



**Nurses' Knowledge, attitudes and practice towards intra-hospital transportation management of the critically ill adult patients: in selected referral hospitals, Kigali- Rwanda.**

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In the College of Medicine and Health Sciences

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## **DECLARATION**

I do hereby declare that this *dissertation* submitted in partial fulfillment of the requirements for the degree of MASTERS OF SCIENCE in NURSING, at the University of Rwanda/College of Medicine and Health Sciences, is my original work and has not previously been submitted elsewhere. Also, I do declare that a complete list of references is provided indicating all the sources of information quoted or cited.

Date and Signature of the Student

## **DEDICATION**

This dissertation is dedicated to :

Almight God for his blessing and guidance throughtout the fluctuating hard times in the completion of my studies,

To my husband Gedeon Mutabazi, to my children Ange Hugo Mugire and Heinz Kuzo, to my family and friends for their invaluable support .

May God bless you all.

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God bless you

## **ABSTRACT**

**Background:** Intra hospital transportation (IHT) of critically ill adult patients is necessary when diagnostic examinations are not possible to be performed at the patients' bedside and also when critically ill patients have to be transferred from different departments to intensive care unit and vice versa. Intra hospital transportation is to be done in order that patients get the right services with specialized medical personnel and sophisticated equipment.

**Aim of the study:** To assess KAP towards intra-hospital transportation management among nurses working in two selected referral hospitals Kigali- Rwanda.

**Methodology:** The data were collected at Rwanda Military Hospital (RMH) and Kigali University Teaching Hospital (KUTH). Descriptive cross sectional design was used to meet the objectives of the study. A sample size of 124 of respondents was selected using Yamane formula at confidence level of 95% and margin error of 5%. Relationships between variables were analysed using a chi-square test. Ethical standards were assured throughout the research.

**Results:** The majority of the participants were males 75(60%), 119(96%) had been involved in IHT, while only 59(48%) were trained in critical care. The great number 112 (90,3%) of participants scored a moderate level of knowledge, while only 8(6.5%) of nurses were classified in the high level of knowledge category and the minority 4(3.2%) had low level of knowlwdge. Self reported attitude of participants was negative 66(53.2%) while 58(46.8%) of the participants had positive attitude. On observed practice only 5(25%) paricipants had medium level, and 15(75%) obtained low level of practice. Surprisingly none of participants had high level of practice scores. The relationship between knowledge and attitude scores has shown a strong correlation (  $R^2 = 1.00$ , P-value = 0.012), and the education level to be associated with knowledge scores at p-value of 0.009.

**Conclusion and recommendations:** The present study reported moderate level of knowledge, negative attitude and low level of practice of nurses towards intrahospital transportation management of critically ill patients. Therefore, interventions targeting boosting knowledge, attitudes and practice are recommended. It is also recommended for further research to conduct the same study on the other referral hospitals.

**Key words:** Knowledge, attitude, Practice, critically ill patient, patient transport.

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## LIST OF SYMBOLS AND ABBREVIATIONS

% :Percentage

<: Less than

>: Greater than

CMHS : College of Medecine and Health sciences.

ESICM: European Society of Intensive Care Medicine

ICU: Intensive Care Unit

IHT: Intra-Hospital Transport

ITCA: Intra-hospital Transport of the critically ill Adults

KAP : Knowledge , Attitude, Practice.

KUTH: Kigali University Teaching Hospital

PUBMED: Publication of Medicine

RMH: Rwanda Military Hospital

SD : Standard deviation

SFAR: Société Française d'Anesthésie et de Réanimation

SFMU: Société Française de Médecine d'Urgence

SIAARTI: Study Group for Safety in Anesthesia and Intensive Care

SPSS: Statistical Package of Social Sciences

SRLF: Société de Réanimation de Langue Française

UR : Univesrsity of Rwanda

WHO: World Health Organization

$X^2$  : Pearson chi-square test

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## **CHAPTER I : INTRODUCTION**

### **1.1. Introduction**

Chapter one includes definition of key terms, background, problem statement, aim of the study, specific objectives, significance of the study, definition of concepts and subdivision of the study.

### **1.2. Study background**

Intra-hospital transport of the critically ill adults is a term used to refer to inter-departmental transfer of patients within the hospital for diagnostic or therapeutic purposes, or patients transfers to specialized units (Martin., 2001; Mary et al., 2017). It is of paramount importance to have intra hospital transfers especially when diagnostic examinations are not possible to be performed at the patients' bedside (Jones et al., 2016). Intra hospital transfers are done to ensure that patients get the right services in the right places with specialized medical personnel and sophisticated equipment.

The reported risks linked to intrahospital transfers are enormous. Alamanou and Brokalaki (2014) argue that the risks related to patient transfers might even result in life threatening conditions and death, though the main aim of such transport is to maintain the continuity of medical care (Kulshrestha and Singh, 2016). The study done by Escobar et al. (2011) highlights that patients on intra-hospital transfers from one department to another of higher levels are prone to high life threatening conditions (Escobar et al., 2011).

It was found in the study conducted in the USA in a Medical surgical ward of North Carolina hospital that among 7,868 hospitalisations in only less than two years, at least one transfer case from one department to the higher level occurred, and it was revealed that among all transfers, 13.2% of all transfers were ICU related compared to the rest (Escobar et al., 2011).

It was further reported in a retrospective study conducted on 3383 transfers of adult patients at Johns Hopkins Hospital that among 7000 to 7500 transfers that occur annually, 1.7% results in adverse events, and a half of them were related to hypoxia and another half was related to blood pressure changes (Ricky, Brown, Ness, 2011). Other adverse events highlighted in the literature include physiological changes, change in heart rate, equipment failure, oxygen tank getting empty, failure of the transportation team and interruption of manual ventilation or the continuous one (Mary et al., 2017).

The study done by Alamanou and Brokalaki (2014), on the other hand added that equipment failure and personnel involved in addition to patients condition and its severity, cardiovascular and respiratory systems are the factors affecting effective intrahospital transportation (Alamanou and Brokalaki, 2014).

In response to the reported drawbacks related to intra hospital patients' transport, guidelines were put in place by professional bodies for safe patient transport hence better outcomes, but most of the guidelines if not all were developed in developed countries (Gupta et al., 2004; Day, 2010; Alamanou and Brokalaki, 2014; Kulshrestha and Singh, 2016).

The guidelines stipulate that the standard procedures for intra-hospital patient transport should be provided at the same level of care, ensure monitoring and intervention that are available in the ICU; prioritization of the sickest patients during the transfer. Safety should be put under consideration during patients handling including timing, route and destination (Day, 2010). Hospitals in different countries developed patients transport and transfer guidelines with reference to the ones developed in developed countries, but not all hospitals have the guidelines or follow them as set (Alamanou and Brokalaki, 2014).

In all published guidelines, the role of the medical practitioners specifically the nurse in prevention of the possible complications is pivotal. Alamanou and Brokalaki (2014) suggested that the risks posed by intra-hospital transport for critically ill patients can be minimized or even prevented by a well-designed transport protocol with the effective participation of the nurse. It was further added that nurses are actively involved in intrahospital transportation from planning, equipment preparation and manipulation and evaluation of the process, therefore, their knowledge, attitude and practice in this process is paramount to influence their decision making (Alamanou and Brokalaki, 2014).

Developing countries are lagging behind in putting in place guidelines that guide professionals working in emergency medicine to provide services to critically ill patients. One of the developing countries that have the guidelines in place is Sri Lanka which was developed in 2013 (The College of Anaesthesiologists of Sri Lanka, 2013). Attempt was made in South Africa among medical practitioners to increase awareness that critically ill patients' transport need special attention by means of public talk (Castro, 2017).

The existing published scholarship does not indicate a study conducted in Rwanda on this particular topic, rather one unpublished information attempted to report on the intra-hospital transport for the neonates at Muhima Hospital.

The study stresses the need to have Intra hospital transport system by elaborating policies, protocols, and guidelines and conduct similar study with a focus on other patient population in health care settings (Umubyeyi, 2017). The present study therefore aims at assessing the knowledge, attitude and practices (KAP) of nurses on intra-hospital transport management of the critically ill adult patients with a focus on selected referral hospitals in Kigali, Rwanda.

### **1.3. Problem statement**

Unsafe transport of critical patient results in unexpeted events in clinical environments due to the factors ranging from transport organization itself, the patient, technical and staff factors (Fanara et al., 2010).

A study by Winter (2010) conducted in South Australia, revealed that critically ill patients are at 44% risk to die during their transportation from one department to another. It was reported that in the same hospital many of the reported rissd would be preventable with good planning and effective communication among staff (Winter, 2010). The study done by Escobar and colleagues, revealed that the transport of critical patients is hazardous, where between 30-70% of all intra-hospital transport was associated with adverse events, and 8% caused life threatening adverse events that needed medical therapy (Escobar et al., 2011). The KAP of the nurses in this process is reported to be a key to achieve safe and reliable patients transportation coupled with the existence of policies, procedures and protocols (Shields, Overstreet and Krau, 2015).

In Rwanda, the intrahospital transport of the critically ill patient is reported to be done in the hospitals, but no attempts done to report on nurses level of knowledge, attitudes, and practice in this domain. Therefore, it is essential to pursue a study in this area to inform any efforts to promote patient safety during transportation of the critically ill patients.

### **1.4. Aim of the study**

The aim of the study was to evaluate the knowledge, attitude and practice of nurses on intra hospital transportation management of critically ill adult patients in selected referral hospitals in Kigali, Rwanda.

### **1.5. Research objectives**

1. To determine the knowledge of nurses on intra-hospital transportation management of critically ill adult patients in selected referral Hospitals in Kigali.
2. To assess the attitude of nurses on intra-hospital transportation management of critically ill adult patients in selected referral Hospitals in Kigali.
3. To determine the practice of nurses with regard to intra-hospital transportation management of critically ill adult patients in selected referral Hospitals in Kigali.
4. To determine the relationship between demographic variables and knowledge, attitude and practice of nurses toward intra-hospital transportation management of critically ill adult patients in selected referral Hospitals in Kigali.

### **1.6. Research questions**

1. What is the knowledge of nurses towards intra-hospital transportation management of critically ill patients at selected referral hospitals in Kigali?
2. What is the attitude of nurses towards intra-hospital transportation management of critically ill patients at selected referral hospitals in Kigali?
3. What are the practices of nurses with regard to intra-hospital transportation management of critically ill patients at selected hospitals?
4. What is the relationship between the demographic variables and knowledge, attitude and practice of nurses on intra-hospital transportation management of critically ill adult patients in selected referral hospitals in Kigali?

### **1.7. Significance of the study**

Nurses are at the fore front in transportation of critically ill patients. This study was expected to assess the knowledge and attitude of nurses on intra hospital transport of critically ill adult patients at selected referral Hospitals in Kigali. It is likely to inform practice of transporting critically ill patients and explore possible gaps in such care and what needs to be improved.

In Rwandan system of care, little is known about the KAP of nurses on intra-hospital transportation management of critically ill patients, therefore, findings from this study will be used to develop guidelines. This study was also expected to guide policy makers to incorporate intra-hospital transport knowledge in schools curriculum and serve as source of evidence of existing status among the big majority of the health care workforce.

This will positively impact on Nursing practice, education and leadership and in research areas which will be evidence based.

### **1.8. Definition of key terms**

**Knowledge:** is defined as awareness or familiarity gained by experience of a person, fact, or thing (Biggam, 2001). The knowledge in the present study is tackling what nurses know about pre-transport phase, during transport and after transport of critically ill patients.

**Attitude:** is a mental or neural state of readiness, organized through experience, exerting a directive or dynamic influence on the individual's response to all objects and situations to which it is related. It is simply a mindset or a tendency to act in a particular way due to both an individual's experience and temperament (Pickens, 2005) The present study uses attitude as a general behavior of nurses towards intra hospital transport.

