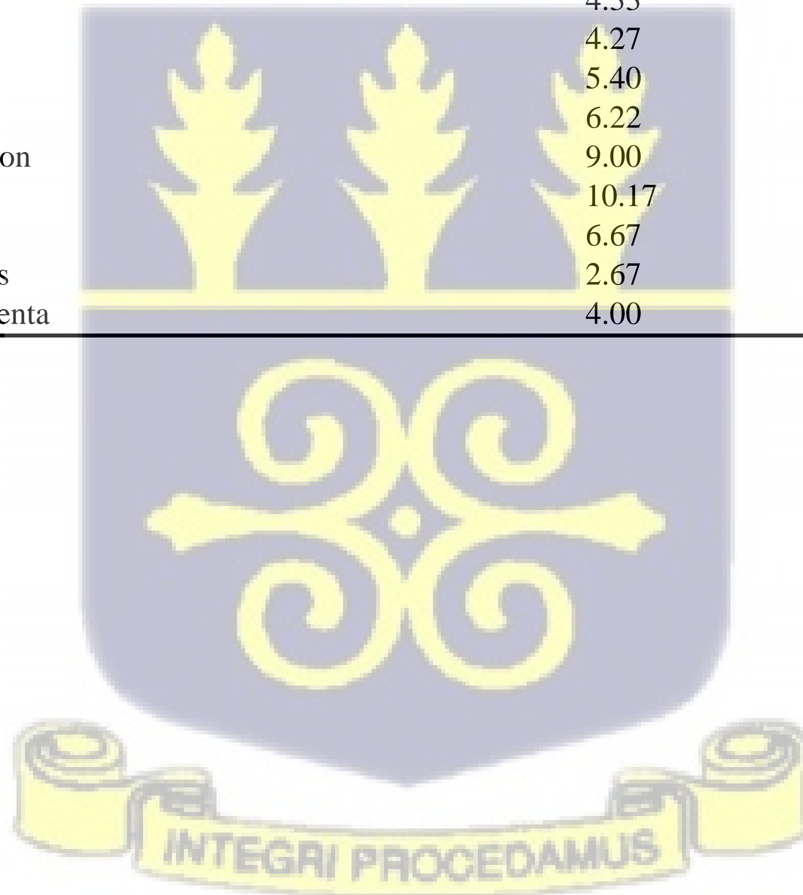
Table 4.4 Proportion of Clinical Conditions of Pregnant women and their related Length of Stay at the Obstetrics unit of the Korle Bu Teaching Hospital

Conditions	Participants Length of Stay	
	Mean	Std. Deviation
Previous CS	5.04	3.13
Acute gastroenteritis	5.25	4.17
Sickle cell	8.10	4.72
Anaemia	7.33	7.22
APH	14.40	14.25
Hypertension	6.95	6.34
Degenerate fibroid	4.00	2.37
Excessive vomiting	6.00	3.66
Latent phase	4.98	4.20
Malaria	4.33	0.49
Postdate	4.27	4.21
Preterm labour	5.40	5.45
PROM	6.22	6.73
Threaten abortion	9.00	9.78
UTI	10.17	6.70
IUFD	6.67	3.97
Puerperal sepsis	2.67	0.76
Low lying placenta	4.00	3.13



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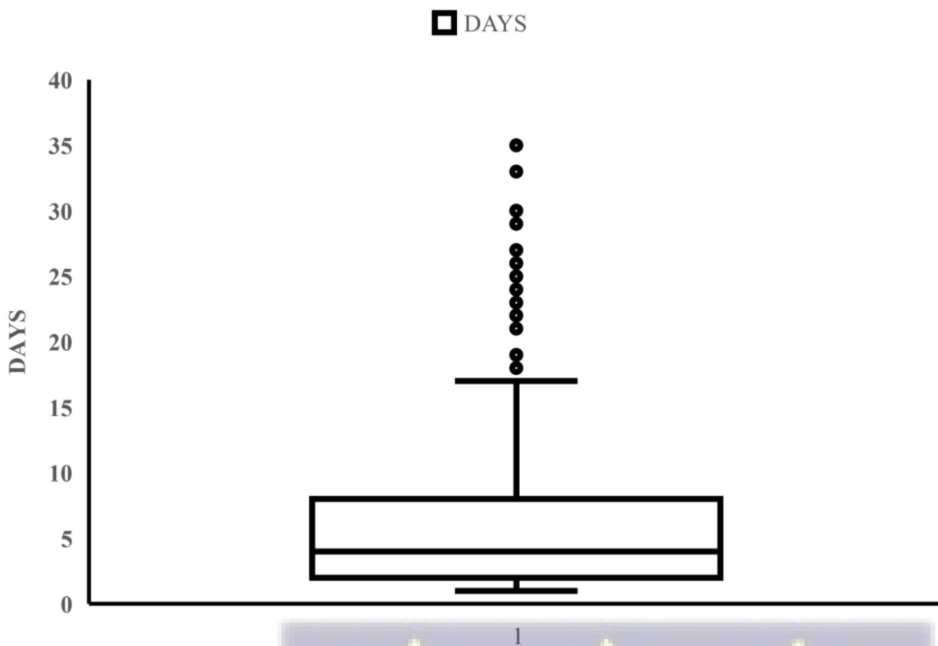

