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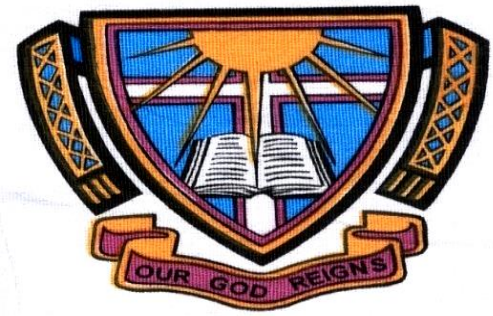

FACTORS ASSOCIATED WITH DISCHARGE AGAINST MEDICAL ADVICE AMONG CHILDREN UNDER 6 MONTHS ADMITTED WITH INFECTIONS AT MBARARA REGIONAL REFERRAL HOSPITAL AND HOLY INNOCENTS CHILDREN'S HOSPITAL, SOUTHWESTERN UGANDA

BY

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A DISSERTATION SUBMITTED TO THE DIRECTORATE OF GRADUATE STUDIES, RESEARCH, AND INNOVATION IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF MASTER OF PUBLIC HEALTH OF BISHOP STUART UNIVERSITY

December 2022

DECLARATION

DECLARATION

I Clare Komugisha (17/BSU/MPH/014), hereby declare that this study is original and has not been submitted for any other degree award to any other university before.

Signed: ..... Date: 20-02-2023

Clare Komugisha

APPROVAL

APPROVAL

This dissertation has been submitted for examination with the approval of the fo supervisors.

Signed: .....Date: 22/2/2023....

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Signed: .....Date: 22-2-2023

Bright Laban Waswa (MSTAT)

DEDICATION

This work is dedicated to my Parents Mr. and Mrs. Geoffrey Beinoburyo, my dear husband Mr. Nuwagaba Julius, and my children; Nissi Helms Ataho, Skylar Saviour Aijuka and Anchor Akoragye for their great sacrifice and encouragement while pursuing this course. God bless you abundantly.

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Table of Contents

List of Acronyms / Abbreviations

AIDS	Acquired Immunodeficiency Syndrome
AMA	Against Medical Advice
ARVs	Antiretrovirals
CHWs	Community Health Workers
DAMA	Discharge Against Medical Advice
HICH	Holy Innocents Children's Hospital
HIV	Human Immunodeficiency Virus
LAMA	Leaving Against Medical Advice
MRRH	Mbarara Regional Referral Hospital

DEFINITION OF KEY TERMS

DAMA: Discharge against medical advice (DAMA) can be defined as the patient / caregiver in the case of children choosing to leave the hospital before the treating physician recommends discharge.

Caregiver: The person responsible for the care and upbringing of the child enrolled in the study.

CHWs: CHWs are community members who have received training in basic health services and who provide health education, screening and treatment of some conditions, and community mobilization.

Infection: The invasion and growth of germs in the body.

Haemoglobin level: This is the amount of red blood cells in one's body.

Health professional or provider: A trained individual with knowledge and skills to provide health care in a systematic way to people, families or communities. They include doctors, nurses, midwives and community health workers.

Patient: Children under 6 months of age admitted to a participating health facility with serious infection.

Sepsis: Sepsis is a life-threatening organ dysfunction caused by a dysregulated host response to infection.

WFA_Z score: Weight for age Z score compares a child's weight to the child's age of the same sex to classify nutritional status.

Oxygen saturation: Oxygen saturation is the fraction of oxygen-saturated hemoglobin relative to total hemoglobin in the blood.

ABSTRACT

Introduction: Discharge against medical advice (DAMA) occurs when a patient /care giver in case of a child leaves a clinical setting before the end of treatment, and against medical recommendation by the medical team. This has become a major problem in health care delivery in Ugandan health facilities as it is associated with high post discharge mortality.

Objectives: The study was guided by three objectives: namely, to find out the prevalence of DAMA among children under 6 months admitted at Mbarara Regional Referral and Holy Innocents Children's Hospitals, to examine the socio-economic and socio demographic factors associated with DAMA among children under 6 months admitted with infections at Mbarara Regional Referral and Holy Innocents Children Hospitals and to establish clinical factors associated with DAMA among children under 6 months admitted with infections at Mbarara Regional Referral and Holly Innocents Children Hospitals.

Methodology: This study utilised secondary data of the Smart Discharges Study, a prospective observational cohort study to develop prognostic models for post-discharge mortality in children below 6 months admitted at the 2 hospitals with infection between March 2018 and February 2020. Data of 1074 participants was considered. Simple and multiple logistic regression models were used to examine associations between DAMA and the independent variables i.e., demographic, socio, and clinical factors.

Results: Out of the 1074 participants enrolled, 110 were DAMA giving a prevalence of 10.2%. Patients admitted at MRRH, the Multivariable results revealed that children whose mother's HIV status was positive were 4.4 times more likely to discharge against medical advice compared to children whose mother's HIV status was negative (AOR=4.4; 95% CI (11.3-15.9**);** p<0.001). Additionally, patients whose axillary temperature of 36°C-37.5°C were 76% less likely to discharge against medical advice compared to patients who had a temperature <36^0C (AOR=0.24; 95%CI (0.06-0.99**);** p<0.050). Similarly, Patients who had an axillary temperature of ≥39^0C were 82% less likely to discharge against medical advice compared to patients who had an axillary temperature of <36^0C (AOR=0.18; 95%CI (0.03 - 0.95); p=0.044).

While Patients who were admitted at HICH and spent more than 2 hours traveling to the hospital were 74% less likely to discharge against medical advice compared to those who spent less than 30 minutes (AOR = 0.26; 95%CI (0.06 – 0.99); p=0.049). Maternal HIV status was also statistically significant with discharge against medical advice. Patients whose mothers were HIV positive were 9fold more likely to discharge against medical advice compared to their counterparts who were HIV negative (AOR = 8.9; 95%CI (6.8 – 25.8); p<0.01). Other factors were not significantly associated with DAMA.

Conclusion: Maternal HIV status, temperature and distance from facility to home were highy associated with discharge against medical advice. Understanding the specific populations at a higher risk of DAMA may provide insights into aspects of health services that need to be addressed to improve quality of care for all patients.

Recommendations: Caregivers with treatment abandonment ideation, so that they can be given empathetic support to avert abandonment. Health care providers should intensify on-going counselling sessions with caregivers on the importance of completing hospital treatment and identify

CHAPTER ONE

INTRODUCTION

1.0 Introduction

The study is about Factors associated with discharge against medical advice among children under 6 months admitted at Mbarara Regional Referral Hospital and the Holy Innocents Children's Hospital. Discharge against medical advice is frustrating to the medical personnel and deprives the patient of adequate medical care. This chapter presents the background of the study, problem statement, objectives, research questions and conceptual framework.

1.1 Background to the Study

Discharge against medical advice (DAMA) can be defined as the "patient choosing to leave the hospital (caregivers leave in case of children) before the treating physician recommends discharge (Alfandre, 2009). This phenomenon typically involves termination of hospitalization, rejection of expert medical opinion/treatment, signing of a discharge document and leaving the hospital with the child (Udosen et al., 2006). However, in Uganda DAMA often will not involve patients signing a DAMA form or communicating their desire to leave to the physician. DAMA is encountered by health personnel all over the world and is a serious public health issue associated with risk of high rates of re-admission and complications accounting for higher costs of treatment (Fadare et al., 2012). In the United States, an estimated 2% of all hospital discharges are designated as against medical advice, increasing up to 6% in disadvantaged inner-city populations (Fiscella et al., 2007; Magauran, 2009; Mareiniss, and Lacovelli, 2012). The prevalence of DAMA which has been reported among hospitalized children varies from 1.2% to 31.7%, depending on the population studied (Ibekweet al., 2009).

Infections in children are a significant cause of morbidity and mortality worldwide. In 2019, over half the 5.2 million under-5 deaths occurred in sub-Saharan Africa, and most of them were due to

sepsis (Sharrow et al., 2022; Pham et al., 2021). Various factors have been shown to contribute to poor outcomes from sepsis, including disease severity, malnutrition and other comorbidities as well as socio-demographic disadvantages such as poverty and low maternal education (Nemetchek et al., 2017). Discharge of hospitalized children against medical advice constitutes an obstacle to adequate and effective health-care delivery to these children and has the potential of increasing not only child mortality rate, but also, the frequency of long-term sequel (Hwang, et al., 2003). In the context of resource limited settings, DAMA are of particular concern, with several studies showing that children who are discharged against medical advice experience substantially higher risk of mortality than their counterparts who are discharged normally (El-Metwally et al., 2019). In addition, patients who leave against medical advice may utilize a disproportionate amount of health care resources if they require repeated or urgent care following discharge (Onyiriuka, 2007). A Study carried out in Uganda by Lowlaavar et al., (2016) about Pediatric in-hospital death from infectious disease in Uganda: derivation of clinical prediction models revealed that among those discharged, 120 (9.7%) were discharged against medical advice and had higher chances of post discharge mortality. Such discharges are also known to be distressing to the physician and other health-care professionals involved in the care of these children (Berger, 2009).