**Practice :** is defined as sets of actual application or use of idea, method, or a repeated exercise of an activity or a skill. Medical Subjects subheading define practice as the use of one's knowledge in a particular profession (MESH terms).

The present study used practice as application of nursing skills to perform intra-hospital transport of critically ill patients.

**Critically ill patients:** Critically ill patients are those that by dysfunction or failure of one or more organs/system depend on survival from advanced instruments of monitoring and therapy (Reeves, 2010; Quenot *et al.*, 2011).

**Intrahospital transport :** is defined as the temporary or definitive referral of patients within the hospital environment and may have a diagnostic and/or therapeutic purpose (Mary *et al.*, 2017).

### **1.9. Subdivision of the study**

This study is composed of six chapters.

Chapter one focuses on general introduction, background of the study, objectives and research questions, significance of study and operational definitions to the study.

Chapter two details the literature review pertinent to the topic concepts, theoretical approach and literature review.

Chapter three summarizes the research methodology which is composed of research approach, study design, study area, study population, sampling criteria, sample size calculation, sampling strategy, data collection instruments and the plan, methods of data analysis, and ethical consideration and limitation and challenges of the study.

Chapter four reports on the results of the study, chapter five discusses the results in relation to the objectives and chapter six reports on conclusion and recommendation of the study.

### **1.10. Conclusion**

This chapter has reported on general introduction of the study, study background, problem statement, research objectives, research questions, key concepts, subdivision of the study and conclusion of chapter one.

## **CHAPTER 2. LITERATURE REVIEW**

### **2.1. Introduction**

This chapter highlights the literature both theoretical and empirical review of past studies. The theoretical review highlights the process of patient's transportation, and adverse effects that may arise when the patients are being transported. The empirical literature focuses on the overview of adult patients intra hospital transport, its phases, factors associated with complications during intra-hospital adult patient transport and empirical evidence on the need to have a well-coordinated intra hospital transport systems in different settings.

The search strategies used include search engine in medical fields, such as: Hinari, Pubmed, Google scholar, Google and African Journals Online for searching African (AJOL) literature. The key words used were: Knowledge, attitude, Practice, critically ill patient, patient transport,

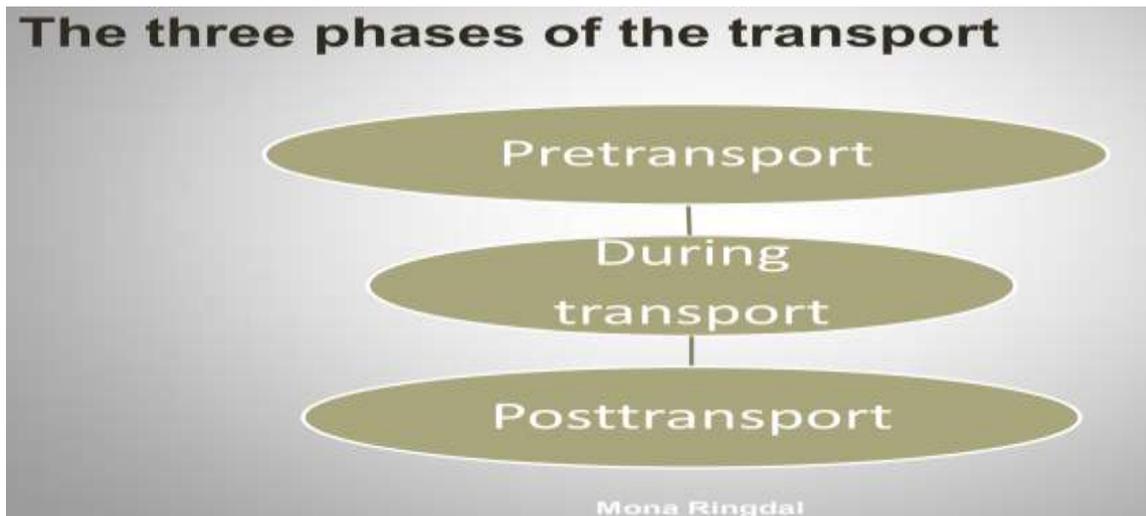
### **2.2. Theoretical literature of intra-hospital transportation**

#### **2.2.1. Process of patient's transportation**

Transport of critically ill patients requires organization and structure. These include the transporting team as well as the logistics involved. The clinical report done at the University of KaZulu-Natal, South Africa revealed that among the requirements needed for intrahospital transportation, guideline is the number one, having a consultant in charge of the transfers, having the required equipment, monitoring and evaluation mechanisms, having paramedical and nursing staff in charge, and putting in place good communication strategies. The same study also added that having a well trained team in advanced airway and resuscitation skills, with a minimum of two staff for a single patient transfer is necessary (Castro, 2017).

#### **2.2.2. Steps of critically ill adult patients transport**

The existing literature reports that Intra-Hospital transport (IHT) of seriously ill patients is composed by three important phases. The first phase deals with preparation of the transfer itself, whereby destination, procedure, and time to be spent should be planned in advance. The preparation phase depends on patient condition after assessment. The second phase deals with proper patients monitoring and evaluation and proper documentation, whereby any change to patients condition has to be immediately resolved, and reported to the whole team. The third phase consist of evaluation, stabilization and report of the holistic process (Ringdal,2016). See Figure 2.1 below.



**Figure 2.1. Phases of intra hospital patients transport**

### **2.2.3. Transport process**

In order to have an efficient transport, the team has to analyse risk-benefit by means of evaluation tool designed to assess both patient condition and equipment in consideration of the time to spend at the receiving unit. It is therefore very important to have a policy or guidelines in place to guide the whole process.

A three-step research approach used to develop an IHT checklist reported that during the intra-hospital transport, there should be evidence of continuity of care as it was in ICU, including vital signs monitoring as well as proper documentation of interventions and outcomes (Brunsveld-Reinders et al. 2015).

### **2.2.4. Staffing**

An integrative review of literature done to identify the literature related to the physiological changes during the transport argued that the team that involves in patient transportation should assess the risks and possible complications related to the transport and be able to react basing on the transport policies to prevent unexpected outcomes (de Almeida Ana, Claudenice Leite Bertoli: Garcia, Júlia Helena: Lopes, Juliana de Lima: de Barros, Alba Lucia Bottura Leite, 2012). The staff involved in transporting critically ill patient should be evaluated to outweigh the likely advantage to the patient (Brunsveld-Reinders *et al.*, 2015).

### **2.2.5. Monitoring**

Monitoring of certain physiological variables should be done during transport. Both Clinical condition of patient and equipment monitoring have to be done within the transport time. (Winter, 2010).

### **2.2.6. Intra-hospital patient transport guidelines**

A review of the literature conducted to provide intensive care units and emergency departments with checklist required for patient transportation by Fanara *et al.*, (2010) highlights that the risk benefit assessment of the transport is the key element in decision making and the balance has to be established in this process. A second priority should be the preparation to ensure that all logistics are on the disposal followed by checking the existing protocols.

The guideline developed in Sri Lanka in 2015 by the College of Anesthesiologists detailed the process on which IHT will follow (The College of Anaesthesiologists, 2015). The guidelines stresses on when to use ambulances, which equipment to be used, which personnel and their specialization should accompany the patient, preparation of the transport, what to do during the transportation, which medications should be available, safety of the transfer and finally the documentation to be used during the transport which includes transfer form, clinical summary, copy of the transfer record, and investigation report.

The guidelines may vary from one country to another, the checklist developed in Brazil to evaluate intra hospital transport of patients in ICU stipulates that identification of the patient is crucial and the people involved in the transport. It also highlights the expertise of personnel involved in the transport. In addition it stresses the preparation phase, transport itself and post transport documentation (Renata, 2015). In all reviewed guidelines, the process is quite similar to ensure patient safety during intra-hospital hospital transportation.

### **2.3. Empirical review**

In recent years, the transport of critically ill adult patients within the hospital has been extensively studied and described in literature as a risky procedure, especially for patients with severe trauma or cancer. From the reported literature, the intrahospital transport is associated with high incidence of life-threatening complications, morbidity and mortality.

### **2.3.1. Intra-hospital transport of critically ill adult patients**

A prospective observational audit of 32 intrahospital transfers of critically ill patients done by Winter (2010) in Australia revealed that many researchers were interested in unexpected patients outcomes occurring during intra-hospital transport of seriously ill patients. This study also pointed out the equipment that is required to accompany the seriously ill patients during transport.

Very few researchers were interested in patients' physiological changes, prevention and management of the complications (Winter, 2010). The same study recommends that staffing and equipment required should be the priority number one as well as careful planning, and communication, and if well coordinated the risks to have adverse incidences are minimized (Winter, 2010).

A review of the literature conducted by Blackeman and Brandson, (2013), revealed that transport of very sick patients is potentially dangerous with up to 70% adverse events occurring within the transport (Blakeman and Branson, 2013). A prospective audit undertaken in a tertiary hospital in India by Harish and Janarthanan (2017) reported on complications and benefits of intra-hospital transport of adult intensive care unit patients. It highlighted that most of the hospitals have the policies and guidelines but not all hospitals follow the same policies due to the fact of insufficiency of resources and or inadequate training of health personnel especially nurses who are always with patients.

The same study revealed that transport in seriously ill cancer patients is more dangerous and needs a good pre-transport preparation. In their study they found that time at the destination is one of the factors that can contribute to the adverse events. It was in addition reported that spending 60 minutes outside the ICU is likely to result in adverse events (Harish and Janarthanan, 2017).

On the other hand, de Almeida in 2012, described the process of intra-hospital transport of very sick adult patients to always consider the patient's condition, whose body's physiological reserves are reduced compared to the alterations caused by the environmental changes. Therefore the complications towards intra-hospital transport could reach or go beyond 76.1% of such patients and can be short or long lasting or even require emergency actions (de Almeida Ana, Claudenice Leite Bertoli: Garcia, Júlia Helena: Lopes, Juliana de Lima: de Barros, Alba Lucia Bottura Leite, 2012)

### **2.3.2. Unexpected events**

The World Health Organization (WHO) has reported that the primary responsibility of nurses is to protect patients from harm and reducing medical errors which are considered as international concern.

According to de Almeida, et al, in 2012 in his study, adherence to policies to maintain patient safety can be discerned once the level of knowledge of these policies among nurses is determined. The policies should take into consideration communication, personnel, equipment, and monitoring of patients transport (de Almeida Ana , Claudenice Leite Bertoli: Garcia, Júlia Helena: Lopes, Juliana de Lima: de Barros, Alba Lucia Bottura Leite, 2012). The nurses are required to have knowledge on most occurring complications during intra-hospital transport.

In the review of the literature titled, intra hospital transport policies: The contribution of the nurse by Alamanou in 2014 found that the most occurring complications during intra-hospital transport of very sick patients is related to a decrease in partial pressure of oxygen in blood (PaO<sub>2</sub>) and in blood oxygen saturation (SpO<sub>2</sub>), increased heart rhythm and arrhythmia which nurses are at the fore front to fix (Alamanou, 2014).

The study done by Day (2010) has added that loss of airways, acute obstruction, respiratory arrest, hypoxemia, pneumonia, pneumothorax, cardiac arrest, bleeding, air embolism, increased intracranial pressure, spinal cord injury destabilization are the major systemic side effects that occur due to unsafe patient transportation.

### **2.3.3. Factors associated with complications during intra-hospital adult patients transport**

Literature reports that around 30-70 % of intra-hospital transport of critically ill patients are associated with adverse events. Ringdalin (2016) highlighted in a report presented in a conference on "What's new in ICU: Conference Edinburgh Critical Care Research Group 2016" that complications occurred during the intra-hospital transport of seriously ill adult patients are hospital system related whereby most them are due to insufficient or malfunctioning of the equipment, staff organization as well as poor planning (Ringdal, 2016).