Figure 3: Distribution of participants Length of Stay

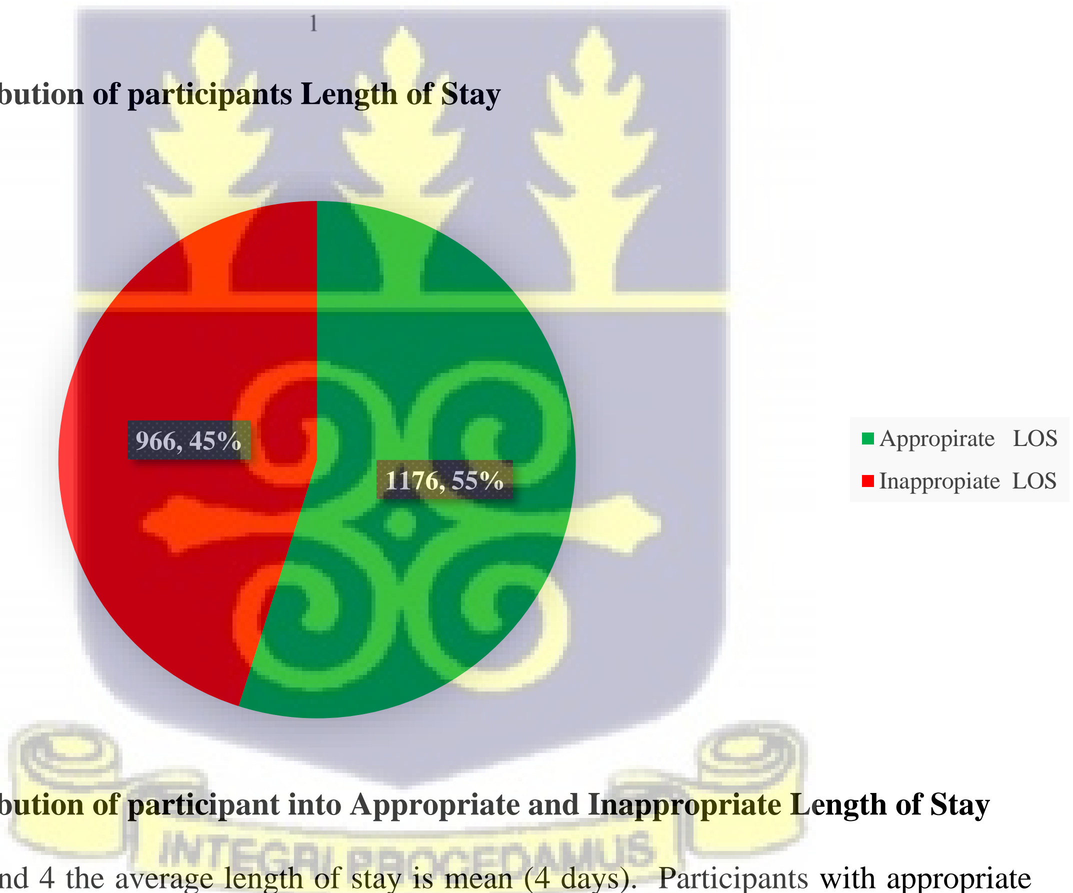

Figure 4: Distribution of participant into Appropriate and Inappropriate Length of Stay

From Figure 3 and 4 the average length of stay is mean (4 days). Participants with appropriate LOS is 1176 (55%), and Inappropriate or longer LOS been 966 (45%) (Figure 3 and 4).