Barriers to seeking adequate care in Sub-Saharan Africa are complex and can include financial constraints, distance to health facilities, cultural practices, gender dynamics, limited knowledge or information, and health facility disincentives, all of which may lead to poor health outcomes (Bedford et al., 2014; Adedini et al., 2014, Kadobera et al., 2012). Although DAMA occurs both in developed and developing countries, the underlying causal factors may differ (Reinke et al., 2009). Various studies have shown that financial constraint is a major determinant of DAMA in Nigeria (Ibekweet al., 2009). Over the years, hospital fees payable by parents has continually been adjusted upwards in all Nigerian health-care institutions. This situation involves lack of effective health-insurance

coverage in the country. Studies in different regions of Nigeria have reported Paediatric DAMA rates from 1.2% to 5.7% (Onyiriuka, 2007; Ibekwe et al., 2009).

In Uganda, some caregivers do not adhere to the medical advice of following normal discharge procedure while in the hospital when their children experienced prolonged treatment because of several reasons like financial challenges, child not improving, other obligations at home among others (Atwiine., et al., 2021). This is among the many reasons given by caregivers for discharge against medical advice especially when handling children aged less than 5 years. To address this issue, caregiver education given by community health workers who are drawn from within the community should be encouraged. Trusted community health workers (CHWs) contribute to improving health outcomes among mothers and their newborn babies through education (Singh et al., 2015).

Mbarara Regional Referral Hospital and Holy innocents' children's hospital are some of the health institutions that experience the issue of discharge against medical advice which has been persistent. This has mostly been observed in the children under 6 months. Currently no study has been conducted to establish the underlying predictors of discharge against medical advice such that appropriate strategies can be designed to deal with the problem. The purpose of this study is thus to identify factors associated with discharges against medical advice for children under 6 months admitted with infections in Mbarara city, Uganda.

1.2 Statement of the problem

Healthcare systems throughout the world are faced with the problem of DAMA and Uganda like the rest of the world is not exceptional. According to Lowlaavar et al., (2016) in their study conducted in pediatric patients in Uganda found out that children who were DAMA were 4 times likely to die post discharge compared to their counterparts discharged routinely. Discharge against medical advice imposes an increased burden on the health care system through disruption of patient care,

disproportionate consumption of resources, and challenges to providers' ethical obligations. Studies have shown that patients complain of dissatisfaction with hospital services, environmental factors and medical factors, patient's unaffordability to pay hospital expenses, mental problems such as being depressed and frustrated, family problems (e.g. having a child at home), lack of significant improvement in medical conditions, believe in traditional medicine, long stay in hospital, and patient's place of residence (urban or rural) pose a problem to the patients hence resulting into discharge against medical advice (Macrohon, 2012).

At MRRH and HICH, substantial achievement has been made in reducing post discharge mortality by 30% in children hospitalized with severe infection. Despite the reduction in mortality, its been noted that post discharge deaths are still high especially in children discharged against medical advice. In Sub-Saharan Africa and Uganda in particular, fewer studies have been conducted on examining the socio demographic, socio economic and clinical factors associated with DAMA. In this study we hope to examine these factors. Understanding the factors leading to DAMA could help health care administrators set up more effective interventions to prevent DAMA and reduce its adverse effects and improve post-discharge outcomes for children admitted with infections. This will in turn help in the achievement of the third SDG of good health and well-being through preventable deaths of newborns and children under 5 years of age, with all countries aiming to reduce under-5 mortalities to at least as low as 25 deaths per 1000 live births by the year 2030.

1.3 Research questions

i. What is the prevalence of DAMA among children under 6 months admitted with infections at Mbarara Regional Referral Hospital and at Holy innocents' children's hospital?
ii. What are the socio demographic and socio economic factors associated with DAMA among children under 6 months admitted with infections at Mbarara Regional Referral Hospital and at Holy Innocents children's' hospital?

iii. What are the clinical factors associated with DAMA among children under 6 months admitted with infections at Mbarara Regional Referral Hospital and at Holy Innocents children's hospital?

1.4 General Objective

The general objective of this study was to examine factors associated with DAMA among children under 6 months admitted at both Mbarara Regional Referral Hospital and Holy Innocents Children's Hospital.

1.5 Specific objectives

The study was guided by the following specific objectives;

1. To find out the prevalence of DAMA among children under 6 months admitted with infections at Mbarara Regional Referral Hospital and at Holy Innocents Children's Hospital.
2. To examine socio demographic and socio economic factors associated with DAMA among children under 6 months admitted with infections at Mbarara Regional Referral Hospital and at Holy Innocents Children's Hospital.
3. To find out the clinical factors associated with DAMA among children under 6 months admitted with infections at Mbarara Regional Referral Hospital and at Holy Innocents Children's Hospital.

1.7.0 Scope of the Study

1.7.1 Geographical Scope

The geographical scope of this study was limited to Mbarara city as a representative of a rural area in southwest Uganda. Mbarara district is bordered by Ibanda district in the north, Kiruhura district in the east, Isingiro district in the south and Rwampala district in the west. The district is located approximately 290 kilometres southwest of Kampala capital city and the majority of the households

depend on subsistence farming as the main source of livelihood. Many paediatric patients from this district and its neighbours seek medical care at Mbarara referral hospitals and Holy Innocents children's hospital both located in the newly created Mbarara City.

1.7.2 Content Scope

The study was limited to determining socio-demographic, socio-economic and clinical factors associated with DAMA among children under 6 months admitted with infections at Mbarara Regional Referral hospitals and Holy Innocents children's hospital. The study used secondary data of the Smart Discharges Study, a prospective observational cohort study to develop prognostic models for post-discharge mortality in children below 6 months. The original study was conducted at 6 hospitals in Uganda and enrolled children 0 to 6 months of age admitted with a proven or suspected infection between March 2018 and February 2020 (Wiens et al., 2023). For this study, the independent variables considered were demographic factors, such as age for both care giver and child, gender, marital status; socio-economic factors such as distance from facility to home, level of education; clinical factors such as oxygen saturation level, weight for age (WFA_Z score), length of hospitalisation and discharge diagnosis; the dependent variable was DAMA (yes/no).

1.7.3 Time Scope

The Smart Discharges project collected the data over a period of two years in children under 6 months who were admitted with infections at the two hospitals in Mbarara district that handle the majority of children seeking medical care. This study was carried out in 3 months, the period was long enough to cover the patients that had been admitted.

1.8 Theoretical Framework

This study was guided by Imogene King's theory of goal attainment. King describes the model as a conceptual system and the goal of nursing as bringing a person closer to a healthy state (King, 1981).

The conceptual system has three interacting systems: the personal, the interpersonal and the social systems. It explains that the nurse and patient go hand-in-hand in communicating information, set goals together, and then take actions to achieve those goals. **Application to the model.** The health workers by virtue of their training and knowledge are in a better position to display the requisite competence through their interaction with the patients who need attention or information concerning their ill health. The practice demands that health workers establish a good rapport, good human relationship, prompt attention and provide social support and comfort to the patients. These will eventually lead to the attainment of the desired goal (successful discharge) and subsequent positive perception of hospitalization avoiding discharge against medical advice. When the above are not utilized as expected of the health workers, the patients in the ward may probably develop a negative perception of hospitalization and may choose to sign against medical advice form or escape from the hospital.

1.9 Conceptual Framework

A conceptual framework explains relationships among the several variables that have been identified as important to the study (Kombo and Tromp, 2011; Mugenda and Mugenda, 2003). According to Orodho (2009), conceptual models are ways of relating factors that influence a particular outline in a pictorial or diagrammatic way. For this study, the independent, dependent and intervening variable linkages are shown in Figure 1 below