The same study stresses that the most risk factor for complications is the equipment, whereby among the unexpected events observed to transported patients, 45.9% were attributed to equipment, the health institution system contributed to 25.8% of observed complications (Ringdal, 2016). This is consistent with what was found in Brasil that 7.1% of complications

were attributed to equipment and other 7.1% were attributed to the institution system and personnel (Alamanou and Brokalaki, 2014). Patients condition was also reported on where 26.2% were attributed to the patient's condition and its severity (Schwebel *et al.*, 2013; Skinnes, Madsen and Rn, 2013; Alamanou and Brokalaki, 2014).

#### **2.3.4. Prevention of intra-hospital transport complications**

Preventing complications of intra hospital transport of critically ill patients is of importance. Different measures should be taken into consideration. One of the reported measure is to ensure that the personnel involved have the necessary skills. Blakeman and Branson (2013) reports that regarding the personnel involved in patient transport, the creation of an intra-hospital transport team is necessary for safe transfers in hospitals. However, this team is insufficient if it does not consist of properly trained and qualified personnel. The frequency of complications related to patient transport within the hospital has to be minimized therefore the greatest benefit is in using the trained transport team for patient safety during transport (Blakeman and Branson, 2013).

In addition, boosting communication between staff of the sending and receiving departments is key to reduce delays in the procedure as well as efficiency in documentations of all patients movement carried during transport, Specifically everyday transport documentation should be kept and evaluated in order to identify possible errors and correct transport technics. This process was confirmed in Winter's study, conducted in Australia, which showed that despite the implementation of guidelines, in 44% of transport, adverse events did occur, the majority of which could be prevented with careful planning and better communication between the personnel (Winter, 2010).

#### **2.3.5. Nurses knowledge of intrahospital transportation**

Nurses knowledge of intrahospital transport of critically ill patients was assessed through the transportation process reported in the literature. The study conducted to assess the intrahospital transport knowledge of the nurses, and student nurses working in the trauma unit studied aspects of knowledge of IHT, knowledge on the existing policies (pre-planning, personnel, equipment and medication requirements as well as communication) (Shields, Overstreet and Krau, 2015). The results of participants knoweldge of pre-planning phase revealed that 50% of the studied population were able to correctly answer that anesthesiologist should be the one to determine who is transpoted directly to surgery by the transportation team. It was further reported that 35% of the study participants incorrectly

mentioned the surgeon should be the one to determine who to transport from one department to another. The same results indicated that 74% of the respondents mentioned that pre-planning involves team work.

The same authors (Shields, Overstreet and Krau, 2015) reported the results on knowledge of participants on element 2, which is personnel involved in intrahospital transportation of critically ill patients. They highlighted that with reference to the standard that at least 3 personnel have to be included in transporting a critically ill patient, the study results show that the majority of the participants (63%) recognized that the anesthesiologist have to evaluate the patients before he/she is transported and recognize the role of team work in this process.

Knowledge of the participants on element 3, which is equipment required to safely transport critically ill patients, report that 98% knew that the aneathetist is the one in charge of equipment. The results further added that 61% of the participants revealed that monitoring of blood pressure should be done and kept at the same level as what the patient had when he/she was in ICU. The last core element assessed was communication which requires 2-way communication with anticipatory guidance. At this point, the majority (66%) of the participants revealed that review of documents and request of missing information is the key element for communication among the IHT team.

The results indicated knowledge deficit among the intrahospital transportation team where knowledge of the nurses on 5 core elements of intrahospital transport was relatively low in most of them, considering the study to have been conducted in hospital environment (Shields, Overstreet and Krau, 2015).

Another qualitative study conducted in Salvador to ascertain nurses' knowledge of intrahospital transport of critically ill patients under three themes namely nurses involvement in preparation of the patient for transportation, nurses accompanying transportation of critically ill patients and nurses role after transportation, revealed that most nurses had the required knowledge but training was recommended for improvement (Pedreira *et al.*, 2014).

A qualitative study conducted to explore critical care nurses' and physicians' experiences and practices associated with critical incidents during the transfer process in critically ill patients in one University hospital in Swedish metropolitan, revealed that organizational prerequisites, professionals skills and attributes as well as actions and behaviors of safely

performing transfers are important aspects to be looked into during transportation. It has added that nurses have shown to have abilities to handle unexpected events and suggested that teamwork and nurses' performance, when it matters, are the best practices that nurses need to have to ensure a safe intrahospital transport (Bergman *et al.*, 2018).

#### **2.4. Research gap identification**

Few of the studied literature take into account knowledge, attitude and practices especially among nurses, and has mainly focused on the general population. The studies conducted in this area were mainly focusing on procedures, equipment, and guidelines in place. It is in addition evident that the published literature on the topic is accumulated in developed countries and very scarce in the developing world.

Hospitals in different countries developed patient transport guidelines with reference to the ones established in developed countries, but not all hospitals have the guidelines or follow them as set (Alamanou and Brokalaki, 2014).

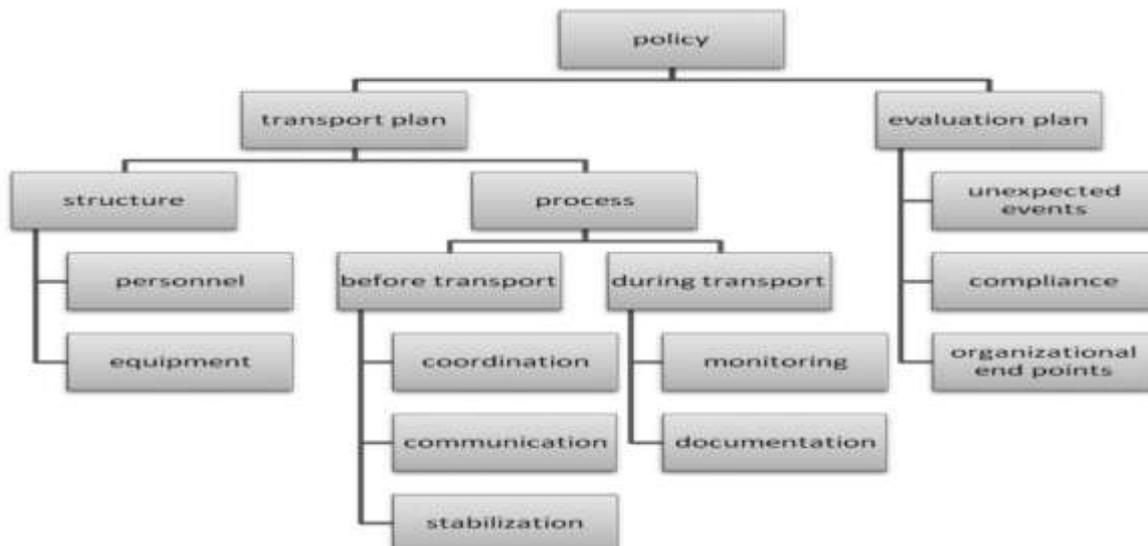
The knowledge, attitude and practice, specifically of the nurses on this topic, are not well known on the existing body of knowledge in the developing world and particularly in Rwanda.

#### **2.5. Conceptual framework**

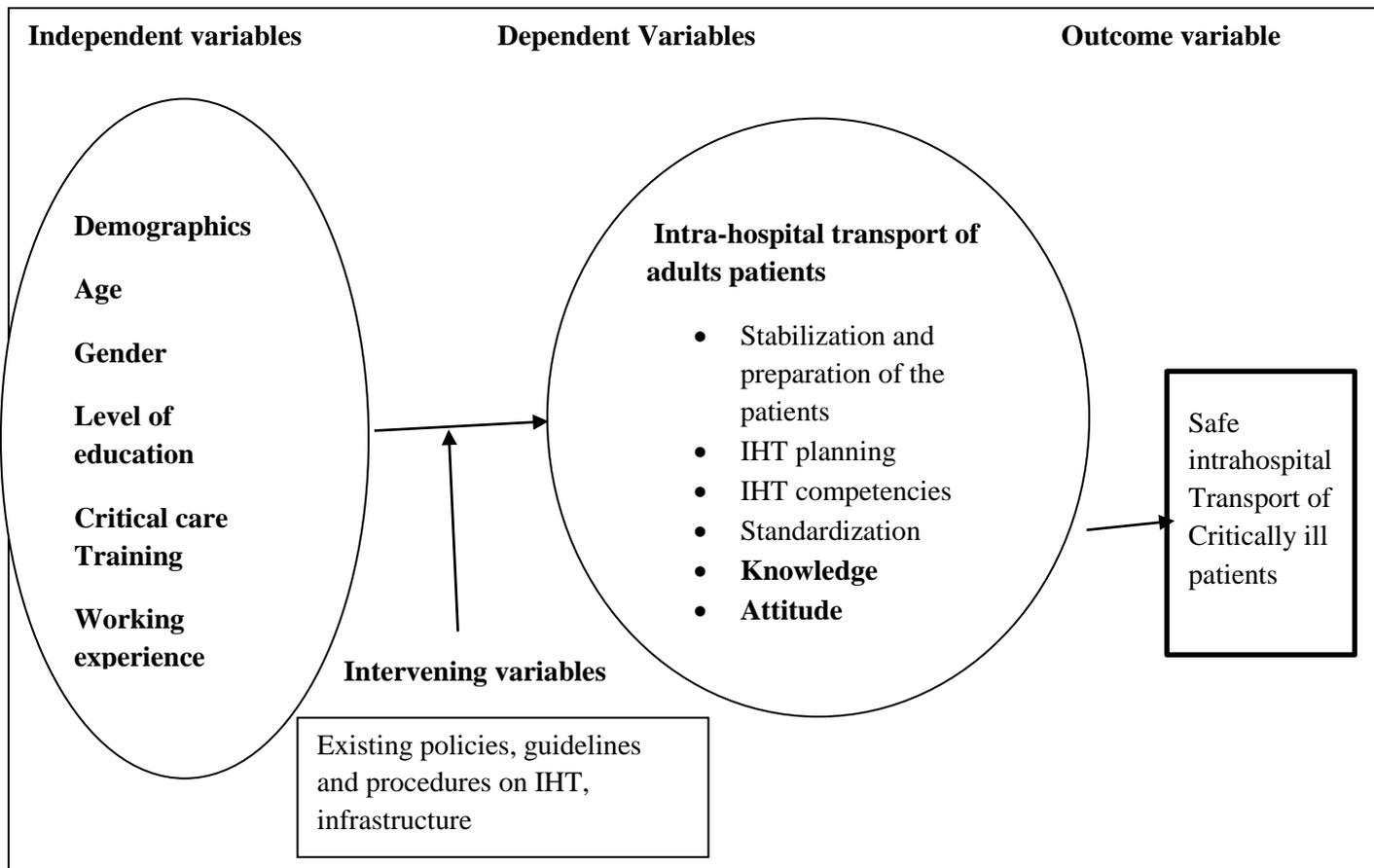
Nursing theories, frameworks or models are sets of processes that guide research from practice, and having research set on nursing theories required for continuous development of nursing as a profession and science (Dnsc, Eshah and Member, 2011). Different theories exist but the present study is guided by the framework which highlights the variables under study. Demographic variables, nursing experience, level of education are the independent variables to influence knowledge on IHT process. Existence of policies and procedures in place to guide that practice and infrastructure in place are intervening variables.

Knowledge, attitude and practice of nurses towards intra-hospital management constitute dependent variables which may be modified by any change in independent variables. The model stipulates that nurses are expected to monitor patients according to their prior knowledge and be guided by the existing policies in their institutions. For the purpose of the present study, this model will be useful in measuring the variables under study and report possible relationships.