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4.5 Association between Independent variables and Length of Stay among Pregnant women at the Korle Bu Teaching Hospital (2021).

Chi square test of association was performed on independent variables and length of stay with a significance level of 0.05. Among the demographic factors examined, age group (p value = 0.010) and educational level (p value=0.020) were found to be significantly associated with LOS ($p<0.05$). Participants aged under 35 had a higher proportion of short LOS, and those with no education had a higher proportion of short LOS than those with primary education or higher.

Of the clinical factors examined, gravidity and mode of delivery (p value, 0.000*) were significantly associated with LOS ($p<0.05$). Participants with a gravidity of 1 had a higher proportion of long LOS, and those who had a caesarean section (CS) had a significantly longer LOS (82.8%) than those who had a spontaneous vaginal delivery (SVD) 30.6% (Table 4.5).

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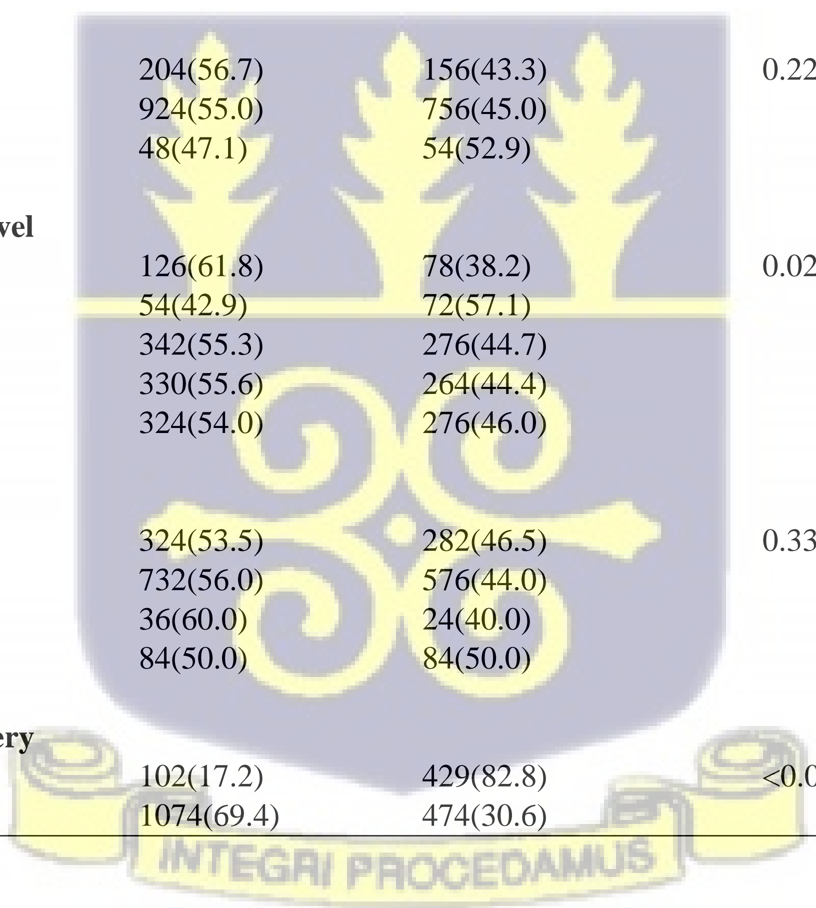
Table 4.5 Chi square test of association between independent variables and Length of Stay among Pregnant women at the Korle Bu Teaching Hospital (2021)

Variables	Short LOS	Long LOS	P-value
Age group			
<35	918(56.5)	708(43.5)	0.010*
>35	258(50.0)	258(50.0)	
Gravida			
1	312(59.1)	216(40.9)	0.020*
2	276(58.2)	198(41.8)	
3	192(52.5)	174(27.5)	
4	192(50.8)	186(49.2)	
>4	204(52.3)	186(47.7)	
Marital status			
Single	204(56.7)	156(43.3)	0.224
Married	924(55.0)	756(45.0)	
Cohabiting	48(47.1)	54(52.9)	
Educational level			
No Education	126(61.8)	78(38.2)	0.020*
Primary	54(42.9)	72(57.1)	
Secondary	342(55.3)	276(44.7)	
Vocational	330(55.6)	264(44.4)	
Tertiary	324(54.0)	276(46.0)	
Occupation			
Formal	324(53.5)	282(46.5)	0.339
Non Formal	732(56.0)	576(44.0)	
Student	36(60.0)	24(40.0)	
Unemployed	84(50.0)	84(50.0)	
Mode of Delivery			
CS	102(17.2)	429(82.8)	<0.001*
SVD	1074(69.4)	474(30.6)	



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4.6 Bivariate and multivariate analysis of independent variables and length of stay among Pregnant women at the Obstetrics Unit of the Korle Bu Teaching Hospital (2021) using Logistic Regression

Bivariate and multivariate regression analyses were conducted to investigate the relationship between various independent variables and length of stay (LOS). C/S delivery and age were significantly associated with Longer length of stay.