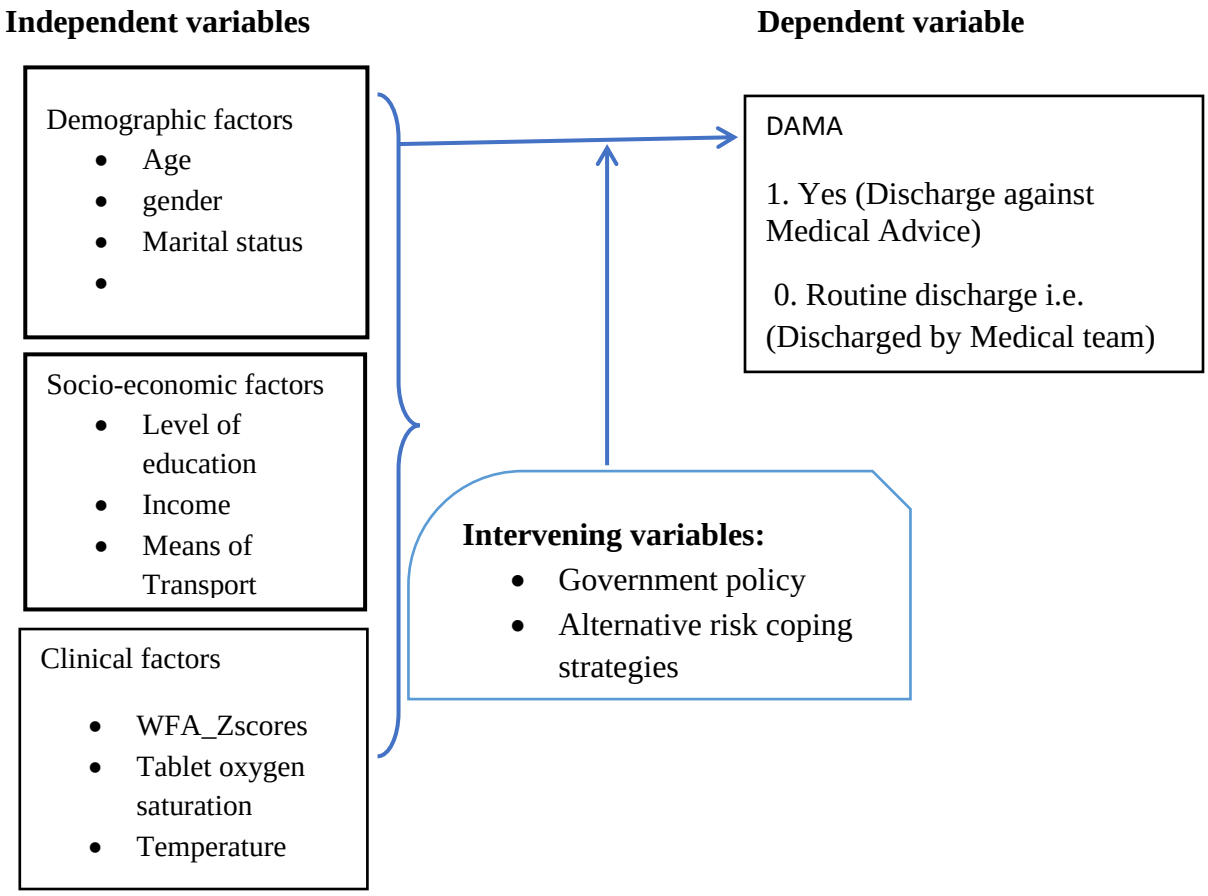

Figure 1: Conceptual framework (adapted from Fadlallah et al., 2018)

The study considered socio-demographic, socio-economic and clinical factors that influence DAMA among children admitted at large hospitals with high admission of children. The dependent variable was DAMA (Yes/No). Demographic factors was age, gender, marital status, while socio-economic factors were level of education, means of transport, income and clinical related factors included Weight WFA_Zscores, length of hospitalisation, axillary temperature. The study also considered government policy and alternative risk coping strategies as the intervening variables. Government policy such as free health services, universal health insurance. Similarly, coping strategies such as increment in salaries, savings, loans, stable prices of agricultural products etc. can help family to pay for high costs for medical bills.

1.10 Significance of the study

The findings from this study might be used by health care administrators to design interventions to reduce devastating effects of DAMA and improve post discharge outcomes in children. The report of the findings will be disseminated through possible research publications to:

The nurses and other health personnel, to intensify efforts in health education sessions to patients to adopt safe practices especially in the hospitalization of patients.

Patients, it may serve as a corrective measure and enable them adopt safe practice of using the hospital for treatment that will prevent infection, protect and preserve the lives of their babies and mothers.

The researchers, it might enable them explore more into other areas aimed at coming up with interventions to reduce DAMA.

1.11 Justification of the Study

Lowlavaar (2016) found out that children who were discharged against medical advice were more likely to die post discharge. As a way of increasing knowledge among health workers on identifying children at risk of discharge against medical advice, a study on factors associated with discharge against medical advice was conducted amongst children admitted with infections at 2 hospitals in Mbarara, Southwestern Uganda. Findings from this study may be used by health worker to identify patients and parents/caregivers who are more at risk of DAMA so that they are given special attention on how to remain in hospital and complete their children's hospital treatment. Additionally, the public should be educated about the consequences of DAMA. Continued health education and the promotion of child survival strategies at the community level, combined with an improvement in the socioeconomic conditions of the population, may further reduce DAMA and improve the chances of survival for children.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

The purpose of this chapter is to provide information related to the study topic focusing on factors associated with discharge against medical advice among children in the whole world and Uganda in particular. The issues highlighted include prevalence of discharge against medical advice, the socio-demographic, socio-economic and clinical factors associated with DAMA.

2.1 Prevalence of DAMA among under five children admitted in medical facilities

Discharge against medical advice (DAMA) can be defined as the "patient choosing to leave the hospital before the treating physician recommends discharge (Alfandre, 2009). DAMA is a common problem worldwide, where global prevalence rates range from 0.07 to 20%. In the United States, an estimated 2% of all hospital discharges are designated as against medical advice, increasing up to 6% in disadvantaged inner-city populations (Magauran, 2009; Levy et al., 2012). In the United Kingdom, Pennycook and colleagues found that 0.73% of emergency department patients left against medical advice (Pennycook et al., 1992). A study in Oman found out that of the 11,802 admissions, there were 38 cases of DAMA, giving a prevalence rate of 0.32%. In 39.5% of the cases, the discharge happened within 24 hours of hospital admission and majority of the cases were infants (n = 24; 63.25%). The diagnosis at discharge in some cases included life-threatening conditions. A study carried out in Uganda by Lowlaavar et al., (2016) about Pediatric in-Hospital Death from Infectious Disease in Uganda: derivation of clinical prediction models in under 5 children admitted at 2 big hospitals in Mbarara revealed that among those discharged, 120 (9.7%) were DAMA with a high post discharge mortality risk. Relatedly, Tan and Feng (2020), in their study to find out why patients choose DAMA (reasons, consequences, prevention, and interventions) argue that hospital readmissions contribute to

higher expenditures and may sometimes reflect suboptimal patient care. They added that Individuals discharged against medical advice (DAMA) are a vulnerable patient population and may have higher risk for readmission.

2.2 Socio-demographic factors that influence DAMA among children under 6 months in medical facilities

A case control study conducted in Saudi Arabia to determine the factors associated with DAMA showed that 4% of all discharges in that hospital were against medical advice. The risk factors of DAMA according to this study were young age, being male, and short length of stay in hospital (Roodpeyma et al., 2010). Similarly, in a study carried out in by Yong (2022) about the characteristics of discharged against medical advice among hospitalized patients found out that patients who opted for DAMA were younger, more often male, more likely of indigenous ethnicity and had less physical comorbidity, but greater mental health comorbidity. This study findings further revealed that half of the DAMA patients stayed less than 3 days. Knowing the profiles of DAMA amongst the pediatric age group is very important as it allows for evidence-based interventions to reduce this problem (Fadare et al., 2013).

2.3 Socio-economic predictors of DAMA among children under 6 months admitted

There are several reasons for DAMA. These include high cost of hospital services, dissatisfaction and disagreements with care, inconvenience of hospitalization (lost days at work, inability to care for other children (Macrohon, 2012). Financial reasons predominate in developing countries because healthcare financing is often communally based, due to a lack of institutionally organized health insurance (Fadare & Jemilohun, 2012). In a study conducted on left AMA cases among adult and pediatric patients at a tertiary care hospital in Nepal, 12% of patients opted to go on Leaving against medical advice (LAMA) because they had financial reasons to not stay in the hospital (Pant, Kumar & Shrestha, 2021). Predictors or risk factors, based primarily on retrospective cohort studies that have

consistently correlated with DAMA include lower socioeconomic class, lack of insurance, and substance abuse (Alfandre, 2009; Karimi et al, 2014). In study among newborns who left AMA from a tertiary hospital in Pakistan found that 173 (72.1%) newborns belonged to low socioeconomic class, 63 (26.3%) to middle class and 4 (1.7%) to upper class. Among fathers of these newborns, 41% had not attained formal education and 29% had only obtained primary education. In addition, 39% were unemployed, 26% were self-employed while 35% were in private or government employment (Abbas et al., 2017). Furthermore Youssef (2012) investigated the factors associated with discharge against medical advice in a Saudi teaching hospital. In his findings, the distance of residence from the hospital was associated with DAMA. The results showed that 72.1% of respondents lived 615 km away from the hospital while 27.9% lived 15km away from the hospital. In addition, Duru (2014) also cited inconvenience of child's admission and hospitalization included far distance of hospital from home, no one to care for other siblings at home, maternal ill health and need for child to go back to school. A study about post discharge outcomes carried out in Uganda among children under 5, revealed that maternal education was significantly associated with discharge against medical advice among children at the hospital. The caregivers who had attained post-secondary school education had 96% lower odds of their children being discharged against medical advice than those who had only some or no primary school education (OR 0.04; 95% CI 0.00 – 0.59) (Nemetchek et al, 2018). In this study cohort, the most common diagnosis with infectious diseases was sepsis 28%. On the other hand, a retrospective review in Canada of discharges against medical advice revealed that the majority of the patients left AMA for personal obligations (Green et al., 2004).