The present model was adapted from the original model by Jones *et al.*, (2016) which highlights that evaluation of all aspects mentioned coupled with patient transport plan and evaluation to influence the patient stabilization is key for better health outcomes as follows:



**Figure 2.2. Original conceptual framework: standardized evaluation plan for intra-hospital transport of critically ill adults (Jones et al., 2016).**



**Figure 2.3. Conceptual framework adapted from (Jones et al., 2016)**

## 2.6. Conclusion

The transport of critically ill patient within the hospital is still a global challenge. The literature shows that there is a gap between availability and the use of standardized guideline /checklist and for analyzing and improving transport of critically ill patients. In addition, little is known about complications that occur during transport to prevent its occurrence. On the other hand, hospitals all over the world have established policies based on published guidelines, but not every hospital follows guidelines due to lack of resources and trained personnel. In Rwanda, the existing literature does not show the published work on nurse'knowledge, attitude and practice on intrahospital transportation.

## **CHAPTER 3. METHODOLOGY**

### **3.1. Introduction**

Chapter three presents the methods and principles to be used in this research. It highlights study area, design, study population, sample size and sampling strategy, instruments, data collection procedure, data analysis and ethical consideration.

### **3.2. Study design**

A descriptive cross-sectional design was used to assess knowledge, attitudes and practices of nurses on intra hospital transportation management of critically ill adult patients. Quantitative cross-sectional research involves a phenomena of collecting numerical data that are analyzed using mathematically based methods at a given point in time (Alversia, 2011). The present study used this design due to the timeframe which requires the researcher to collect the data and be able to provide report in agreed timeframe which is contrary to other design which require the researcher to observe or participate in the research for a long period of time.

### **3.3. Research approach**

In this study, a researcher used a quantitative approach, where a set of closed ended questions were used to report on knowledge and attitude. An observation checklist organized according to the study objectives has also been used to assess nurses' practice towards intra-hospital transportation management of the critically ill patient of the two selected referral hospitals.

### **3.4. Research setting**

The researcher has conducted the study in two selected public referral hospitals in Kigali specifically the Rwanda Military Hospital (RMH), and Kigali University Teaching Hospital (KUTH). RMH is located in Kigali City, Kicukiro district and Kanombe sector. This hospital receives national and international patients and it has a mandate to treat patients and serve as a teaching Hospital. RMH has a capacity of 250 bed , and receives both civilian and military patients. The hospital offers a variety of services through different department such as: internal medicine, surgical, pediatrics, ICU, and other specialized departments. The RMH ICU has 7 beds, receives patients from one month and above and it is a general mixed ICU. The average admissions of ICU, is between 14 and 18 patients per month (RHH, ICU report book 2018).

The UTHK is located in Kigali City, Nyarugenge District. The hospital receives national and international patients, with a capacity of 445 beds. It has different departments such as, internal medicine, surgical, pediatrics, ICU and other specialized department. The KUTH has a general mixed ICU with a capacity of 7 beds and PICU (Pediatrics intensive care unit) which has a capacity of 3 beds.

### **3.5. Target population**

The study population were nurses working in emergency, ICU and theater at RMH and KUTH due to the fact that intra-hospital transport of the critically ill patients is performed by the mentioned nurses at a highest level in comparison to other services in the health care system. To date, according to the data from the study sites, a total of 181 nurses were part of the population from emergency, ICU and operating theater of KUTH and RMH. At KUTH: ICU: 31 nurses, Emergency: 44 nurses and theater: 30 nurses. At RMH hospital, ICU : 26 nurses; 30 nurses in Emergency and Operating Theater: 20 nurses.

#### **3.5.1. Inclusion criteria**

To be enrolled in this study the nurse had to be :

1. Registered with the Rwanda Nurses and Midwives Council
2. Working in selected units : ICU, Emergency, Operating Theater.
3. Nurses who voluntarily wanted to participate

#### **3.5.2. Exclusion criteria**

1. Nurses with working experience of less than 6 months in current units
2. Nurses who were on leave during data collection.
3. Nurses who refused to participate.

### 3.6. Sampling

#### 3.6.1. Sample size

Sample size was computed using statistical formula of Yamane (1967:886), which states that, for any given population, the required sample size is calculated by:

$$n = \frac{N}{1 + N(e)^2}$$

Where: n=the required sample size; N =the known population size; and e= the margin error, which is =0.05.

Given a total population of 181 nurses,  $n = \frac{181}{1+181(0.05)^2} = 124$

#### 3.6.2. Sampling strategy

A Proportional sampling methods were used to get participants from different services where participants were allocated from different units according to their numbers (Alversia, 2011).

Proportional sampling was used to calculate samples using the rule of three to get participants from the services to be described as follows:

**Table 3.1. Sampling strategy**

HOSPITAL	SERVICES	ACTUAL POPULATION	SIMPLE PROPORTION CALCULATION	SAMPLE
<b>KUTH</b>	ICU	31	124*31/181	21
	Emergency	44	124*44/181	30
	Operating Theater	30	124*30/181	20
<b>RMH</b>	ICU	26	124*26/181	18
	Emergency	30	124*30/181	21
	Theater	20	14*20/181	14
<b>TOTAL</b>	<b>181</b>			<b>124</b>

### **3.7. Data collection**

#### **3.7.1. Data collection instruments**

The study instruments are sets of the tool to be used in the study to answer the objectives of the study. The questionnaire and observation checklist were used as a tool for data collection. The questionnaire comprised of closed ended questions and it has 3 sections : The first section reported on demographic characteristics of the respondents and had four items: Age, Gender, Education level and years of experience. The second section had 17 questions which were assessing knowledge of nurses regarding IHT, then section three consisted of 13 items in Likert scale format for determining attitude of nurse on IHT. The observation checklist in a separate tool which report on the current state of the art of practices towards IHT was used to establish nurses' practice of transport of critically ill adult patients.

The tool was in English version as study participants use it in their day to day activities.

#### **3.7.2. Validity and reliability of research instruments**

The used questionnaire was developed and tested in the Netherlands context to provide a guide on how intra hospital transport of critically ill patients can be done (Anja et al. 2015). The permission to use the tool was requested by the author and it was granted (appendix1).

Some questions were removed, others adapted. A consensus approach with experts in critical care was used to confirm the validity of the modified questionnaire.

The pilot study was done on 9 nurses to test if the questionnaire was readable and easily understandable, before the actual data collection. In response to the results from the pre-test, errors were corrected and adopted in the questionnaire and observation checklist. Finally, the Cronbach Alpha was calculated for both knowledge and attitude (0.726), practice (0.7570) to confirm the reliability of the questionnaire by test- retest on two occasions of the pilot of the instrument on the same population, and the cronbach alpha were greater than the recommended value of 0.7 .

**Table 3.2. Content validity of the tool**

<b>Objectives</b>	<b>Framework</b>	<b>Data collection tool</b>
To determine the knowledge of nurses on intra-hospital transportation management of critically ill adult's patients	Knowledge on Stabilization and preparation of the patients, IHT planning , IHT competencies , Standardization,	Section 2: questions related to knowledge1-17
To assess the attitude of nurses on intra-hospital transportation management of critically ill adult patients	Attitude	Section 3: questions related to attitudes 1-13
To determine the practice of nurses with regard to intra-hospital transportation management of critically ill adult patients	Practice	Section 4: questions related to practice1-37
To determine the relationship between demographic variables and knowledge, attitude and practice of nurses toward intra-hospital transportation management of critically ill adult patients	The link between age, gender, nurses working experience,level of education , critical care training with knowledge, attitude, and practice	See chap 4 (analysis)

**3.7.3. Data collection procedure**

The data were collected from nurses working in ICU, Emergency and Operating Theatre at the study sites.

First of all, all necessary permission was sought from both University and the study site to ensure ethical standards. After that participants were approached in their respective departments through their supervisors. Working hours were respected as the sites are busy departments within hospitals settings, hence the time before and after work were suitable for introduction to the participants. Thereafter, respondents who voluntarily agreed to participate signed a consent to ensure full participation, those who did not accept to continue to participate were respected.

The questionnaire was coded according to hospital, department, and participant to ensure the follow up of the questionnaire accordingly. The study instruments were then self-administered to the participants who voluntarily agreed to participate in order to allow them to have time to read and understand the tool. The participants were given only one day to return the questionnaires. Upon return, all questionnaires were given a code for ease of data entry and management.

The returned questionnaires were kept by the researcher in a locked cabinet so that security of the data is assured. Participants were assured of the security of their data until they are destroyed as regulated by the University Policy on destruction of the research data. The observation of participants' practice on intra-hospital transportation was done in one month for 20 participants.

### **3.8. Data analysis**

After the data were collected, questionnaires were checked one by one to confirm the quality of the collected data. The data was analyzed quantitatively with a descriptive statistics by means of SPSS version 21. The percentages, mean, and standard deviations were used to report the descriptive data.

The relationship between independent and dependent variables was tested with Pearson's chi-square at 95% Confidence interval, standard error of 0.05 and P- Values below 0.05 was considered significant. No attempts were done to report on multivariate analysis due to the fact that only two variables were reported to have a significant association. In addition, the relationship between socio-demographics and practice were not measured as the sample for observations was too small (20) to be crosstabulated with demographic variables.

The level of knowledge, attitude and practice were measured by computing questions related to each objective where the cut off for knowledge and attitude were set according to the UR academic standards as follows: Low level of knowledge and practice is set at < 60% of the total scores while moderate level were set between 61% to 79% of the total scores. The highest level of both knowledge and practice were set at all scores above 80% of the total scores. Positive Attitude cut off was set at all scores of 70% and above of the total, and scores < 70% was considered as negative attitude towards intra-hospital transportation.

### **3.9. Ethical considerations**

Ethics clearance for the present study was sought from the University of Rwanda, College of Medicine and Health Sciences Institutional Review Board. In addition, permission letters

were sought in all study sites. Participants were informed about their freedom to participate or not and that they could withdraw from the study at any time without sanction. All selected participants signed a written consent form before their participation in the study. The questionnaire were anonymous, self-administered and coded and submitted in sealed envelopes in observance of anonymity, confidentiality and privacy.

Hard copies were kept confidential in locked cupboard, soft data were protected with password, only known to the researcher and the information provided by the participants is not available for the public. The results of this research will be shared with research sites and publication will be done through scientific journal.

### **3.10. Data management**

Collected data were coded and entered in a computer using SPSS version 21. Microsoft excel was used to clean tables for the readability. After data analysis the soft copy were kept by the researcher in a computer locked by a password, and hard copies were stored in a locked cupboard and will be kept up to 5 years according to the university of Rwanda rules and regulations.

### **3.11. Data dissemination**

After data analysis, the data shall be shared at the University level, presented in staff meetings at the study sites and published in scientific journals for a wider audience.

### **3.12. Problems and limitations**

The present study is limited in scope because only two hospitals were the target and this may reduce the generalizability of the results. The fewer IHT cases than that was expected caused having a small sample size for observation, consequently did not allow calculation of its relationship with demographic variables of the main study.

### **3.13. Conclusion**

Chapter three reported the methodology used to respond to the research objectives which highlights introduction, research design, research approach, setting, population, sampling, sampling strategy, sample size, data collection instruments, validity and reliability of the instrument as well as content validity relating to the objectives, data collection procedure, analysis, ethical consideration, data management, data dissemination and limitation and problems.

## **CHAPTER 4. RESULTS AND INTERPRETATION**

### **4.1. Introduction**

Chapter four presents the results in relation to the objectives of the study. It starts by the response rate, the socio-demographic data followed by the level of knowledge, attitude, practice of nurses on intra-hospital transportation management of critically ill adult patients. Finally it presents the relationship between demographic variables and knowledge, practice of nurses towards intra-hospital transportation management of critically ill adult patients in selected referral hospitals in Kigali.

The levels of knowledge and practice were classified according to the University of Rwanda standard of learning outcomes measured criteria which state that the score < 60% is low, 60-79% is moderate,  $\geq 80\%$  is considered high level. For attitude, all scores of 70% and above was considered as positive and < 70% scores was considered as negative attitudes.

### **4.2. The response rate**

The study sample size was 124 nurses of two referral hospitals in Kigali. All 124 out of 124 participated in the research to make the response rate 100%.