Women with Secondary education had a higher risk of longer LOS compared to those with no education (COR =1.57, 95% CI=1.06-2.31, p=0.02), while those with tertiary education did not show any significant association. Mode of delivery is significantly associated with longer LOS (p value = 0.000*).

After adjusting for all variables, the results of the multivariate regression analysis showed that age was not significantly associated with LOS (AOR=1.10, 95% CI=0.98-1.03, p=0.68). Women with three pregnancies still had a lower risk of longer LOS compared to those with one pregnancy (AOR=0.55, 95% CI=0.38-0.80, p=0.002). Married women and cohabiting women still had a lower risk of longer LOS compared to single women (AOR=0.54, 95% CI=0.34-0.88, p=0.01 and AOR=0.44, 95% CI=0.27-0.64, p=0.00*, respectively). Women with secondary education still had a higher risk of longer LOS compared to those with no education (AOR=2.09, 95% CI=1.20-3.63, p=0.00*) (Table 4.6).

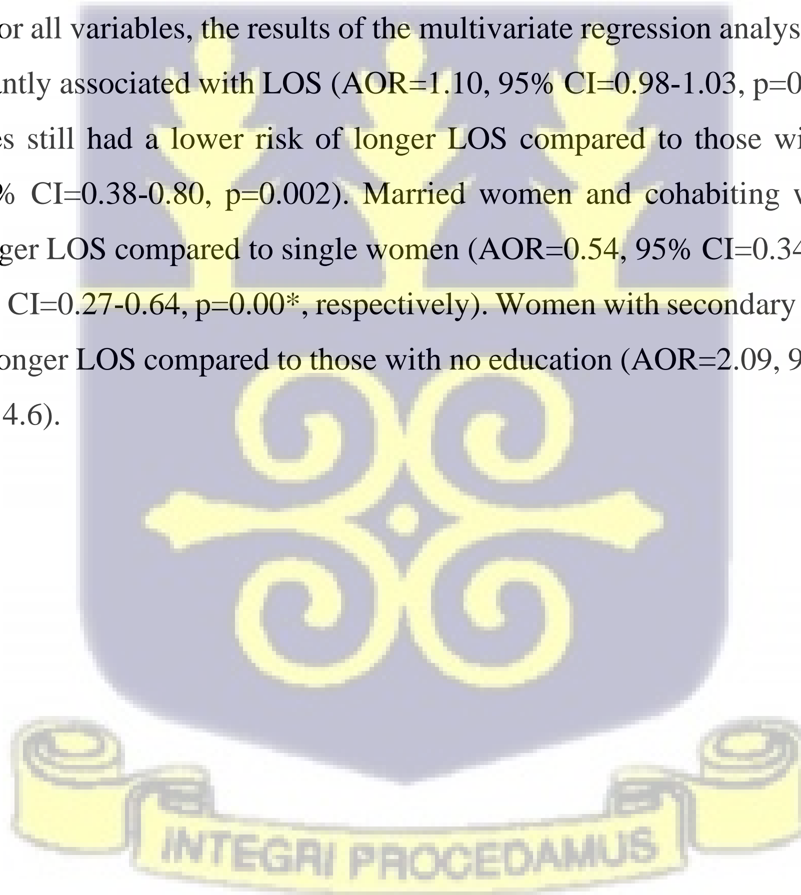

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Table 4.6 Bivariate and multivariate analysis of independent variables and length of stay among Pregnant women at the Obstetrics Unit of the Korle Bu Teaching Hospital (2021)