In a cohort study conducted on all children admitted in two maternity and children's hospitals in Jeddah, the top three reasons identified for DAMA were parent's false assumption that their child's condition had improved (43.8%), dissatisfaction with treating/managing team (16.2%) and difficulties arranging care for patient's siblings at home (7.7%). However, these socioeconomic

factors should always be considered in the context of the pediatrician's legal liabilities (Macrohon, 2012)

2.4 Clinical factors associated with DAMA among children under 6 months admitted at Mbarara Regional Referral Hospital and Holy Innocents Children's Hospital

In the previously mentioned study conducted on left AMA cases in Nepal, patients left AMA because they opted for follow up in OPD the next day (30%), wanted to continue treatment in other centers (9%), they chose not to undergo further treatment or investigations (3%), or they were sent home because they didn't have anyone to accompany them in the hospital during treatment (5%) (Pant, Jha & Shrestha, 2021). Some observers consider that most cases of discharge against medical advice reflect failure to reach consensus between the attending physician and patient regarding the need for continued inpatient care. This failure may reflect, in part, poor communication and lower trust between the physician and the patient (Franks, Meldrum and Fiscella, 2006). A well-recognized fact is that lack of patient's trust on medical care providers interferes with communication about diagnosis, prognosis and appropriate treatment (Saitz, 2002). In a qualitative study by Askew (2021) on self-discharge among adult patients in Australlia, participants reported a lack of effective communication. In particular the participants didn't understand the terminologies used by health workers and didn't feel they were given enough information about procedures and investigations including the duration of their hospitalization, why various investigations were conducted, and the timing of procedures during their admission Poor communication contributes to dissatisfaction and disagreements in quality of care being offered and affects compliance with regard to admission, medications and follow-up. In a study carried by Ndu (2016) out among children aged 0- 17 years at a tertiary hospital in Nigeria found out that the most common discharge diagnosis in DAMA cases were Malaria (20.1%) followed by pneumonia (15.7%) and sepsis (12.3%). For pediatric patients in particular,

well-informed caregivers are more likely to take rational health decisions concerning their sick children (Okoromah and Egri-kwaji, 2004).

2.5 Summary of literature review

The gaps identified from other previous researchers' works included: fewer studies have been conducted on examining the socio demographic, socio economic and clinical factors associated with DAMA. Again, most studies used more of descriptive summary statistics than analytical methods of data analysis during the data analysis. This similar study intends to address these gaps in the existing literature and also use analytical statistical analysis techniques of data modelling using the binary logistic regression to ascertain the validity and reliability of the presented findings. This study may act as a platform for other researchers, scientists and academicians to do replication of the study on different population and explore variables that were not previously investigated.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter outlines the research methods which were used for the study. Specifically, it explains the research design, target population, sample size, methods of data collection, methods of data analysis and ethical considerations.

3.2 Study Design

The study used a cross-sectional survey to determine the demographic, socio-economic and clinical factors associated with discharge against medical advice among paediatric patients at 2 hospitals in Mbarara. A cross-sectional survey was chosen mainly because the exposure and outcome were measured at the same time. This study utilized secondary data of the Smart Discharges Study, a prospective observational cohort study to develop prognostic models for post-discharge mortality. The original study was conducted at 6 hospitals in Uganda, and enrolled children 0 to 6 months of age admitted with a proven or suspected infection between March 2018 and February 2020 (Wiens et at.,2023). Only data for children admitted at Mbarara Regional referral hospital and Holy Innocents Children's Hospital was utilized for this study.

3.3 Study Area

The study was carried out in Mbarara city, southwest Uganda. It targeted children under 6 months admitted with severe infection at Mbarara Regional Referral Hospital and Holy Innocents Children's Hospital. Mbarara city was purposively chosen from among the districts in southwest Uganda because its health facilities provide care for paediatric patients hailing from many parts of the sub-region. Mbarara Regional Referral Hospital is a government aided hospital while Holy Innocents Children's Hospital is a private hospital. Mbarara city is located approximately 290 kilometres (180 miles) southwest of Kampala, the capital city of Uganda and is bordered by Ibanda district in the north, Kiruhura district in the east, Isingiro district in the south and Rwampara district in the west. The district has a population of about 472,625 people, with an estimated average household size of 4.2 people (UBOS, 2017). The majority of the households (52.7%) depend on subsistence farming as the main source of livelihood. The population within the district is served by hospitals located in Mbarara city, the area's commercial hub which has a population of 195,013 (Okello *et al*., 2016; UBOS, 2014).

3.4 Study Population

The study was carried out among paediatric patients under 6 months admitted with infections who were enrolled in the Smart discharges project at MRRH and HICH. MRRH is a public hospital funded by the Uganda Ministry of Health and is associated with the Mbarara University of Science and Technology Faculty of Medicine with a bed capacity of 600 beds. The paediatrics "Toto" ward admits approximately 5000 patients per year. HICH is a Catholic children's hospital offering subsidized fee for-service outpatient and in-patient care in Mbarara and admits approximately 2500 patients annually.

3.5 Sample Size and Sampling Procedure

This study used secondary data of the Smart Discharges Study, a prospective observational cohort study to develop prognostic models for post-discharge mortality in children below 6 months admitted at the 2 hospitals with infection between March 2018 and February 2020. There was no specific calculation used to determine sample size for this study as there was sufficient data available for use. In addition, various similar studies carried out elsewhere do not point out any method used to determine sample size. At these 2 hospitals a total of 2916 participants under 6 months of age were screened and 1194 enrolled in the study. Of these 120 children died in hospital and were excluded from this particular study, leaving 1074 participants who were considered for this study.

3.5.1 Inclusion and exclusion criteria for Smart Discharges

All children under 6 months of age admitted with a proven or suspected infection who provided consent were enrollment in the Smart Discharges study. Whether or not a patient had a suspected or proven infection were determined by the admitting health care professional in each case. Subjects already enrolled in the study were not eligible to be enrolled during subsequent admissions (i.e., a

subject cannot be enrolled more than once). Provision of informed consent was a criterion for enrollment. For this particular study children who died in the hospital were excluded from the study.

Inclusion Criteria:

- Age ≤ 6 months were enrolled in the observation study
- Admission to hospital
- Provide informed consent

Exclusion Criteria:

- Refusal to participate
- Previous enrolment in the study

3.6 Data Collection Instruments

Data was extracted from that collected by Smart Discharges project. Smart discharges team used a survey embedded on a software on a tablet. Due to the complex nature of a large multi-center study, data was collected using an electronic data collection form using REDCap (research Electronic Data Capture). All data entered into the mobile application was stored in an encrypted database using the encryption cipher Rabbit. Access to the tablet and the application was secured by passwords; without using the application, the encrypted files are not readable. Encrypted data was stored for less than a day on the tablets and was directly uploaded daily over a secured internet connection to the central study server. REDCap is a secure web-based application designed to support data capture for research studies. Each subject was given a unique number and all data was connected to this unique number. Using REDCap limited the amount of paper-based data, further ensuring data integrity and safety. All paper-based data collection items, including consent forms are stored in a locked cabinet, in a locked room, in the central Mbarara study office and for any additional time required by the local and/or national guidelines at the time.

3.7 Data Collection Procedures

For this study, the variables of interest were extracted from the original data collected by Smart Discharges project. The procedure of data collection by smart Discharges is described in detail; the parent or legal guardian(s) of participants meeting inclusion criteria were approached by a trained research nurse upon admission of their child in the hospital. Written informed consent was obtained from the parents or guardians of eligible participants. The parents voluntarily signed and dated the consent form if they wished to participate in the study and were then provided with a copy of the consent form. A signed and dated copy of the consent form was kept in the documentation file at all times. All participants were aware of the study rationale, as well as any potential risks. The consent form made it clear that standard care was not going to be compromised if children and their guardians did not consent to participate in this study. Following enrollment, a research nurse would obtain and record clinical and demographic variables required for model validation. These include vital signs, oxygen saturation, anthropometric data, prior care seeking, co-morbidities and diagnoses. A rapid diagnostic test using blood, which required a finger prick to collect < 0.5ml of blood, was conducted to assess the patient's HIV status, parasitemia, lactate, and hemoglobin. The study research nurse would then fill the survey during admission and also record some information at discharge. A project manager was working full-time to ensure the quality of all data collected.

3.8 Variables of the study

The Smart Discharges team collected data on over 150 factors but for this study we considered about 45 risk factors associated with DAMA. The independent variables of the study included gender of primary caregiver and child, Education level of the caregiver, Current marital status of primary caregiver, means of transport to the hospital, Time taken to travel to the hospital, Weight WFA_Zscores and tablet oxygen saturation (measure). The dependent variable was DAMA. This

variable has two categories: Yes (Discharged Against Medical Advice) and No (Routine discharge). Details are displayed in the table 1.

Table 1: Study variables

Dependent variable			**DAMA** (categorical- nominal) 1. Yes (Discharge against Medical Advice) 0. No (Discharged by Medical team or routine discharge)
Independent variables			
Variables	**Value labels**	**Data type**	**Variable description**
Gender primary caregiver	1. Male **2.** Female	Categorical (nominal)	Sex of caregiver
Level of education	0. None 1. Primary 2. Secondary 3. Tertiary	Categorical (ordinal)	Education level of caregiver
Age (months) child		continuous	Age of the child
Age of the care giver		Continuous	Age of caregivers (complete years)
Time taken to travel to the hospital	1. < 30 minutes 2. 30 min-1 hr 3. 1-2 hours 4. > 2 hours	Categorical (nominal)	Time taken to- from home to hospitals
Child Primary caregivers	1. Father 2. 2. Grandparent 3. Mother	Categorical (nominal)	Child's care giver
Education level of the caregiver	1. Primary or no school 2. Secondary school 3. Post-secondary school	Categorical (ordinal)	Education level of the care giver

Current marital status of primary caregiver	1. Married 2. Single 3. Separated/divorced 4. widowed	Categorical (ordinal)	Marital status of the caregiver
Means of transport to the hospital	1. Private vehicle 2. Taxi/special hire 3. Ambulance 4. Motorcycle 5. Walking	Categorical (nominal)	Means of transport to the hospital
Weight WFA_Zscores	1. <-3 2. -3 to -2 3. > -2	Categorical (nominal)	Weight of children (z scores)
Tablet oxygen saturation (measure)	1. <90 2. 90-94 3. >94	Categorical (nominal)	Tablet oxygen saturation

3.9 Data analysis

The data analysis involved processing of the data which was done at three levels using Statistics/Data Analysis (STATA) version 13.