### **4.3. Socio-demographic data**

The data in table 4.1 below shows that the majority of the participants were males 75(60%) and 49(40%) were females. Most of them were between 30-39 age group (59(48%)) and holding a bachelor's degree were 68(55%). Less than half (59(48%)) had training in critical care nursing while almost all of them 119(96%) had been involved in transporting critically ill patients. Most of the participants (73(59%)) had 5 years and above of working experience.

**Table 4. 1. Socio-demographic characteristics**

<b>Variables</b>		<b>N</b>	<b>%</b>
<b>Name of the Hospital</b>	KUTH	70	56
	RMH	54	44
Total		124	100
<b>Age</b>	20-29	24	20
	30-39	59	48
	40 and above	39	32
Total		124	100
<b>Gender</b>	Male	75	60
	Female	49	40
Total		124	100
<b>Education level</b>	A2	3	2
	Advanced diploma (A1)	39	31
	Bachelor's degree (A0)	68	55
	Master s degree	14	11
Total		124	100
<b>Working experience</b>	6 months – 1 year	7	6
	1 year – 3years	18	15
	3 years -5years	26	21
	5 years and above	73	59
Total		124	100
<b>Training in critical care nursing</b>	Yes	59	48
	No	65	52
Total		124	100
<b>Involvement in transporting critically ill patients</b>	Yes	119	96
	No	5	4
Total		124	100

#### **4.4. Knowledge of the participants on intra-hospital transportation**

This section reports on levels of knowledge of nurses on intra-hospital transportation management of critically ill patients. The results in table 4.2. below indicate that all participants (124(100%)) were involved in transporting critically ill patients, and all participants answered correctly on the purpose of ITH. The knowledge of purpose of intra-hospital transportation from ICU to step down units or high dependency unit on improvement was positively reported by 115 nurses or 92.7%. In general, affirmative rate on the knowledge of the purpose for intra-hospital transportation was higher than 90%. For the knowledge of the existence of transport tools, all participating nurses (124(100%)) mentioned that they did not have checklists used to transport critically ill patients. Only 40 nurses (32.3%) reported to know the protocol and 29(23.4%) knew the algorithm to follow. The calculated average on all correct responses to tools available only 26(20.97%) have indicated that they had knowledge on transportation tools of critically ill patients while 98(79.03%) didn't have knowledge on those guides.

Most of the participants (119(96%)) mentioned that before the transport of a critically ill patient, they establish the best route through the hospital to the destination, 115(92.7%) reported that the destination of the patient is well prepared, 118(95.2%) said they establish a reasonable time slot for transporting a critically ill patient and 108(87.7%) indicated that they had knowledge on the preparation and availability of accessories for connecting the patient equipment. On average, 115(92.74%) nurses said they established the required environment and equipment needed in transportation of critically ill adult patients.

The results in the same table show that the transportation team is mainly formed by an ICU trained nurse with Intensivist and porter 58(46.8%). However, considering all questions, the majority of nurses 115(92.7%) affirmatively responded on transport team members.

Of 124 nurses 87(97.6%) responded correctly on what to check on equipment before transport. About the minimum level of oxygen in oxygen cylinder before transport only 31(34.5%) gave a correct response. Most participants 117(83.475%) reported to communicate to co-oworkers on leaving the unit before transport, 103(83.475%) stated that the responsibility of each team member is discussed before transport. A small majority (70(56.8%)) admitted not to record parameters during transport. Only 31(25%) knew when administration of extra medication during transportation is necessary.

Table 4.2 also shows that 100(80.6%) participants confirmed to always keep the visual of monitor facing them during transport of patients. It is also indicated that 71(57.3%) participants always prepared the receiving unit to host the critically ill patients. It was reported that 46(37.1%) participants knew the need for continuous ventilation during exposure of rays while wearing protective gear. Contrary, the participants who interrupt ventilation are a majority (74(59.7%)). The commonly known adverse incident during transportation was oxygen cylinder running empty as reported by 74(59.7%) participants.

In addition, the performance of quality improvement review process post transportation was on average confirmed by 117(94.5%) participating nurses.

**Table 4. 2. Description of knowledge related questions**

Variables	Yes		No	
	n	%	n	%
<b>Involvement in transporting critically ill patients</b>	124	100	00	00
<b>The purpose for intra-hospital transportation</b>				
1. From ICU to theatre for surgery	121	97.6	3	2.4
2. From theatre to ICU postoperatively	118	95.2	6	4.8
3. From ICU to Radiology department for diagnostic procedure	124	100.0	00	0.0
4. From Emergency to ICU for admission	124	100.0	00	0.0
5. From emergency to theatre	124	100.0	00	0.0
6. From emergency to radiology	120	96.8	4	3.2
7. From ICU to Step Down Units or High Dependency Unit on improvement	115	92.7	9	7.3
<b>Having patient transportation tools</b>				
1. Protocol	40	32.3	84	67.7
2. Checklist	00	0.00	124	100
3. Guideline	35	28.2	89	71.8
4. Algorithm	29	23.4	95	76.6
<b>Before the transport of critically ill patient you establish the following</b>				
1. Destination well	115	92.7	9	7.3
2. The best route through the hospital to the destination	119	96.0	5	4.0
3. Time slot for the critically ill patient	118	95.2	6	4.8
4. Available accessories for connecting the patient equipment	108	87.1	16	12.9
<b>Transport team members</b>				
1. Experienced nurse with porter	6	4.8	118	95.2
2. ICU trained nurse with Resident and Porter	51	41.1	73	58.9
3. ICU trained nurse with Intensivist and porter	58	46.8	66	53.2
4. Experienced nurse with Resident	4	3.2	120	96.8

<b>What to check on equipment</b>				
1. Availability of equipment	3	2.4	121	97.6
2. Functionality of equipment	107	86.3	17	13.7
3. Adequacy of equipment	117	94.4	7	5.6
4. Extra equipment	121	97.6	3	2.4
<b>Level of oxygen</b>				
1. 100 bar	28	22.6	96	77.4
2. Not less than 80 bar	74	59.7	50	40.3
3. Above 50 bar	41	33.1	83	66.9
4. At least 40 bar	4	3.2	120	96.8
<b>Informed person when leaving the department for transport</b>				
1. Colleague	117	94.4	7	5.6
2. Unit Manager	71	57.3	53	42.7
3. Shift Leader	120	96.8	4	3.2
4. Receiving department	117	94.4	7	5.6
<b>Responsibility during transport</b>				
1. Airway management and ventilation	113	91.1	11	8.9
2. Intravenous lines	101	81.5	23	18.5
3. Communication	103	83.1	21	16.9
4. Monitoring and documentation	97	78.2	27	21.8
<b>Recorded parameters during transport</b>				
1. Vital signs	24	19.4	100	80.6
2. Medication given during transport and procedure	65	52.4	59	47.6
3. Intravenous fluid at the appropriate interval	62	50.0	62	50.0
4. Any adverse incident that occurred during transportation	63	50.8	61	49.2
<b>Administration of extra medication during transportation</b>				
1. Always	11	8.9	113	91.1
2. Often	2	1.6	122	98.4
3. Occasionally	10	8.1	114	91.9
4. When necessary	31	25.0	93	75.0
5. If prescribed	7	5.6	117	94.4
6. Never	1	.8	123	99.2

<b>Position the visual of the monitor turned towards the staff for continuous monitoring during transport</b>				
1. All the time	110	88.7	14	11.3
2. Frequently	100	80.6	24	19.4
3. Occasionally	11	8.9	113	91.1
4. Not possible	9	7.3	115	92.7
5. Never	2	1.6	122	98.4
<b>The receiving units is ready</b>				
1. Always	71	57.3	53	42.7
2. Often	42	33.9	82	66.1
3. Sometimes	120	96.8	4	3.2
4. Never	1	.8	123	99.2
<b>Continuous ventilation during exposure to lays</b>				
1. Put on protective apron/gear and continue to ventilate patient manually	46	37.1	78	62.9
2. Interrupt manual ventilation during exposure of rays	50	40.3	74	59.7
3. The patient would rather not be scanned if mechanically ventilated	14	11.3	110	88.7
<b>Adverse incident during transport</b>				
1. Oxygen cylinder running empty	74	59.7	50	40.3
2. Deterioration in vital signs	39	31.5	85	68.5
3. Desaturation	29	23.4	95	76.6
4. Cardiorespiratory arrest	24	19.4	100	80.6
5. Hypothermia	15	12.1	109	87.9
6. Agitation	50	40.3	74	59.7
<b>Quality Improvement review process</b>				
1. Evaluation of the intra-hospital transport process	116	93.5	8	6.5
2. Analyzing the incident reports	115	92.7	9	7.3
3. Involving multidisciplinary team in the analysis	116	93.5	8	6.5
4. Initiation of corrective actions for future transport	115	92.7	9	7.3
5. Communicate corrective actions to all involved in transport	124	100	0	0

#### 4.5 .The level of knowledge of participants on intrahospital transportation

This section reports on the level of knowledge of participants by computing all knowledge questions and came up with knowledge scores. The level of knowledge was calculated by means of conventional knowledge scaling whereby on a percentage scale, participants who scored less than 60% of the scores were categorized as having low level of knowledge, the scores between 60% to 79% were classified as moderate level while scores of 80% and above were reported to be high level of knowledge. The scoring is based on University of Rwanda system of grading (University of Rwanda, 2018) In total, 4(3.2%) of nurses had low level of knowledge, 112 (90.3%) had moderate level of knowledge, while 8(6.5%) had high level of knowledge towards IHT.

**Table 4. 3. Distribution of Knowledge scores**

Variables	Scores/75	N (%)	Percentage of knowledge	Level of knowledge
Knowledge	42.00	1(.8)	56%	Low level of knowledge
	43.00	1(.8%)	57%	
	44.00	2(1.6%)	59%	
	45.00	1(.8%)	60%	Moderate level knowledge
	46.00	2(1.6%)	61%	
	47.00	2(1.6%)	63%	
	48.00	2(1.6%)	64%	
	49.00	3(2.4%)	65%	
	50.00	4(3.2%)	67%	
	51.00	9(7.3%)	68%	
	52.00	7(5.6%)	69%	
	53.00	9(7.3%)	71%	
	54.00	12(9.7%)	72%	
	55.00	11(8.9%)	73%	
	56.00	12(9.7%)	75%	
	57.00	9(7.3%)	76%	
	58.00	12(9.7%)	77%	
	59.00	17(13.7%)	79%	
	60.00	7(5.6%)	80%	High level of knowledge
	61.00	1(.8%)	81%	

#### **4.6. Attitude of the participants on intra-hospital transportation**

This section (Table 4.4.) reports on participants' attitude towards intra-hospital transport of critically ill patients. The results in tables 4.4. show that 24(19.4%) of the participants strongly agreed with the statement that they felt very confident in transporting critically ill patients to various units/departments. Other participant; 1(8.1 %) strongly disagree with the belief that they cannot understand so much about pre-transport preparation of the critically ill patient. Most of them (60.5%) agreed that the team used for transporting patients is never discussed nor planned while 5(4%) strongly disagreed on the statement that the team used for transporting patients is never discussed nor planned. Few nurses; 5 (4%) strongly disagreed that some equipment used for transporting patients are hard to operate.

Some participants 6(4.8%) strongly disagreed that the nurse can only transport patients with confidence if some direction in the form of protocol or checklist can be developed. It is also shown that 4(3.2%) strongly disagreed that participants never find time to prepare for transport of patients because everything is done in a rush. Most participants; (53(42.7%)) strongly disagreed that they feared transporting critically ill patients because they had had many adverse events during patient transportation predominantly equipment failure. The participants 27(21.8%) strongly agreed with the statement that they had never been confident in transporting patients because they had never had any training on it even in-service. A few participants (11(8.9%)) disagreed that more often than not they had found missing medication during transportation. It is also reported that 21(16.9%) participants strongly agreed that the report they receive about transfers is very comprehensive and directive to continuity of care.