Variables	COR (95C.I)	P-value	AOR (95C.I)	P-value
Age	1.0(1.0-1.0)	0.02*	1.10(0.98-1.03)	0.68
Gravida				
1	1	1	--	-
2	0.76(0.58-0.98)	0.41	0.83(0.58-1.17)	0.28
3	0.79(0.60-1.03)	0.08	**0.53(0.38-0.74)**	**0.01***
4	0.99(0.75-1.32)	0.97	0.79(0.56-1.12)	0.18
>4	1.06(0.80-1.41)	0.68	0.86(0.62-1.19)	0.36
Marital Status				
Single	1		1	
Married	0.68(0.44-1.06)	0.09	**0.54(0.34-0.88)**	**0.01**
Cohabiting	0.73(0.49-1.09)	0.12	**0.41(0.27-0.64)**	**0.01***
Education level				
No education	1		1	
Primary	0.73(0.53-1.01)	0.54	1.41(0.91-2.18)	0.12
Secondary	**1.57(1.06-2.31)**	**0.02***	**2.53(1.55-4.12)**	**0.01***
Vocation	0.95(0.76-1.19)	0.64	**1.41(1.00-2.00)**	**0.05**
Tertiary	0.93(0.74-1.11)	3.58	1.24(0.9-1.71)	0.18
Occupation				
Formal	1			
Non formal	1.26(0.79-2.01)	0.34	0.98(0.64-1.50)	0.94
Student	1.07(0.54-2.13)	0.85	0.79(0.54-1.16)	0.23
Unemployed	1.06(0.93-2.77)	0.09	0.97(0.48-1.95)	0.94
Mode of Delivery				
SVD	**1**			
CS	**10.93(8.61-13.88)**	**0.000***	**12.95(10.04-16.71)**	**<0.001***

COR Crude odds ratio, AOR Adjusted odds ratio, C.I Confidence interval.

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CHAPTER 5

5.0 DISCUSSION

5.1 Descriptive Characteristics of Pregnant women and their corresponding length of stay at the Obstetrics unit of the Korle Bu Teaching Hospital (2021)

The study examined the sociodemographic characteristics of 2142 mothers who delivered at the Obstetrics department of the Korle Bu Teaching Hospital and their corresponding length of stay (LOS). The findings from this study revealed an average LOS of 4.5 days, indicating considerable variation in LOS among the study participants. Comparing our findings to other studies, a study conducted by Oweis et al. (2020) in Jordan found an average LOS of 2.5 days, which is significantly lower than the average LOS in our study. One possible explanation for this difference is that the Jordanian healthcare system has a stronger emphasis on early discharge and postnatal care at home. In contrast, the healthcare system in Ghana may prioritize longer hospital stays for maternal and infant health monitoring and education. Another study conducted by Zhang et al. (2017) in China found an average LOS of 6.3 days, which is slightly higher than the average LOS in our study. Both studies included mothers who had both vaginal and cesarean deliveries. This study found that the largest gravidity group was women who had one pregnancy (25%) with a mean LOS of 5.91 days. This finding is consistent with previous studies that have shown that first-time mothers may require longer hospital stays for monitoring and support. A study conducted by Jia et al. (2019) in China found that first-time mothers had a longer LOS than multiparous mothers. The study did not reveal any significant differences in LOS among mothers with different educational backgrounds. However, previous studies have shown that mothers with higher levels of education may have a shorter LOS due to their greater knowledge and access to healthcare

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resources. For example, a study conducted by Nijagal et al. (2019) in the United States found that women with a college education had a significantly shorter LOS than women with a high school education or less. Our study found that informal workers comprised the largest occupation group (61%) with a mean LOS of 5.82 days, while formal workers had a higher average LOS of 6.47 days. A study conducted by Ricketts et al. (2019) in South Africa found that unemployed women had a longer LOS than employed women, which contrasts with our findings. This difference may be due to the differences in the unemployment rates and social support systems between the two countries.

In conclusion, the findings from our study provide valuable insights into the sociodemographic characteristics of mothers who give birth at the Korle Bu Teaching Hospital and their corresponding maternal LOS. The study highlights the importance of considering sociodemographic characteristics, including age, gravidity, occupation, and marital status, when designing interventions to reduce maternal LOS and improve maternal and child health outcomes.