3.9.1 Univariate Analysis

Univariate analysis incorporated the descriptive summary for each variable. To study characteristics of respondents, techniques for summarizing data for continuous variables were used and these included: Mean, variance and standard deviation while the frequencies and percentages were used for categorical variables.

3.9.2 Bivariate Analysis

Bivariate associations were done to test any possible associations between each of the independent variables and the dependent variable. Statistical significance of the relationships were determined for the P-value (P=0.05) and all significant variables at this level were considered at multivariate level of analysis. The model is given by;

$$\log\left(\frac{p}{1-p}\right) = a + b_i x_i + e \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 3.1$$

Where; p = is the probability of success

α = is the coefficient on the constant term

b_i = is the coefficient(s) on the independent variable(s)

x_i =is the individual independent variable(s)

e = is the error term

3.9.3 Multivariate Analysis

Multivariate analysis was performed to assess which factor associated with DAMA more than the other. The DAMA is either 'YES, 'or 'NO. DAMA is a nominal (Binary/dichotomous) variable and therefore the suitable model used to analyze this kind of criterion variable was the binary logistic regression. The model is given by;

$$\log\left(\frac{p}{1-p}\right) = a + b_1x_1 + b_2x_2 + b_3x_3 + \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots + b_nx_n + e \ldots\ldots 3.2$$

Where; p = is the probability of success

α = is the coefficient on the constant term

b_i = is the coefficient(s) on the independent variable(s)

x_i =is the independent variable(s)

e = is the error term

3.10 Study Limitations

Since the study utilized secondary data to establish the factors associated with DAMA, some information may not have been collected.

3.11 Ethical Considerations

Approval to conduct the study was sought from the directorate of graduate studies, research, and innovations at Bishop Stuart University. Further approval was sought from the principal investigator for permission to use part of the data collected by the Smart Discharges Project. Prior to the commencement of the original study, Smart discharges project obtained approval from the MUST

Research ethics committee (No. 15/10-16) following administrative clearance from the hospital directors of Mbarara Regional Referral Hospital and Holy Innocents children Hospital. They further obtained approval from the Research ethics committee at the University of British Columbia (H16-02679) in Canada and obtained a registration permit from the Uganda National Council of Science and Technology (HS 2207). Written informed consent were obtained each from participants before enrolment. Members of the study team ensured that the rights of subjects and confidentiality of data was protected and respected. During data collection, interviews and examinations were held in private. No information that disclosed the identity of participants was released or published without their specific consent to the disclosure. However, research records and medical records identifying participants were inspected in the presence of the Investigator or his or her designate by representatives of the MUST Research Ethics Committee for the purpose of monitoring the research. No records which identified the participants by name or initials were allowed to leave the Investigators' offices.

CHAPTER FOUR

RESULTS

4.0 Introduction

This chapter covers the presentation and interpretation of findings from a cross-sectional survey which was carried out to determine the impact of demographic and socio-economic factors and facility related factors on DAMA in Mbarara city. The data were collected by interviewing caregivers of paediatric patients and analysed using, univariate (descriptive statistics), bivariate and multivariable logistic regression analyses.

4.1 Prevalence of DAMA

At the two hospitals a data of 1074 participants under 6 months were considered for this study. Of these, 529 and 545 children were admitted at MRRH and HICH respectively. Results in table 4.1 reveal that the overall prevalence of DAMA was 110(10.2%). Stratified by the study areas, the prevalence of DAMA among patients admitted at MRRH was 58(11%) while for patients admitted at HICH was 52(10%).

Table 4.1 Prevalence of discharge against medical advice by study areas

Study area	**Discharge status**		
	Routine discharge n(%)	DAMA n(%)	Total
MRRH	471(89.04)	58(10.96)	529(100.0)
HICH	493(90.46)	52(9.54)	545(100.0)
Total	964(89.76)	110(10.24)	1,074(100.0)

4.2 Causes of admission among children discharged against medical advice in MRRH and HICH

Table 4.2 shows the disease conditions associated with DAMA. The most common conditions for admitted children who were DAMA had sepsis 53(36.81%), Pneumonia;24(16.67%) and Meningitis/encephalitis or other CNS infection; 16(11.11%). These same conditions were common

among patients who were not discharged against medical advice / followed routine discharge i.e. sepsis; 484(41.47%) Pneumonia;210(17.99%) and Meningitis/encephalitis or other CNS infection; 71(6.08%).

Table 4.2. Causes of admission among children discharged against medical advice in MRRH and HICH

Discharge Diagnosis in admitted children	Discharge Against Medical Advice	Routine discharge
	n(%)	n(%)
Malaria	02(1.39)	28(2.40)
Pneumonia	24(16.67)	210(17.99)
Sepsis	53(36.81)	484(41.47)
URTI	03(2.08)	33(2.83)
Gastroenteritis/diarrhea	04(2.78)	51(4.37)
Meningitis/encephalitis or other CNS infection	16(11.11)	71(6.08)
Malnutrition	10(6.94)	26(2.24)
Measles	02(1.39)	14(1.20)
Other - Infection	30(20.83)	250(21.42)
Total	**144(100.00)**	**1167(100.00)**

Note: These were multiple responses

4.3. Socio-demographic and Socio-economic characteristics of children under 6 months admitted with infections to Mbarara Regional Hospital and Holy Innocents Childrens' Hospital

The results in the table 4.3 indicated that there were 110 (10.2 %) cases of DAMA out of 1074 children admitted with infections. Of the children admitted, 604 (56.2%) of them were male, while 470(43.8%)

were female. Their modal age was <1-month, median age was 0.8 month, mean age 1.43 months with standard deviation of 1.43 months.

Of the patients who discharge against medical advice, 41(71%) and 32(62%) were male admitted at MRRH and HICH respectively. Looking at the mothers age, majority of the mothers 45(82%) of children who were DAMA were in the 20-30 age group at MRRH where as those at HICH in a similar age group were 44(87%). This age group was observed in mothers whose children were not DAMA at both hospitals.

Mothers' level of education differed by facility, 35(60%) had completed primary, 18(31%) secondary and only 5 (9%) had completed post-secondary at MRRH whereas at HICH, 18(35%) had completed primary, 14(27%) secondary and 20 (38%) had completed post-secondary. In terms of travel time to hospital, 18(31%) and 15(29%) spend less than 30 minutes to travel to hospital, 15(26%) and 16(31%) spent 30 minutes to 1 hour while 24(43%) and 21(36%) spent more than an hour to travel to hospital at MRRH and HICH respectively.

In terms of means of transport to hospital, the highest number of patients used motorcycles 24(24%) and taxi/special hire 23(40%) at MRRH whereas at HICH those who used motorcycles and taxi/ special hire were 23(44%) and 24(46%) respectively. When mothers were asked about sleeping under a mosquito net, a significant number 48(83%) and 45(87%) reveled that they always slept under the mosquito net.

Table 4.3 Socio-demographic and Socio-economic distribution of the patients by study area.

Characteristics	**category**	**MRRH**	
		Routine discharge n(%)	**DAMA n(%)**
Gender	Male Female	272(57.75) 199(42.25)	41(70.69) 17(29.31)
Mothers age	<20 20-30	24(5.12) 335(71.28)	3(5.45) 45(81.82)

	>30	111(23.72)	7(12.73)
Education level of the mother	Primary Secondary Post -Secondary	255(54.49) 149(31.84) 64(13.68)	35(60.34) 18(31.03) 5(8.62)
Travel time to hospitals	<30 min 30 min-1 hr 1-2 hrs >2 hrs	207(43.95) 118(25.05) 89(18.90) 57(12.10)	18(31.03) 15(25.86) 17(29.31) 8(13.79)
Means of transport to hospitals	Ambulance Motorcycle Private vehicle Taxi/special hire Walking	12(2.55) 255(54.14) 49(10.40) 149(31.63) 06(1.27)	03(5.26) 24(42.11) 06(10.53) 23(40.35) 01(1.75)
Sleep under a mosquito net?	Never Always Sometimes	32(6.79) 408(86.62) 31(6.58)	05(8.62) 48(82.76) 05(8.62)

4.4. Clinical factors distributions of patients admitted with infections to Mbarara Regional Hospital and Holy Innocents Children's Hospital

As regards to clinical factors, patients who were admitted at MRRH and were DAMA, had the following characteristics. Looking at WFA_Z score a significant number of patients, 35(60%) had Z score of >-2, 32(55%) had an axillary temperature of 37.5-39°C, average length of admission was 3-5 days for both DAMA and non DAMA patients, 39(67%) had oxygen saturation of above 94%, 38(66%) had a hemoglobin level of above 11g/dl and 47(81%) were not in respiratory distress. Furthermore, the highest number of admitted children were attended to by their mothers 53(91%) who were HIV negative 45(78%). In addition, the patients at HICH had the following characteristics. Looking at WFA_Z score a significant number of patients 42(81%), had Z score of >-2, 25(48%) had an axillary temperature of 36-37.5°C, 34(65%) had oxygen saturation of above 94%, 40(77%) had a hemoglobin level of above 11g/dl and 42(81%) were not in respiratory distress. Furthermore, the highest number of admitted children were attended to by their mothers 51(98%) and majority of mothers were HIV negative 40(78%).