**Table 4. 4. Attitudes questions (N=124)**

Variables		N	%
I feel very confident in transporting critically ill patients to various units/departments	Strongly Disagree	3	2.4
	Disagree	29	23.4
	Not sure	15	12.1
	Agree	53	42.7
	Strongly agree	24	19.4
	<b>Total</b>	<b>124</b>	<b>100</b>
I cannot understand so much about pre-transport preparation of the critically ill patient.	Strongly agree	7	5.6
	Agree	52	41.9
	Not sure	9	7.3
	Disagree	46	37.1
	Strongly disagree	10	8.1
	<b>Total</b>	<b>124</b>	<b>100</b>
Some equipment used for transporting patients is hard to operate	Strongly agree	8	6.5
	Agree	52	41.9
	Not sure	11	8.9
	Disagree	48	38.7
	Strongly disagree	5	4.0
	<b>Total</b>	<b>124</b>	<b>100</b>
The team used for transporting patients is never discussed nor planned	Strongly agree	16	12.9
	Agree	75	60.5
	Not sure	15	12.1
	Disagree	13	10.5
	Strongly disagree	5	4.0
	<b>Total</b>	<b>124</b>	<b>100</b>
I can only transport patients with confidence if some direction in the form of protocol or checklist can be developed	Strongly Disagree	6	4.8
	Disagree	25	20.2
	Not sure	12	9.7
	Agree	27	21.8
	Strongly agree	54	43.5
	<b>Total</b>	<b>124</b>	<b>100</b>

One never finds time to prepare for transport of patients because everything is done in a rush	Strongly agree	11	8.9
	Agree	63	50.8
	Not sure	18	14.5
	Disagree	28	22.6
	Strongly disagree	4	3.2
	<b>Total</b>	<b>124</b>	<b>100</b>
I fear transporting critically ill patients because we have had many adverse events during patient transportation predominantly equipment failure	Strongly agree	10	8.1
	Agree	29	23.4
	Not sure	10	8.1
	Disagree	22	17.7
	Strongly disagree	53	42.7
	<b>Total</b>	<b>124</b>	<b>100</b>
I have never been confident in transporting patients because I have never had any training on it even in-service	Strongly Disagree	11	8.9
	Disagree	35	28.2
	Not sure	8	6.5
	Agree	42	33.9
	Strongly agree	28	22.5
	<b>Total</b>	<b>123</b>	<b>100</b>
I hate transporting patients to Radiology Department because I get exposure to radiation for having to continuously ventilate a patient without a portable ventilator	Strongly Disagree	10	8.1
	Disagree	17	13.7
	Not sure	18	14.5
	Agree	19	15.3
	Strongly agree	60	48.4
	<b>Total</b>	<b>124</b>	<b>100</b>
More often than not we have found missing medication during transport	Strongly agree	12	9.7
	Agree	24	19.4
	Not sure	15	12.1
	Disagree	62	50.0
	Strongly disagree	11	8.9
	<b>Total</b>	<b>124</b>	<b>100</b>

The receiving units are very welcoming and ready each time we transfer our critically ill patients	Strongly Disagree	2	1.6
	Disagree	19	15.3
	Not sure	14	11.3
	Agree	66	53.2
	Strongly agree	23	18.5
	<b>Total</b>	<b>124</b>	<b>100</b>
The report we receive about transfers is very comprehensive and directive to continuity of care	Strongly Disagree	2	1.6
	Disagree	7	5.6
	Not sure	18	14.5
	Agree	76	61.3
	Strongly agree	21	16.9
	<b>Total</b>	<b>124</b>	<b>100</b>
I always relax when I am transporting a critically ill patient with an intensivist	Strongly agree	2	1.6
	Agree	9	7.3
	Not sure	12	9.7
	Disagree	34	27.4
	Strongly disagree	67	54
	<b>Total</b>	<b>124</b>	<b>100</b>

#### 4.7. Distribution of attitudes scores

The results in Table 4.5 report on level of attitude that is negative if scores are below 70%; otherwise the attitude level is positive. The total of 66(53.2%) participants had negative attitudes while 58(46.8%) of them had positive attitude. The minimum score was 38% and maximum score was 97% .

**Table 4. 5. Distribution of attitude scores**

Variables	Scores/65	N(%)	Percentage of attitude	Level of attitude	
Attitude	25.00	1(.8%)	38	Negative attitude	
	28.00	1(.8%)	43		
	30.00	2(1.6%)	46		
	31.00	1(.8%)	48		
	32.00	1(.8%)	49		
	33.00	4(.8%)	51		
	34.00	2(1.6%)	52		
	35.00	1(.8%)	54		
	36.00	2(1.6%)	55		
	37.00	2(1.6%)	57		
	38.00	6(4.8%)	58		
	39.00	11(8.9%%)	60		
	40.00	11(8.9%)	62		
	41.00	3(2.4%)	63		
	42.00	1(.8%)	65		
	43.00	7(5.6%)	66		
	44.00	6(4.8%)	68		
	45.00	4(3.2%3.2	69		
	46.00	4(3.2%	71		Positive Attitude
	47.00	7(5.6%)	72		
48.00	7(5.6%)	74			
49.00	7(5.6%)	75			
50.00	5(4.0%)	77			
51.00	11(8.9%)	78			
52.00	6(4.8%)	80			
54.00	8(6.5%)	83			
57.00	2(.8%)	88			
63.00	1(.8%)	97			
Total	124				

#### 4.8. The level of practice of participants on intrahospital transportation

This section (Table 4.6) reports on observed practice of 20 participants towards intrahospital transportation. The results in Table 4.6 show that most participants 12(60%) in this study did not carry a transport bag when transporting critically ill patients. However, the majority 14(70%) had a portable cardiac monitor with accessories. All participants 20(100%) did not have a portable defibrillator, portable suction machine and portable mechanical ventilator. The battery for cardiac monitor was reported to be charged by 14(70%) nurses. Oxygen level for cylinder was above 50 bar as observed by Researcher among 15(75%) participants.

Most participants 14(70%) checked and set visual and audible alarms. The cuff pressure of endotracheal tube (ETT) was checked by 7(35%). The depth of ETT was checked by 8(40%) participants. The pre-transport spine position before transport was also checked by 11(55%) participants. The checking of baseline vital signs before was done by 14(70%) nurses. All participants 20(100%) informed the receiving unit, reported to leaving unit, connected back the patient to the mechanical ventilator, connected back the patient to the cardiac monitor and, updated data on cardiac monitor. Nonetheless, all 20(100%) did not: complete the checklist form, continuously monitor and document ventilator settings and document patient transport in statistics book.

**Table 4. 6. Observed practice regarding IHT management of the critically ill patient**

<b>Variables</b>		<b>N</b>	<b>%</b>
Transport bag present	No	12	60
	Yes	8	40
	<b>Total</b>	<b>20</b>	<b>100</b>
Portable cardiac monitor with accessories available	No	6	30
	Yes	14	70
	<b>Total</b>	<b>20</b>	<b>100</b>
Portable defibrillator machine with accessories available	No	20	100
Portable oxygen cylinder available	Yes	20	100

Potable suction machine with accessories available	No	20	100
Portable mechanical ventilator machine with accessories available	No	20	100
Battery for defibrillator machine charged	No	20	100
Battery for cardiac monitor charged	No	6	30
	Yes	14	70
	<b>Total</b>	<b>20</b>	<b>100</b>
Battery for suction machine charged	No	20	100
Oxygen level for cylinder is above 50 bar	No	5	25
	Yes	15	75
	<b>Total</b>	<b>20</b>	<b>100</b>
Equipment operation checked	No	4	20
	Yes	16	80
	<b>Total</b>	<b>20</b>	<b>100</b>
Check and set visual and audible alarms	No	6	30
	Yes	14	70
	<b>Total</b>	<b>20</b>	<b>100</b>
Cuff pressure checked 20-30 cmH <sub>2</sub> 0	No	13	65
	Yes	7	35
	<b>Total</b>	<b>20</b>	<b>100</b>
Depth of Endotracheal Tube	No	12	60
	Yes	8	40
	<b>Total</b>	<b>20</b>	<b>100</b>
Stop enteral feeding	Yes	20	100
Check length of iv tubes	No	13	65
	Yes	7	35
	<b>Total</b>	<b>20</b>	<b>100</b>

Removal of non-essential equipment	No	8	40
	Yes	12	60
	<b>Total</b>	<b>20</b>	<b>100</b>
Pre-transport spine position tried for tolerance	No	9	45
	Yes	11	55
	<b>Total</b>	<b>20</b>	<b>100</b>
Last time nasogastric tube bolus noted	No	8	40
	Yes	12	60
	<b>Total</b>	<b>20</b>	<b>100</b>
Transport root for smooth transport checked	Yes	20	100
Recorded baseline vital signs	No	6	30
	Yes	14	70
	<b>Total</b>	<b>20</b>	<b>100</b>
Receiving unit informed	Yes	20	100
Report coworkers of leaving the unit	Yes	20	100
Transport team verified	Yes	20	100
Checklist form completed	No	20	100
Continuous monitoring and documentation of Ventilator settings	No	20	100
Continuous monitoring and documentation of Vital signs	No	6	30
	Yes	14	70
	<b>Total</b>	<b>20</b>	<b>100</b>
Continuous monitoring on transportation back to the unit	Yes	20	100
Time of arrival to unit noted	No	16	80
	Yes	4	20
	<b>Total</b>	<b>20</b>	<b>100</b>

Connecting back patient to unit equipment eg: Mechanical ventilator	Yes	20	100
Connecting back patient to unit equipment eg:Cardiac monitor	Yes	20	100
Update data on cardiac monitor	Yes	20	100
Untangle iv tubes before reconnection	No	8	40
	Yes	12	60
	<b>Total</b>	<b>20</b>	<b>100</b>
Documentation of transport procedure in patient medical file	No	13	65.0
	Yes	7	35.0
	<b>Total</b>	<b>20</b>	<b>100</b>
Document patient transport in statistics book	No	20	<b>100</b>
Replenish/refill used equipment	No	12	60.0
	Yes	8	40.0
	<b>Total</b>	<b>20</b>	<b>100</b>

#### 4.9.Level of practice scores

Table 4.7 indicates the distribution of practice scores where all scores less than 60% are classified as low, 60-79% as medium and 80% and above as high level of practice. The low level of practice category, which has maximum scores of 21 and the minimum of 12 scores was observed among 15(75%) of observed participants.

The highest category of practice scores (which was actually medium level) was attained by 5(25%) participants with a maximum of 24 scores and minimum of 23 scores. The overall mean (standard deviation) of practice scores was 19.9 (SD=0.7) and the median was 20 scores. Surprisingly none of participants was scored high level of practice.

**Table 4. 7. Distribution of Practice scores**

<b>Variables</b>	<b>Scores</b>	<b>N (%)</b>	<b>Percentage of scores</b>	<b>Levels of practice</b>
Practice	12.00	1(5.0%)	32.4	Low level of practice
	15.00	2(10.0%)	40.5	
	18.00	1(5.0%)	48.6	
	19.00	4(20.0%)	51.4	
	20.00	3(15.0%)	54.1	
	21.00	4(20.0%)	56.8	
	23.00	3(15.0%)	62.2	Medium level of practice
	24.00	2(10.0%)	64.9	
<b>0</b>				High level of practice

#### 4.10. Socio- demographic factors associated with knowledge

The association of socio-demographic factors (hospital where the nurses works, nurse age, gender, education level, working experience and training status on critical care) and knowledge scores was analysed using Chi-square test. Table 4.8 shows the education level of nurses to be associated with knowledge scores in managing transportation of critically ill patients, p value: 0.009.