5.2 Clinical Conditions and their related Length of Stay among Pregnant women at the Obstetrics Unit of the Korle Bu Teaching Hospital (2021)

The study investigated medical conditions and their corresponding length of stay. The most common medical condition among the participants was chronic hypertension, which accounted for 24.1% of the sample. This finding is consistent with other studies that have reported hypertension as a leading cause of maternal morbidity and mortality (Podymow et al., 2018). The mean length of stay for mothers with chronic hypertension was 6.95 days, which was longer than the overall mean length of stay of 5.71 days. This may be attributed to the need for close monitoring of blood pressure levels and the risk of complications such as preeclampsia and eclampsia. Another notable finding was that antepartum haemorrhage (APH) had the longest mean length of stay at 14.40 days,

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which is significantly longer than the overall mean length of stay. This finding is consistent with previous studies that have reported APH as a risk factor for prolonged hospital stay (Ezebialu et al., 2017). The prolonged length of stay may be attributed to the need for further investigations and interventions to manage the bleeding and prevent complications such as placental abruption and fetal distress. Sickle cell disease, anaemia, and threatened abortion were also associated with longer mean lengths of stay ranging from 7.33 to 9.78 days. These findings are consistent with other studies that have reported these conditions as risk factors for prolonged hospital stay (Owusu-Ansah et al., 2019; Schuster et al., 2020). The longer hospital stay may be due to the need for close monitoring and management of complications associated with these conditions. Latent phase had the highest frequency of participants at 26.9% with a mean length of stay of 4.98 days, which is lower than the overall mean length of stay. This finding may be attributed to the fact that most women in latent phase are admitted for observation and may not require any interventions or active management. This is consistent with other studies that have reported shorter lengths of stay for women in latent phase (Pattinson et al., 2015). This finding is consistent with other studies that have reported a wide range of lengths of stay among mothers (Owusu-Ansah et al., 2019; Durnwald et al., 2018). Understanding the factors that contribute to prolonged hospital stay can help healthcare providers to develop interventions to improve maternal outcomes and reduce healthcare costs.

The study found that chronic hypertension was the most common medical condition among the participants, while APH had the longest mean length of stay. Sickle cell disease, anaemia, and threatened abortion were also associated with longer mean lengths of stay. The findings of this study are consistent with previous research and highlight the need for healthcare providers to

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develop targeted interventions to manage maternal conditions and reduce the risk of prolonged hospital stay.

5.3 Association between Length of Stay and independent variables among Pregnant women at the Obstetrics Unit of the Korle Bu Teaching Hospital (2021).

From the study some demographic and clinical factors were significantly associated with length of stay (LOS) in obstetric patients. Age group and educational level were found to be significantly associated with LOS ($p<0.05$), with younger mothers and those with no education having higher odds of (56.5 and 61.8) respectively of short LOS. This finding is consistent with previous studies that have found a similar association between younger maternal age and shorter LOS (Ezegwui et al., 2016; Weng et al., 2019). The reason for this association may be related to the fact that younger mothers generally have fewer complications and a quicker recovery time, leading to shorter hospital stays. Gravida and mode of delivery were also found to be significantly associated with LOS ($p<0.05$), with participants who had a gravida of 0 and those who had a C/S having higher odds of (100.0 and 82.8) respectively of long LOS. This finding is in line with previous studies that have shown that higher gravidity and C/S delivery are associated with longer LOS (Ahlberg et al., 2014; Pallasmaa et al., 2014). The prolonged LOS in women who had a C/S delivery may be due to the need for postoperative care and monitoring of the surgical wound.

Mainly, these findings suggest that certain demographic and clinical factors should be considered when predicting LOS in obstetric patients. Understanding these factors can help healthcare providers to tailor their care and management plans for each patient, which may ultimately lead to improved patient outcomes and reduced healthcare costs. It is worth noting that while our findings are consistent with previous studies, some studies have reported different results. Further research

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is needed to better understand the factors that influence LOS in obstetric patients and to develop more accurate prediction models.

5.4 Bivariate and multivariate analysis of independent variables and length of stay among Pregnant women at the Obstetrics Unit of the Korle Bu Teaching Hospital (2021) using Logistic Regression

The findings of the multivariate regression analyses suggest that several demographic and clinical factors are significantly associated with the length of stay (LOS) of obstetric patients. Specifically, C/S delivery and age were found to be significantly associated with longer LOS in the bivariate analysis, while after adjusting for all variables, age was no longer significant, but mode of delivery remained significant. Additionally, educational level and marital status were also found to be significant predictors of LOS in the multivariate analysis. The finding that C/S delivery is associated with longer LOS is consistent with previous studies, which have shown that C/S delivery is a major risk factor for prolonged hospital stay in obstetric patients. The longer LOS in C/S patients may be due to the more invasive nature of the procedure and the increased risk of postoperative complications, such as infection and bleeding. The finding that age is not a significant predictor of LOS after adjusting for other variables is somewhat surprising, as previous studies have suggested that older age is associated with longer LOS in obstetric patients. However, it is important to note that the effect of age on LOS may be confounded by other factors, such as comorbidities and pregnancy complications, which were not included in this study.