Table 4.4 Clinical factors' distributions of the patients by study area. study area.

Characteristics	category	MRRH		HICH	
		Routine discharge n(%)	DAMA n(%)	Routine discharge n(%)	DAMA n(%)
WFA_Z score: Weight for age Z score	<-3 -3 to -2 >-2	52(11.04) 48(10.19) 371(78.77)	10 (17.24) 13(22.41) 35(60.34)	68(13.82) 50(10.16) 374(76.02)	8(15.38) 2(3.85) 42(80.77)
Maternal HIV status	Negative Positive	468(99.36) 03(0.64)	45(77.59) 13(22.41)	483(97.9) 10(2.03)	40(78.43) 11(21.57)
Axillary temperature (Celsius)	<36 36-37.5 37.5-39 >=39	08(1.70) 185(39.28) 218(46.28) 60(12.74)	3(5.17) 19(32.76) 32(55.17) 4(6.90)	17(3.45) 271(54.97) 166(33.67) 39(7.91)	03(5.77) 25(48.08) 22(42.31) 02(3.85)
Tablet SpO2	<90 90-94 >94	93(19.79) 99(21.06) 278(59.15)	10(17.24) 09(15.52) 39(67.24)	84(17.07) 122(24.80) 286(58.13)	08(15.38) 10(19.23) 34(65.38)
Length of admission (days)	<3 3-5 >5	51(10.83) 217(46.07) 203(43.10)	02(3.45) 24(43.10) 31(53.45)	101(20.49) 262(53.14) 130(26.37)	12(23.08) 22(42.31) 18 (34.62)
Hemoglobin level (g/dl)	<7 7-11 >11	18(3.83) 98(20.85) 354(75.32)	3(5.17) 17(29.31) 38(65.52)	12(2.43) 73(14.81) 408(82.76)	00(0.00) 12(23.08) 40(76.92)
severe respiratory distress	Yes No	92(19.53) 379(80.47)	11(18.97) 47(81.03)	114(23.12) 379(76.88)	10(19.23) 42(80.77)

4.4 Factors associated with the DAMA among children under six admitted with infections at MRRH and HICH.

4.4.1 Bivariate logistic regression analysis.

This section represents the association of clinical factors, socio-demographic and socio-economic to DAMA amongst patients admitted with infections at MRRH as shown in table 4.

Among socio-demographic and socio-economic factors, travel time to hospital for 1-2 hours at Unadjusted Odds Ratio(UOR); (UOR=2.19; 95%CI(1.1-4.5; p=0.029) was statistically significant.

Patients who spent 1-2 hours traveling to Mbarara Regional Referral hospital were more than 2 times more likely to discharge against medical advice compared to their counterparts who spent less than 30 minutes travelling to the hospital. Additionally, among the clinical factors, HIV status stood out as a key marker associated with DAMA. Patients whose mothers were HIV positive were more than 45 times more likely to leave against medical advice compared to patients whose mothers were HIV negative (UOR = 45.1, 95% CI: 12.4-16.41, p =<0.001). Children with axillary temperature of 39^0C and above were 82% less likely to discharge against medical advice compared to those whose axillary temperature was less than 36^0c (UOR = 0.18, 95% CI: 0.08 – 0.95, p = 0.043).

Similarly these factors were statistically significant among patients admitted at Holy Innocents Children's hospital as shown in table 4.4b, Discharge against Medical Advice was significantly associated with the time spent traveling to the hospital among the clinical factors. Thus patients who spent more than two hours traveling to the hospital were 73% less likely to discharge against medical advice compared to their counterparts who spent less than 30 minutes, (UOR = 0.27, 95% CI: 0.08-0.95, p = 0.043). Among the clinical factors, findings from the model indicate that the mother's whose HIV status was positive were 13.2 times more likely to discharge against medical advice compared to children whose mother's were HIV negative(UOR = 13.2, 95% CI:5.3-33.2, p <0.001).

Summary Bivariate analysis

The section focused on determining the association between the Discharge Against Medical Advice among children admitted to two hospitals in Mbarara city with infections and the socio-demographic and socio-economic and clinical factors. It presents the bivariate analysis results carried out using logistic regression analysis presenting the unadjusted / crude estimates. The bivariate analysis showed that the Discharge Against Medical Advice is associated with time spent traveling to hospitals, Maternal HIV status and axillary temperature. Other factors were not significantly associated with DAMA as demonstrated in (tables 4.4a & 4.4b).

Table 4.4a: Bivariate analysis results of factors associated with DAMA among children under six admitted at MRRH (n = 529)

Characteristics	category	MRRH			
		Routine discharge n(%)	DAMA n(%)	UOR(95%CI)	P-value
Gender	Male Female	272(57.75) 199(42.25)	41(78.85) 17(32)	1 0.56(0.31-1.02)	 0.061
Mothers age	<20 20-30 >30	24(88.89) 335(88.16) 111(94.07)	3(5.77) 45(86.54) 7(13.46)	1 1.41(0.57-3.51) 0.49(0.23-1.05)	 0.462 0.066
Education level of the mother	Primary Secondary Post -Secondary	255(54.49) 149(31.84) 64(13.68)	35(60.34) 18(31.03) 5(8.62)	1 0.88(0.48-1.61) 0.57(0.21-1.51)	 0.678 0.258
Travel time to hospitals	<30 min 30 min-1 hr 1-2 hrs >2 hrs	207(43.40) 118(24.74) 89(18.66) 57(11.95)	18(8.00) 15(11.28) 17(16.04) 8(12.31)	1 1.46(0.7-3.0) 2.19(1.1-4.5) 1.61(0.67-3.9)	 0.302 **0.029*** 0.288
Means of transport to hospitals	Ambulance Motorcycle Private vehicle Taxi/special hire Walking	12(80.00) 255(91.40) 49(89.09) 149(86.63) 6(85.71)	3(20.00) 24(8.60) 6(10.91) 23(13.37) 1(14.29)	1 0.37(0.1-1.43) 0.48(0.1- 2.25) 0.62(0.16-2.35) 0.67(0.06-7.85)	 0.151 0.358 0.480 0.747
WFA_Z score:	<-3 -3 to -2 >-2	52(11.04) 48(10.19) 371(78.77)	10 (17.24) 13(22.41) 35(60.34)	1 1.41(0.57-3.51) 0.49(0.23-1.05	 0.462 0.066
Maternal HIV status	Negative Positive	468(99.36) 3(0.64)	45(77.59) 13(22.41)	1 45.1(12.4-164.1)	 **0.000***
Axillary temperature (Celsius)	<36 36-37.5 37.5-39 >=39	8(1.70) 185(39.28) 218(46.28) 60(12.74)	3(5.17) 19(32.76) 32(55.17) 4(6.90)	1 0.27(0.06-1.12) 0.39(0.1- 1.55) 0.18(0.03-0.94)	 0.072 0.182 **0.043***
Tablet SpO2	<90 90-94 >94	93(19.79) 99(21.06) 278(59.15)	10(17.24) 9(15.52) 39(67.24)	1 0.84(0.32-2.17) 1.30(0.62- 2.73)	 0.727 0.477
Sleep under a mosquito net?	Never Always Sometimes	32(6.79) 408(86.62) 31(6.58)	5(8.62) 48(82.76) 5(8.62)	1 0.75(0.28-2.0) 1.03(0.27-3.92)	 0.574 0.963

Length of admission (days)	<3 3-5 >5	51(10.83) 217(46.07) 203(43.10)	2(3.45) 24(43.10) 31(53.45)	1 2.9(0.67-12.8) 3.9(0.90- 16.8)	 0.151 0.068
Hemoglobin level (g/dl)	<7 7-11 >11	18(3.83) 98(20.85) 354(75.32)	3(5.17) 17(29.31) 38(65.52)	1 1.04(0.27-3.92) 0.64(0.18- 2.29)	 0.953 0.496
severe respiratory distress	Yes No	92(19.53) 379(80.47)	11(18.97) 47(81.03)	1 1.03(0.52-2.1)	 0.918

Table 4.4b: Bivariate analysis results of factors associated with DAMA among children under six admitted at HICH (n = 545)