**Table 4. 8. Socio-demographic factors associated with knowledge**

<b>Variables</b>	<b>Chi-square Test Statistic</b>	<b>P value</b>
<b>Hospital</b>	23.345	.223
<b>Age</b>	29.055	.317
<b>Gender</b>	18.774	.471
<b>Education level</b>	85.547	<b>.009*</b>
<b>Working experience</b>	51.237	.690
<b>Critical care training</b>	21.355	.317

P\*-value significant at P< 0.05

#### 4.11.Socio demographic factors associated with attitudes

The Table 4.9. contains the results of association analysis between socio-demographic factors and attitudes scores using Chi-square test. There was no evidence of relationship for attitude scores with social demographic factors in managing transportation of critically ill patients.

**Table 4. 9. Socio-demographic factors associated with attitude**

<b>Variables</b>	<b>Chi-square Test Statistic</b>	<b>P value</b>
<b>Hospital</b>	26.580	.487
<b>Age</b>	44.231	.826
<b>Gender</b>	22.686	.702
<b>Education level</b>	74.492	.682
<b>Working experience</b>	93.030	.170
<b>Critical care training</b>	26.905	.469

P\*-value significant at P< 0.05

#### 4.12. Correlation between levels of knowledge and levels of attitude

The level of knowledge and the level of attitude were correlated to report on possible relationships in this section where correlation coefficient was used to determine the relationships.

The results in table 4.10. shows that there is a strong correlation between knowledge and attitude scores ( $R^2 = 1.00$ ,  $P = 0.012$ ).

**Table 4. 10: Correlation between levels of knowledge and levels of attitude**

Correlations		Attitude score	Knowledge score
Pearson Correlation	Attitude score	1.000	.203
	Knowledge score	.203	1.000
Sig. (1-tailed)	Attitude score		<b>.012*</b>
	Knowledge score	.012	
N	Attitude score	124	124
	Knowledge score	124	124

P\*-value significant at  $P < 0.05$

#### 4.13 . Conclusion

The results of this study were analysed using descriptive statistics as well as bivariate analysis the research findings were presented in frequencies and percentages in tables . The majority of the participants 119(96%) had been involved in transporting critically ill patients, while only 59(48%) were trained in critical care.

On bivariate analysis ,the education level was significantly associated with knowledge at p-value of 0.009. The relationship between knowledge and attitude has shown a strong correlation (  $R^2 = 1.00$ ,  $P\text{-value} = 0.012$ ),

## **CHAPTER 5. DISCUSSION**

### **5.1. Introduction**

This chapter discusses the results of the study in relation to the research objectives and available evidence including the conceptual framework. The overall objective of this study was to assess the knowledge, attitude and practice of nurses on intra hospital transportation management of critically ill adult patients in selected referral hospitals (KUTH and RMH).

### **5.2. Demographics characteristics**

Demographics showed that most of the participants were males 75(60%) holding a bachelor's degree 68(55%), 14(11%) had masters level , and less than half 59(48%) had training in critical care nursing while almost all of them 119 (96%) had been involved in transporting critically ill patients. Most of the participants (73(59%)) had 5 years and above of work experience. The participants experience which is more than 5 years of experience is a prerequisite for the participants to have the minimum required knowledge to transport critically ill patients safely. The results are supported by the available evidence which shows that some important demographics play a pivotal role in safe intrahospital transportation like the fact that nurses trained at masters level and those who had critical care training are still few (Alamanou and Brokalaki, 2014).

### **5.3. Level of knowledge of intrahospital transportation of critically ill patients**

The majority of the participants on knowledge scores reported to have moderate knowledge, whereby out of 75 scores, they scored between 45-59. The mean score was 54, (SD: 4.1). The knowledge questions reported various aspects in relation to intrahospital transportation of critically ill patients. The results of analysis revealed that all participants were involved in transporting critically ill patients from ICU to theatre for surgery, from ICU to radiology and from Emergency department to ICU for admission. The knowledge of the purpose of intra-hospital transportation was affirmatively reported by more than 90% participants.

For the knowledge of transport guides; the participants did not use them or more generally did not have knowledge about them; only less than 30% knew at least one of transportation guides that included a checklist, protocol and algorithm. This is contrary to the study carried out by Warren et al (2004) which concluded that the transport of critically ill patients impose different kinds of dangers. Therefore, the use of transport guides ensures safe transportation. This was also confirmed by Alamanou and Brokalak (2014) who arrived at concluding that the risk caused by intra-hospital transportation of critically ill patients can be maximally avoided through adequate use of protocol conditionally to the full involvement of nurses.

More of the participants; (above 87%) mentioned that they ensure required environment and equipment needed in transportation of critically ill patient within hospitals. In addition, the knowledge of quality improvement review process was on average confirmed by 94.5% study participating nurses.

The existing literature reports that the nurses level of knowledge of intrahospital transportation is assessed from different levels, from preplanning, personnel, equipments, monitoring as well as communication (Shields, Overstreet and Krau, 2015). The overall knowledge scores on the abovementioned area have indicated moderate knowledge, and the results are contrary with the evidence that most of nurses are knowledgeable about transportation, although specific training is necessary for them to act more safely (Pedreira et al., 2014). Hence they need more training on transportation of critically ill patients.

#### **5.4. Level of nurses attitude on intra-hospital transportation of critically ill patients**

The results showed that a big majority (66(53.2%)) have negative attitudes of transporting critically ill patients where attitudes scores were 25-45 out of 65 compared to the scores depicting that 58(46.8%) of participants had positive attitudes and attitudes scores was ranging between 52-63 out of 65. The negative attitude reported in the present study might be linked to the moderate level of knowledge that was reported.

The individual questions on attitude have shown that 61.3% of the nurses agreed that the report they receive about transfers is very comprehensive and directive to continuity of care which shows good indication though the transportation team used for transporting patients is never discussed nor planned because everything is done in a rush. This is supported by the study done by Day, which concluded that the reported negative attitude was due to increased workload for those who are actively involved in transporting critically ill patients (Day, 2010).

Therefore, in order to have improved attitude, transportation team should discuss on what to do, when to do it and clarify the roles among the team members who are responsible for every care to be given to the critically ill patient.

### **5.5. Practice of nurses of intrahospital transportation of critically ill patients.**

The results indicated that 15(75%) study participants had low level of practice which had maximum scores of 21 and the minimum of 12 out of 38. The highest category of practice scores (which was actually medium level) was attained by 5(25%) participants with a maximum of 24 scores and minimum of 23 scores. The overall mean (standard deviation) of practice scores was 19.9 (SD=0.7) and the median was 20 scores.

None of the participant had High level of practice. The low level of practice can be explained by individual questions on practice variable. Whereby the availability of transportation equipment was not enough to ensure safe patient transportation, the transportation bag was not available by 60%, portable suction machine was not available (100%). Another observed practice is pre-transport supine position which was only done in 11 among the observed 20 patients, and this is contrary to the study done by Day, which recommend that every patient should be laid flat for 5 to 10 minutes to assess tolerance before transportation (Day, 2010).

The reported practice in the present study is contrary to the evidence that recommend that equipment for transporting critically ill patients should always be at the disposal of nurses involved so that the transporting team can perform a safe patient transport (Fanara *et al.*, 2010; Alamanou and Brokalaki, 2014). According to the study done by Day, States monitoring and evaluation of equipment including ventilator settings check, should be done repetitively as recommended that if the patient receiving mechanical ventilation is transported, he/she should continuously be mechanically ventilated rather than using manual ventilation for transportation (Day, 2010). This was not the case in the present study where all patients were ventilated manually during transport, therefore, this evidence can be used to shift from the current practice.

### **5.6. Association between knowledge attitude of intrahospital transportation of critically ill patients**

The results on association between knowledge and attitude showed that there is a strong correlation between knowledge and attitude scores ( $R^2= 1.00$ ,  $P= 0.012$ ). This imply that nurses' attitudes are influenced by their level of knowledge of intrahospital transport. This confirms the fact that attitude is influenced by the training that some one has (Fanara et al, 2010). This author further added that critically ill patients that are prepared and accompanied by a less knowledgeable team is a great risk.

Therefore, the use of required equipment and the use of checklists and professional training are needed to increase the safety of transported patients.

The association between socio-demographic and level of knowledge as well as attitude did not show any association.

The discussed level of knowledge has shown moderate level of knowledge, negative attitudes, and low level of practice of nurses on transporting critically ill patients. The relationship between knowledge and attitude has shown a strong correlation, and the education level to be associated with knowledge scores.

### **5.7.Strength and limitations**

This section presents strengths and limitations. On the strength of this study is the methodology specifically on data collection and study setting. The method used for data collection was both participant's responses and observations. Another strength is that data were collected in two different hospitals this helped to identify challenges of ICU nurses towards intrahospital transportation of the critically ill patients in more cross cutting way rather than one facility challenges.

The calculated sample size was 124 and the response rate of 100% was achieved. This high response rate became strengths of this study because it maintained statistical power of the study. The minimum sample size of observed practice became a limitation for inferential statistics because the association of practice and other variables were not possible.

### **5.8 Conclusions**

This chapter five discusses the results obtained from the study, the research findings were discussed relating to study objectives, conceptual framework and findings from the literature. Then strengths and limitations were discussed.

## **CHAPTER 6. CONCLUSION AND RECOMMEDATION**

### **6.1.Introduction**

This chapter concludes the results of the present study and provides recommenations based on the results and provides the final conculsion.

### **6.2. Recommendations**

From the results of the present study the following are recommended:

#### **Recommendation for future researchers**

- Future research is recommended by extending the study to other referral institutions and also this can be done for inter-hospital transportation which is on a larger scale than intra-hospital.
- As this study was conducted on adult population, future study is recommended on pediatric patients.

#### **Recommendation for clinical settings**

- Consider the critical care nursing course for the recruitment for new nurses and establish special continuous professional development emphasizing on critical care nursing practices for those who are involved in IHT.
- In consideration of adverse incident during intrahospital transport, continuous training of staff involved in critically ill patients transport is recommended with the focus of pre-tranport stabilization of patients. It is recommended to elaborate policies and guidelines about all phases of transport.

#### **Recommendation for Nursing education**

- Intrahospital transport of the critically ill patient is not in the curriculum of nursing schools. It is recommended to include it in the curriculum of nurses and midwives student in all nursing schools.

#### **Recommendation for the Ministry of Health**

- It is recommended to include IHT of the critically ill patient concept in the existing national health policy and guideline.
- Given the lack of basiline equipment during intra hospital transport, it is recommended to the ministry of health to provide financial support for appropriate

equipment for transport and provide training on the use of critical care sophisticated equipments.

### **6.3.Conclusions**

- Nurses involved in IHT lack enough knowledge on intra-hospital transportation management of critically ill patients in all phases of transportation. Hence a risk to patient management during transportation.
- Nurses in the participating hospitals do not have guidelines or protocols to guide their intra-hospital management while they also have not had training towards intra-hospital management. Hence their confidence in transporting patients is affected negatively.
- The majority of nurses in the participating hospital departments predominantly have a negative attitude towards intra-hospital transportation management of critically ill patients probably related to lack of training and guidelines.
- Practice as observed was also poor with only 5 participants getting medium scores, and none of them getting high scores. The association was not calculated for practice because of the small sample, as only 20 participants were observed during transportation of critically ill patients.

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# **APPENDICES**

## Appendix 1. Permission for use of questionnaire



• **A.H.Brunsveld-Reinders@lumc.nl**

À : mukdenise@yahoo.fr

Dear Denise,

Thank you for your email and your interest in using the transport checklist in your hospital.

Hereby I give you the permission to use the tool.

Kind regards,

Anja Brunsveld



4. Experience of working in the current Unit:
1. 6 months – 1 year
  2. 1 year – 3years
  3. 3 years -5years
  4. 5 years and above
5. Have you ever had a Critical Care training: Yes:  No:

**Section 2: Questions Related knowledge towards IHT management**

1. Are you involved in transporting critically ill patients? Yes:  No:

2. The definition of intra-hospital transportation is reserved for which of the following purposes for transportation of critically ill patients specifically?