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The finding that educational level is a significant predictor of LOS is consistent with previous studies, which have shown that women with lower educational levels have longer hospital stays after delivery. This may be due to lower health literacy and less access to healthcare resources among women with lower educational levels. The finding that marital status is a significant

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predictor of LOS is also consistent with previous studies, which have shown that unmarried women have longer hospital stays after delivery than married women. This may be due to the lack of social support and the increased risk of postpartum depression among unmarried women.

The findings suggest that several demographic and clinical factors should be considered when predicting LOS in obstetric patients. However, further research is needed to better understand the complex relationships between these factors and LOS, and to develop effective strategies for reducing LOS and improving outcomes in this patient population.

5.5 Study implication

The duration of time a patient spends from admission to discharge is an indicator of efficiency and quality of care.

Therefore, clinicians can provide better patient care to improve on patient outcome. This will help in reducing overall costs and appropriate allocation of resources to staff and patient needs will be improved. Managers of the hospital should strengthen the health system and educate patients and patients relatives on the hospital processes to help in the flow of transactions during admission and after discharged of patient. As an issue of concern for the hospital, further researches may be needed to be conducted on a broader scope.

5.6 Limitation of the study

There were a lot of missing values in some of the variables in the hospital dataset which reduced the sample size. Missing variables were not included in the multivariate regression analysis as indicated in the methodology chapter. The study design is not strong enough to establish precision.

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CHAPTER 6

6.0 CONCLUSION AND RECOMMENDATION

6.1 Conclusion

The aim of this study was to determine the length of stay of mothers at Korle Bu Teaching Hospital. From the study, the average length of stay was 4.5 days. From the Chi square test of association, age group, education and mode of delivery were significantly associated with Maternal length of stay.

From the logistic regression performed using the adjusted odds ratio, mothers with gravida of three, married, cohabiting, secondary education and C/S delivery was associated with length of stay.

Mode of delivery was found to be significantly associated with LOS, with women who had a cesarean section (CS) having a significantly longer LOS compared to those who had a spontaneous vaginal delivery (SVD).

6.2 Recommendations

From the findings of the studies the following recommendations were given;

1. Healthcare providers should consider the demographic and clinical factors that have been identified as significantly associated with length of stay (LOS) in obstetric patients when predicting LOS and planning for patient care. Specifically, they should take into account factors such as mode of delivery and marital status in their assessments.

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2. Further research should be conducted to explore the relationship between demographic and clinical factors and LOS in obstetric patients. This could include studies that examine the impact of other factors such as socioeconomic status, pre-existing medical conditions, and access to healthcare services on LOS.

3. Finally, healthcare providers should work towards improving the quality of care for obstetric patients, particularly those who are at a higher risk of longer LOS. This could include training and education programs for healthcare providers, implementing evidence-based guidelines for obstetric care, and enhancing patient-centered care approaches.

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APPENDIX: ONE

MEDICAL DIRECTORATE
KORLE BU TEACHING HOSPITAL

26th JANAUARY, 2022

THEOPHILUS NII ARMAH BROCKE
SCHOOL OF PUBLIC HEALTH
UNVIVERSITY OF GHANA
ACCRA, GHANA

ADMINISTRATIVE APPROVAL

KBTH-ADM/0004/2023

The Korle Bu Teaching Hospital Research Office reviewed and granted an administrative approval to conduct a study in the Hospital titled: **"Assessing Maternal Length of Stay and It's associated factors at the Obstetrics Ward of the Korle-Bu Teaching Hospital".**

Kindly, note that, any modification/amendment to the approval study protocol without approval renders this certificate invalid.

The approval is valid till **30TH JULY, 2023**. You may, however, request extension of the approval period, or renewal as the case may be, should the study extend beyond the stated period.

You are to contact the **Head of Obstetrics and Gynaecology** to make arrangement to begin your study

Sincere regards.

HEAD OF RESEARCH
RESEARCH UNIT
KORLE-BU TEACHING HOSPITAL

MR. EUGENE BUDU
AG. HEAD OF RESEARCH

Distribution:

1. **The Head, Department of Obstetrics and Gynaecology, Korle Bu**

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