Characteristics	**category**	**HICH**			
		Routine discharge (%)	**DAMA n(%)**	**UOR(95%CI)**	**P-value**
Gender	Male Female	259(53.18) 234(48.05)	32(11.00) 20(7.87)	1 0.69(0.38-1.24)	 0.218
Mothers age	<20 20-30	43(97.73) 327(88.14)	1(2.27) 44(11.86)	1 0.34(0.06-1.67)	 0.184

	>30	122(95.31)	6(4.69)	0.95(0.42-2.12)	0.909
Education level of the mother	Primary Secondary Post - Secondary	220(44.62) 138(27.99) 135(27.38)	18(34.62) 14(26.92) 20(38.46)	1 1.24(0.6-2.57) 1.81(0.92-3.55)	 0.564 0.083
Travel time to hospitals	<30 min 30 min-1 hr 1-2 hrs >2 hrs	124(89.21) 140(89.74) 137(88.39) 92(96.84)	15(10.79) 16(10.26) 18(11.61) 3(3.16)	1 0.94(0.45-1.99) 1.1(0.52- 2.25) 0.27(0.08-0.95)	 0.881 0.824 **0.043***
Means of transport to hospitals	Ambulance Motorcycle Private vehicle Taxi/special hire Walking	5(100.00) 181(88.73) 32(91.43) 268(91.78) 7(77.78)	0(0.00) 23(11.27) 3(8.57) 24(8.22) 2(22.22)	1 0.44(0.09-2.27) 0.33(0.05-2.35) 0.31(0.06-1.59) 0.29(0.06-1.38)	 0.330 0.267 0.162 0.118
WFA_Z score:	<-3 -3 to -2 >-2	68(13.82) 50(10.16) 374(76.02)	8(15.38) 2(3.85) 42(80.77)	1 0.34(0.07-1.67) 0.95(0.42-2.12)	 0.184 0.909
Maternal HIV status	Negative Positive	483(97.9) 10(2.03)	40(78.43) 11(21.57)	1 13.2(5.3-33.2)	 **0.000***
Axillary temperature (Celsius)	<36 36-37.5 37.5-39 >=39	17(3.45) 271(54.97) 166(33.67) 39(7.91)	3(5.77) 25(48.08) 22(42.31) 2(3.85)	1 0.52(0.14-1.91) 0.75(0.20-2.78) 0.29(0.04-1.90)	 0.326 0.667 0.197
SpO2 from other device	<90 90-94 >94	84(17.07) 122(24.80) 286(58.13)	8(15.38) 10(19.23) 34(65.38)	1 0.86(0.33-2.27) 1.25(0.56-2.8)	 0.762 0.591
Sleep under a mosquito net?	Never Always Sometimes	48(9.74) 423(85.80) 22(4.46)	7(13.46) 45(86.54) 0(0.00)	1 0.73(0.31-1.71) 0.14(0.06-1.32)	 0.467 0.480
Length of admission (days)	<3 3-5 >5	101(20.49) 262(53.14) 130(26.37)	12(23.08) 22(42.31) 18 (34.62)	1 0.71(0.34-1.48) 1.17(0.54-2.53)	 0.358 0.699
Hemoglobin level (g/dl)	<7 7-11 >11	12(2.43) 73(14.81) 408(82.76)	0(0.00) 12(23.08) 40(76.92)	1 1.6(0.84-3.35) 0.1(0.07-1.14)	 0.143 0.158
severe respiratory distress	Yes No	114(23.12) 379(76.88)	10(19.23) 42(80.77)	1 1.26(0.61-2.6)	 0.525

***Statistically significant (p<0.05) at bivariate analysis**

4.5 Multivariate logistic regression analysis

Multivariate analysis was performed to assess which factor associated with Discharge against Medical Advice more than the other. The section presents the multivariate analysis results that were carried out using the multivariable logistic regression. At a multivariate level, all factors which had p-values below the threshold of 0.05 at the bivariate analysis were included in the multivariate model (Table 4.5). A reference category was selected for each categorical variables.

The multivariate analysis showed that patients who were admitted at MRRH and whose mother HIV status was positive were 4.4 times more likely to discharge against medical advice compared to patients whose mothers' HIV status was negative Adjusted Odds Ratio (AOR) (AOR=4.4; 95%CI(11.3-15.9**);** p<0.001) among the clinical variables. Furthermore, Patients admitted at MRRH who had axillary temperature 36-37.5 were 76% less likely to discharge against medical advice compared to patients who had temperature <36^0c (AOR=0.24; 95%CI(0.06-0.99**);** p<0.050). Results revealed that patients who had axillary temperature of ≥39^0c were 82% less likely to discharge against medical advice compared to patients who had temperature <36^0c (AOR=0.18; 95%CI (0.03 - 0.95); p=0.044).

The multivariate analysis further revealed that Patients who were admitted at HICH and whose mothers' were HIV positive was statistically significant with discharge against medical advice. Patients whose mothers were HIV positive were 9 times more likely to discharge against medical advice compared to their counterpart who were negative (AOR = 8.9; 95%CI(6.8 – 25.8); p<0.01) while among the social demographic and social factors, patients who spent more than 2 hours traveling to the hospital were 74% less likely to discharge against medical advice compared to those who spent less than 30 minutes (AOR = 0.26; 95%CI(0.06 – 0.99); p=0.049). Other factors were not significantly associated with DAMA as demonstrated in (table 4.5).

Table 4.5: Multivariable analysis results of factors associated with Discharge against Medical Advice among children less than six admitted at MRRH & HICH, Mbarara district

Characteristics	category	MRRH			
		Routine discharge n(%)	**DAMA n(%)**	**AOR(95%CI)**	**P-value**
Travel time to hospitals	<30 min	207(43.94)	18(31.03)	1	
	30 min-1 hr	118(25.05)	15(25.86)	1.65(.76-3.58)	0.206
	1-2 hrs	89(18.89)	17(29.31)	1.87(0.83- 4.21)	0.130
	>2 hrs	57(12.10)	08(13.80)	1.59(.60- 4.16)	0.349
Maternal HIV status	Negative	468(99.36)	45(77.59)	1	
	Positive	3(0.64)	13(22.41)	4.4(11.3- 15.9)	**0.000****
Axillary temperature (Celsius)	<36	08(1.70)	03(5.17)	1	
	36-37.5	185(39.28)	19(32.76)	0.24(0.06 - 0.99)	**0.050****
	37.5-39	218(46.28)	32(55.17)	0.30(0.07 - 1.26)	0.100
	>=39	60(12.74)	04(6.90)	0.18(0.03 - 0.95)	**0.044****
HICH					
Travel time to hospitals	<30 min	124(25.15)	15(28.85)	1	
	30 min-1 hr	140(28.39)	16(30.77)	1.53(0.67 - 3.48)	0.317
	1-2 hrs	137(27.79)	18(34.62)	1.32(0.58 - 3.03)	0.508
	>2 hrs	92(18.66)	03(5.77)	0.26(0.06 - 0.99)	**0.049**
Maternal HIV status	Negative	483(97.9)	40(78.43)	1	
	Positive	10(2.03)	11(21.57)	8.9(6.8-25.8)	**0.000****
Axillary temperature (Celsius)	<36	17(3.45)	3(5.77)	1	
	36-37.5	271(54.97)	25(48.08)	0.36(0.09 - 1.41)	0.144
	37.5-39	166(33.67)	22(42.31)	0.51(0.12 - 2.03)	0.340
	>=39	39(7.91)	2(3.85)	0.21(0.03- 1.42)	0.109

** Statistically significant ($p<0.05$) at multivariate analysis

CHAPTER FIVE

DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents a summary of the findings, discussion, conclusions, recommendations, study contribution to the body of knowledge and areas recommended for further study based on the study findings. The main objective of this study was to determine demographic, socio and clinical factors associated with DAMA in children under 6 months admitted with infections at two hospitals located in Mbarara city and was carried out for a period of one year. DAMA was associated with demographic, socio and clinical factors. These results have important implications for medical/public health intervention and may be used in improving health service delivery.

5.2 Discussion

5.2.1 Prevalence of DAMA

The prevalence of DAMA was 10.2%. Stratified by the study areas, the prevalence of DAMA among patients admitted at MRRH was 58(11%) while for patients admitted at HICH was 52(10%). These rates fall within the range found out from other studies carried out in a similar setting looking at pediatric in-hospital death from infectious disease in Uganda: Derivation of clinical prediction by Lowlaavar et al., (2016) where prevalence of DAMA was at 9.7%. The high prevalence may be attributed to the high costs associated with hospitalisation. A study carried out by Atwiine et al., (2019) to understand the reason for abandoning treatment by children with cancer revealed that financial constraint was the major reason for abandoning cancer treatment where care givers reported that they struggled to raise money to buy food and other necessities during hospitalisation.

5.2.1 Socio-demographic and socio-economic

Among the DAMA cases, most children that experienced DAMA were male. These findings conquer with those found out by Ndu (2016) & Abbas (2017) in their studies carried out to find out reasons why children leave against medical advice. These results bear similarity with this study where males constituted 66% of self-discharged babies. Male predominance may be because of gender bias towards baby boys, as a result of which more boys are brought for admission. Also, boys are more susceptible to infections and premature death due to differences in genetic and biological make up which results in their higher admission rate.