1. From ICU to theatre for surgery
2. From theatre to ICU postoperatively
3. From ICU to Radiology department for diagnostic procedure
4. From Emergency to ICU for admission
5. From emergency to theatre
6. From emergency to radiology
7. Patient deteriorated from ward to ICU
8. From ICU to Step Down Units or High Dependency Unit on improvement

3. For the safe transportation of patients, you have one of the following to guide you

1. Protocol
2. Checklist
3. Guideline
4. Algorithm

4. Before transport of the critically ill patient you establish the following:

1. Destination well
2. The best route through the hospital to the destination
3. Time slot for the critically ill patient
4. Available accessories for connecting the patient equipment

5. An intubated, mechanically ventilated patient with haemodynamic instability is supposed to be transported to the radiology department. State the categories of staff that will safely transport this patient

1. Experienced nurse with porter
2. ICU trained nurse with Resident and Porter
3. ICU trained nurse with Intensivist and Porter
4. Experienced nurse with Resident

6. You are to check equipment for transportation of the critically ill patient. You will check the following:

1. Availability of equipment
2. Functionality of equipment
3. Adequacy of equipment
4. Extra equipment

7. What is the acceptable minimum level of oxygen in the oxygen cylinder for safe transport of the critically ill patient?

1. 100 bar
2. Not less than 80 bar
3. Above 50 bar
4. At least 40bar

8. Before transport, discussion of patient status occurs between physician and the allocated nurse. This is done

1. Always
2. Often
3. Sometime
4. Never

9. When leaving the unit/department for Radiology department or transfer, the following are informed

1. Colleague
2. Unit Manager
3. Shift Leader
4. Receiving department/unit

10. Among things agreed upon before transport the responsibilities during transport and procedures are discussed, for example, who is responsible for:

1. Airway management and ventilation
2. Intravenous lines
3. Communication
4. Monitoring and documentation

11. The following parameters and treatment are recorded during transport

1. Vital signs
2. Medication given during transport and procedure
3. Intravenous fluid at the appropriate interval
4. Any adverse incident that occurred during transportation

12. Extra medication is given during transportation

1. Always
2. Often
3. Occasionally
4. When necessary
5. If prescribed
6. Never

13. During transport and procedure you ensure that the visual of the monitor is turned towards the staff for continuous monitoring of the patient.

1. All the time
2. Frequently
3. Occasionally
4. Not possible
5. Never

14. The receiving unit is ready for the reception of the critically ill patient

1. Always
2. Sometime
3. Often
4. Never

15. You are transporting a mechanically ventilated patient to CT Scan, and you do not have a portable mechanical ventilator. How do you ensure continuous ventilation for the patient?

1. Put on protective apron/gear and continue to ventilate patient manually
2. Interrupt manual ventilation during exposure of rays
3. Bring the patient's mechanical ventilator from ICU
4. The patient would rather not be scanned if mechanically ventilated

16. What are the adverse incidents that you have experienced during transportation and procedure? (Tick whatever is appropriate to your situation)

1. Oxygen cylinder running empty
2. Deterioration in vital signs,
3. Desaturation
4. Cardiorespiratory arrest
5. Hypothermia
6. Agitation

17. Tick what is relevant for Post transport quality improvement review processes.

1. Evaluation of intra-hospital transport process

2. Analysing the incident reports, for timeliness, patient outcomes, management of complications, etc.

3. Involving multidisciplinary team in the analysis

4. Initiation of corrective actions for future transport

5. Communicate corrective actions to all involved in transport

### Section 3. Likert scale of Attitude Questions.

Items	1.Strongly Disagree	2. Disagree	3. Not sure	4. Agree	5. Strongly agree
1.I feel very confident in transporting critically ill patients to various units/departments					
2.I cannot understand so much fuss/concern about pre-transport preparation of the critically ill patient.					
3. Some equipment used for transporting patients is hard to operate					
4. The team used for transporting patients is never discussed nor planned					
5.I can only transport patients with confidence if some direction in the form of protocol or checklist can be developed					
6. One never finds time to prepare for transport of patients because everything is done in a rush					
7.I fear transporting critically ill patients because we have had many adverse events during patient transportation predominantly equipment failure					
8.I have never been confident in transporting patients because I have never had any training on it even in-service					
9.I hate transporting patients to Radiology Department because I get exposure to radiation having to continuously ventilate a patient without a portable ventilator					
10. More often we have found missing medication during transport					
11. The receiving units are very welcoming and ready each time we transfer our critically ill patients					
12.The report we receive about transfers is very comprehensive and directive to continuity of care					
13 .I always relax when I am transporting a critically ill patient with an intensivist					

Thank you.

### Appendix 3. Observation checklist

The tick will be used in the box provided

Hospital:

Department:

Dates : .....

Start time of observation .....

End time of observation .....

<b>Observed practices during transportation and procedure</b>			
<b>1. Availability of Equipment</b>		1.Yes	2. No
1.1	Transport bag present		
1.2	Portable cardiac monitor with accessories available		
1.3	Portable defibrillator machine with accessories available		
1.4	Portable oxygen cylinder available		
1.5	Potable suction machine with accessories available		
1.6	Portable mechanical ventilator machine with accessories available		
<b>2. Checks done</b>		1.Yes	2.No
2.1	Battery for mechanical ventilator charged		
2.2	Battery for defibrillator machine charged		
2.3	Battery for cardiac monitor charged		
2.4	Battery for suction machine charged		
2.5	Oxygen level for cylinder is above 50 bar		
2.6	Equipment operation checked		
2.7	Check and set visual and audible alarms		
2.8	Cuff pressure checked 20-30 cmH <sub>2</sub> 0		
2.9.	Depth of Endotracheal Tube		
2.10	Stop enteral feeding		
2.11	Check length of iv tubes		
2.12	Removal of non-essential equipment		

2.13	Pre-transport spine position tried for tolerance			
2.14	Last time nasogastric tube bolus noted			
2.15	Transport route for smooth transport checked			
2.16	Recorded baseline vital signs			
2.17	Receiving unit informed			
2.18	Report coworkers of leaving the unit			
2.19	Transport team verified			
2.20	Checklist form completed			
2.21	Continuous monitoring and documentation of :	Ventilator settings		
		Vital signs		
2.22	Continuous monitoring on transportation back to the unit			
2.23	Time of arrival to unit noted			
2.24	Connecting back patient to unit equipment e.g.:	Mechanical ventilator		
		Cardiac monitor		
2.25	Update data on cardiac monitor			
2.26	Untangle iv tubes before reconnection			
2.27	Documentation of transport procedure			
2.28	Document patient transport in statistics book			
2.29	Replenish/refill used equipment			

#### **Appendix 4: Information sheet**

Dear Participants you have been chosen to be part of the present study which is about assessing knowledge and attitude of nurses on intra hospital transportation management of critically ill adult's patients in selected referral hospitals in Kigali.

Participation in this study is voluntary and no one will be forced to be part of the study  
Confidentiality of participants will be kept and no names will be disclosed.

All participants will be required to answer questions to the level of their knowledge without any external influence whatsoever. No direct benefit will be given as incentives rather future patients will benefit from improved services due to the gained knowledge throughout the process of the present research.

If you agree to participate you will be required to sign a consent form attached to the questionnaire as proof that agreement is voluntary.

If you have any questions, contact the researcher at : 0788678102 and at the contact of my supervisor at 0782333732. If you observe concerns about the research process you can report to the Institutional Review Board chairperson at 0783340040.

Thank you for acceptance.

**Appendix 5: Consent form**

**Title of the study : Nurses' knowledge, attitude and practice regarding Intra-Hospital Transportation management of the Critically Ill Adult Patient in selected referral hospitals Kigali, Rwanda.**

I, \_\_\_\_\_ after being informed on the purpose and importance of this current study, the rights and responsibility of study participant, I agree to participate in the study entitled “Nurses' knowledge and attitude regarding Intra-Hospital Transportation management of the Critically Ill Adult Patient in selected referral hospitals in Kigali, Rwanda”

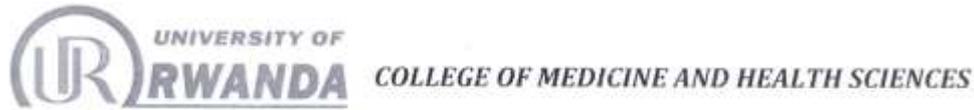
I am aware that participation in the study is voluntary and I will not be paid for the participation. In addition, all information provided will be treated with confidentiality and that my anonymity will be maintained. I am aware that the results of this study may be published but I will not be identified as an individual. I reserve the right to withdraw from the study at any time if I wish.

Signature of participant  
.....

Date    .../.../.....

Signature of Researcher  
.....

## Appendix 6. Ethical approvals



CMHS INSTITUTIONAL REVIEW BOARD (IRB)

Kigali, 14/01/2019  
Ref: CMIHS/IRB/006/2019

Mukabagire Denise  
School of Nursing and Midwifery, CMHS, UR

Dear Mukabagire Denise

RE: ETHICAL CLEARANCE

Reference is made to your application for ethical clearance for the study entitled "*Nurses' Knowledge, Attitudes and Practices towards Intra-Hospital Transportation Management of The Critically Ill Adult Patient in Selected Referral Hospitals in Kigali, Rwanda.*"

Having reviewed your protocol and found it satisfying the ethical requirements, your study is hereby granted ethical clearance. The ethical clearance is valid for one year starting from the date it is issued and shall be renewed on request. You will be required to submit the progress report and any major changes made in the proposal during the implementation stage. In addition, at the end, the IRB shall need to be given the final report of your study.

We wish you success in this important study.

  
Professor Jean Bosco GASHUKU  
Chairperson Institutional Review Board  
College of Medicine and Health Sciences, UR

Cc:

- Principal College of Medicine and Health Sciences, UR
- University Director of Research and Postgraduate studies, UR



CENTRE HOSPITALIER UNIVERSITAIRE  
UNIVERSITY TEACHING HOSPITAL

Ethics Committee / Comité d'éthique

February 08<sup>th</sup>, 2019

Ref.: EC/CHUK/026/2019

Review Approval Notice

Dear Denise Mukabagire,

*Your research project: "Assessment of nurses' knowledge and practice towards intra-hospital transportation management of critically ill adult patients at CHUK"*

During the meeting of the Ethics Committee of University Teaching Hospital of Kigali (CHUK) that was held on 08<sup>th</sup> February, 2019 to evaluate your request for ethical approval of the above mentioned research project, we are pleased to inform you that the Ethics Committee/CHUK has approved your research project.

You are required to present the results of your study to CHUK Ethics Committee before publication.

PS: Please note that the present approval is valid for 12 months.

Yours sincerely,

**Dr. Emmanuel Rusingiza**  
The Chairperson, Ethics Committee,  
University Teaching Hospital of Kigali



<<University teaching hospital of Kigali Ethics committee operates according to standard operating procedures (Sops) which are updated on an annual basis and in compliance with GCP and Ethics guidelines and regulations>>



March 29, 2019

Ref.: RMH IRB/016/2019

**REVIEW APPROVAL NOTICE**

Dear MUKABAGIRE Denise  
School of Nursing and Midwifery, CMHS  
University of Rwanda

Your Research Project: **“Nurses’ Knowledge, Attitudes and Practices towards Intra-Hospital Transportation Management of the Critically Ill Adult Patient in Selected Referral Hospitals in Kigali, Rwanda”**.

With respect to your application for ethical approval to conduct the above stated study at Rwanda Military Hospital, I am pleased to confirm that the RMH/Institutional Review Board (IRB) has approved your study. This approval lasts for a period of **12 months** from the date of this notice, and after which, you will be required to seek another approval if the study is not yet completed.

You are welcome to seek other support or report any other study related matter to the Research office at Rwanda Military Hospital during the period of approval.

You will be required to **submit the progress report** and any major changes made in the proposal during the implementation stage. In addition, you are required to **present the results** of your study to the RMH/IRB before publication.

Sincerely,

Prof. Alex M. Butera  
Colonel.

Chairperson Institutional Review Board, RMH