Furthermore Youssef (2012) investigated the factors associated with discharge against medical advice in a Saudi teaching hospital. In the study findings, the distance of residence from the hospital was associated with DAMA. The results showed that 72.1% of respondents lived 615 km away from the hospital while 27.9% lived 15km away from the hospital. Findings from this study however, reveal that patients who spent less than 30 minutes traveling to hospital were more likely to DAMA than those that stayed far / spent a longer time travelling to hospital.

5.2.3 Clinical factors

Among the patients admitted at these hospitals, the commonest diagnoses were neonatal sepsis and Pneumonia. A similar pattern was reported by Ndu in 2016 and Opara and Eke, 2009. According to Annis (2002) and Albayati et al., (2021) in their studies of centre for excellence in HIV/AIDS and why patients leave against medical advice respectively, found out that patients who were HIV positive were lively to leave against medical advice. The findings are in agreement with finds from this study where mothers who were HIV positive were more likely to leave against medical advice. This can be attributed to the fact that these mothers once at the admission facility, they usually face challenges in accessing HIV care such as picking their ARVs drugs and opt for DAMA. These 2

hospitals are referral centres in the region and may not be the facilities where mothers usually obtain HIV care from.

5.2 Limitations

This study was subject to several important limitations. First, we did not collect the reasons patients left against medical advice, making it harder to contextualize and understand their decision. Secondly, the data we collected focused on clinical factors, and unplanned discharge relies heavily on socioeconomic conditions. While we did collect socioeconomic data, and found some important relationships, a higher granularity of socioeconomic information could have provided a more comprehensive understanding of the circumstances behind unplanned discharge. Finally, our data was collected from hospitals in semi-urban areas. Thus, it is unclear if our results would generalize to either highly rural or highly urban areas. Further research studies can be carried out to address this.

5.3 Conclusions

Maternal HIV status, temperature and distance from facility to home were highy associated with discharge against medical advice. Understanding the specific populations at a higher risk of DAMA may provide insights into aspects of health services that need to be addressed to improve quality of care for all patients.

5.4 Recommendations

Health care providers should intensify on-going counselling sessions with caregivers on the importance of completing hospital treatment and identify caregivers with treatment abandonment ideation, so that they can be given empathetic support to avert abandonment. Further research should be carried out to understand why patients leave against medical advice from the patient's perspective.

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Appendix 1: Questionnaire

Factor associated with DAMA among children under 6 months admitted at both Mbarara Regional Referral Hospital and Holy Innocents Children's Hospital

	Demographic variables	
1	Study ID	_____Response options_____
2	Site of enrollment	□ Holy Innocents Children's Hospital □ Mbarara Regional Referral Hospital
3	Is the child admitted with a proven or suspected infection	□Yes □ No
5	Date of admission	_____
6	Gender of the patient	□ Male □ Female
7	Is child date of birth known	□Yes □ No
8	Child date of Birth	_____
	Who brought the child to Hospital	□ Biological parent □ Grand parent □ Sibling □ Uncle/Aunt □ Other
9	Gender of the person who brought the child to Hospital.	□ Male □ Female
10	Age of the person who brought the child to hospital (years)	□ <=18 □ 18<50 □ >50
11	Is the person who brought the child to hospital the child's primary care giver?	□ Yes □ No
12	Is the child less than 30 days old?	□ Yes □ No
13	Has care been sought for this illness prior to this admission?	□ Yes □ No
14	Is this a referral visit?	□ Yes □ No
15	If yes, referral source	□ Hospital □ Health center/Clinic □ VHT □ Untrained Health worker □ Traditional healer
	Clinical Variables	
16	Does the child have pallor?	□ Yes □ No

17	Is the child suckling well when breastfeeding?	□ Yes □ No
18	Muscle Tone	□ Increased (stiff □ Decreased (floppy) □ Normal □ Don't know
19	What is the duration of the present illness before admission?	□ < 48 hrs □ 48 hrs – 7d □ >7 days- Imo □ >1mo □ Don't know
20	What was the child's gestational age at admission	□ Term □ Preterm □ Don't know
21	Height (cm)	_____
22	Weight (kg)	_____
23	Respiratory rate	_____
24	Heart Rate	_____
25	Tablet Oxygen Saturation	_____
26	Maternal Chronic illness requiring ongoing treatment	
27	Maternal HIV status	□ HIV positive □ HIV negative □ Don't know
28	Maternal substance abuse in the last 30 days. (tick all that apply)	□ Leaves the child home to go and drink □ Drinks more than 3 times a week □ Drinks more than 6U in one siting □ Smoking daily □ None apply □ Don't know
29	Does the child have severe respiratory distress	□ Yes □ No
30	Does the child have any comorbid diagnoses (HIV, malnutrition and anemia not included. (ick all that apply)	□ Kidney disease □ Cardiac disease □ Oncological disease □ Physical/mental development disability □ TB □ Other
	Socio Economic Variables	

31	How did you travel to the hospital?	□ private car □ Taxi/special hire □ Ambulance □ Motorcycle □ Walking □ Other
32	How long did it take you to travel to the hospital?	□ 30 min □ 30min-1 hr □ >1hr-2hrs □>2 hrs
33	Current Marital status of the primary care giver.	□ Married □ Single □ Separated/Divorced □ Widowed
34	Is the child's mother alive/	□ Yes □ No
35	Is the child mother's age known?	□ Yes □ No
36	If yes, What's the child mother's age	□ <=18 □ 18<50 □ >50
37	Mother's highest level of education	□ No school □ <=P3 □ P4-P7 □ S1-S6 □ Post-secondary □ Don't know
38	Number of children in the family who are alive	_____
	Laboratory variables	
39	Lactate (mmol/L)	_____
40	Haematocrit (g/dl)	_____
	Discharge Variables	
41	Child's disposition	□ Routine discharge □ Died □ Fled □ DAMA □ Referred to higher level of care

42	Disposition date	_____
43	Disposition diagnosis	□ Malaria □ Pneumonia □ Sepsis □ URTI □ Gastro enteritis □ Meningitis/CNS infection □ Other infection
44	Feeding status	□ Feeding well □ Feeding poorly □ Not feeding at all
45	Length of hospitalization	_____

APPROVAL TO USE DATA

THE UNIVERSITY OF BRITISH COLUMBIA

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November 29, 2022

To whom it may concern,

This letter confirms that Clare Komugisha, who is a co-investigator for, and staff member within, the Smart Discharges study program, has been given access to the Smart Discharges dataset for children 0-6 months of age. The use of this data is restricted to analysis for her thesis project related to discharges against medical advice among those enrolled into this cohort. Please do not hesitate to contact me if you have any further questions about this dataset.

Best wishes,

Dr. Matthew O Wiens PharmD, PhD

Principal Investigator, Smart Discharges Program
Director, Pediatric Research
Walimu, Uganda

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REC APPROVAL

MBARARA UNIVERSITY OF SCIENCE AND TECHNOLOGY
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RESEARCH ETHICS COMMITTEE
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Our Ref: MUIRC 1/7 **Date:** June 14, 2017

Dr. Jerome Kabakyenga
Director, Maternal Newborn and Child Health Institute
MUST

Dr. Niranja (Tex) Kissoon
University of British Colombia

Re: **Request for amendment of approved study Protocol on "Smart discharges to improve post-discharge health outcomes in children: a prospective stepped-wedge effectiveness study" No. 15/10-16**

Type: [ ] Initial Application
[√] Protocol Amendment
[ ] Letter of Amendment (LOA)
[ ] Continuing Review
[ ] Material Transfer Agreement
[ ] Other, specify: _____

Your request to amend the above mentioned study protocol has been received and reviewed by MUST REC.

The committee has approved the following amendment:

1. Change the study title to "Smart discharges to improve post-discharge health outcomes in Children: A prospective before-after study with staggered implementation".
2. Consent to participate in long term study will be sought in the future with a new proposal submission.
3. Clinical data will be shared with health care givers concerned about the health of the child.
   PARA mobile application will undergo minor design refinement.
4. Discharge kit will have two versions to ensure all children receive some benefits.
5. Proposed activities to ensure data quality, confidentiality and privacy.
6. Regional meetings will take place over one day in February 2018.
7. Consent form amended to have simpler language, include techonology supplier and information intent to make data publicity available.

Please note that you are required to inform MUST REC of changes in the PARA mobile application.

UNCST APPROVAL

Uganda National Council for Science and Technology
(Established by Act of Parliament of the Republic of Uganda)

Our Ref: HS 2207 **6th May 2019**

Prof. Jerome Kahuma Kabakyenga
Principal Investigator
Mbarara University of Science and Technology
Mbarara

Dear Prof. Kabakyenga,

RE: SMART DISCHARGES TO IMPROVE POST – DISCHARGE HEALTH OUTCOMES IN CHILDREN: A PROSPECTIVE STEPPED – WEDGE EFFECTIVENESS STUDY

This is to acknowledge receipt of your letter dated **22nd February 2019** in which you notified Uganda National Council for Science and Technology (UNCST) about the approved amendments made to the above study by Mbarara University of Science and Technology, Research Ethics Committee. The UNCST has no objection to the notification.

Yours sincerely,

Beth Mutumba
for: Executive Secretary
UGANDA NATIONAL COUNCIL FOR SCIENCE AND TECHNOLOGY

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