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EFFECTIVENESS OF VIDEO TEACHING ON BASIC LIFE SUPPORT KNOWLEDGE,
ATTITUDE AMONG NON-HEALTH PROFESSIONAL STUDENTS AT THE UNIVERSITY
OF RWANDA

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ATTITUDE AMONG NON-HEALTH PROFESSIONAL STUDENTS AT UNIVERSITY OF
RWANDA**

By

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A dissertation submitted in partial fulfilment of the requirements for the degree of
MASTER OF SCIENCES IN NURSING / critical care and trauma

In the College of medicine and health sciences

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Declaration and authority to submit the dissertation.

Title of the study: **“EFFECTIVENESS OF VIDEO TEACHING ON BASIC LIFE SUPPORT KNOWLEDGE AMONG NON-HEALTH PROFESSIONAL STUDENTS AT THE UNIVERSITY OF RWANDA”**

A. Declaration of the student

I do hereby declare that this study submitted in fulfillment of the requirement for the degree of masters of sciences 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

Names of student

Signature

Kayumba Jean de Dieu

10th June 2019

B. Authority to submit the dissertation

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Signature

Supervisor: Prof Busisiwe Rosemary Bhengu

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Abstract

Introduction: Surviving cardiac arrest is possible but not unconditionally. This is because the victim needs to be helped as early as possible.

Aim of the study: was to assess the effectiveness of video teaching on basic life support knowledge and its retention among non-health professional students at the University of Rwanda, School of Business and Economics.

Methods: The study adopted a quantitative approach, using a quasi-experimental research design. The study was conducted at the University of Rwanda College of Business and Economics which is one among colleges of the University of Rwanda. It is located at Gikondomain campus, in Kicukiro District which is one among three districts of Kigali City, Rwanda (University of Rwanda, 2018).

In this research the populations were non-health professional students at the University of Rwanda, College of Business and Economics (UR-CBE) was chosen randomly. In this study a stratified random sampling was used.

The strata were representing levels of education (year one, year two, year three). The students in the same year of education were considered as homogenous group of students without differentiations in knowledge regarding basic life support.

The sample was calculated using Taro Yamane formula and it comprised of 382 participants. Data from the questionnaires were collected and entered as descriptive data, in the computer as nominal and categorical variables. Categorical variables were coded to enable the statistical analysis. Descriptive data were entered into the Statistical Package of Social Sciences (SPSS) version 20, then analyzed using frequencies, mean, then inferential statistics using paired T test at a level of 95% of confidence interval, (p value of <0.05 .) to determine associations between variables and statistical significance.

Ethical consideration: The researcher observed the ethical principles. A letter for ethics clearance was acquired from the Independent Review Board (IRB), and was presented to the College of Business and Economics authorities, where the study was carried out, with permission.

Results

There was a significant increase in the total score ($p < 0.0001$) from mean total percentage of pretest of 9 to 79 points. The participants performed significantly better in all items of our questionnaire both in posttest and three months later. Therefore there was a non-significant regression of mean total percentage after three months which was probably due to memory lapse.

Conclusions: Non-health profession students attending video teaching on BLS course have a significantly improved BLS performance post session and after 3 months compared to pre-test knowledge performance.

List of abbreviations, or acronyms

%: Percentage

AED: Automated External Defibrillator

AHA: American Heart Association

ALS: Advanced Life Support

ANZCOR: Australia and New Zealand Council on Resuscitation

BLS: Basic Life Support

BV: Brief Video

CCO: Chest Compression-Only

Cdepth: Compression Depth (Crate): Mean Compression Rate

Chand%: Percentage of Compressions with Correct Hand Position

CO-CPR: Compression Only CPR

CPR: Cardio Pulmonary Resuscitation

Crel%: Percentage of Correctly Released Compressions

EMS: Emergency Medical Service

ICU: Intensive Care Unit

OHCA: Out of the Hospital Cardiac Arrest.

SPSS: Statistical Package of Social Sciences

UR CBE: University of Rwanda College of Business and Economics

UR/CMHS: University of Rwanda College of Medicine and Health Science

UR: University of Rwanda

VSI: Video Self-Instruction

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Chapter I INTRODUCTION AND BACKGROUND

General Introduction

Cardiac arrest is the abrupt loss of heart function in a person who may or may not have been diagnosed with heart disease. The time and mode of death are unexpected. It occurs instantly or shortly after the symptoms appear (AHA, 2018).

Surviving cardiac arrest is possible but not unconditionally. This is because the victim needs to be helped as early as possible. Early recognition, early access and early cardiopulmonary resuscitation, are crucial phases of helping the victim from cardiac arrest (AHA, 2018). This proposal of the study aimed to evaluate the effectiveness of video teaching of basic life support to non-health professional students and was conducted at the University of Rwanda, College of Business and Economics among Gikondo Campus students.

Cardiopulmonary Resuscitation: CPR stands for cardiopulmonary resuscitation. It is a lifesaving medical procedure which is given to someone who is in cardiac arrest. It helps to pump blood around the person's body when his/her heart cannot. To carry out CPR a person presses up and down on the casualty's chest (chest compressions) and gives them a series of rescue breaths to help save their lives when they are in cardiac arrest. (British Heart Foundation on 23/04/2018).

The preliminary steps of CPR, as defined by the American Heart Association, are (1) calling for help; (2) establishing unresponsiveness in the victim by tapping or gently shaking and shouting at him or her; (3) positioning the victim in a supine position on a hard surface; (4) giving two breaths; and (5) checking the pulse. These are begun as quickly as possible. Prompt action is essential for a successful outcome. The moment breathing and heart action stop, "clinical death" ensues. Within four to six minutes the cells of the brain, which are the most sensitive to lack of oxygen, begin to deteriorate. If breathing and circulation are not restored within this period of time, irreversible brain damage occurs and "biological death" takes place (American Heart Association).

Basic life support: Basic Life Support (BLS) is defined as “maintaining airway patency and supporting breathing and the circulation without the use of equipment other than a protective device” (Resuscitation Council UK, 2015).

Cardiopulmonary resuscitation (CPR) has 3 fundamental components:

A: Airway assessment and management.

B: Breathing assessment and management.

C: Circulation assessment and management(Zealand,2016).

Basic Life Support (BLS) is the preservation or restoration of life by the establishment of and/or the maintenance of the airway, breathing and circulation, and related emergency care. Adjunctive equipment is NOT essential for basic life support, however, the use of Automated External Defibrillator (AED) by persons trained in their use but not trained in advanced life support (ALS) techniques is encouraged by the Australia and New Zealand Council on resuscitation(ANZCOR)(Zealand,2016) the same meaning was used in this study.

Background

With early basic life support initiated, the chance is to rescue the victim. Every minute CPR is delayed, a victim's chance of survival decreases by 10%. Immediate CPR from someone nearby can double – even triple - their chance of survival (AHA, a 2017).

In the United States more than 350,000 out of the hospital cardiac arrests occurred in 2016 whereby 46.1% of the victims received bystander CPR. The survival rate was 12% (AHA, 2017). Video teaching on basic life support to young students is one of the key pillars to manage out of hospital cardiac arrest (AHA, 2018).

A study done by Contri, et al., (2016) in Italy on video-based compression- only CPR (CO CPR) concluded that CO-CPR training in schools may be feasible and effective with rather good performance results.

A study done in Switzerland on “Novices learning BLS with a commercially available self-learning video kit with and without instructor support” A randomized controlled trial with the purpose to investigate whether pure self-learning without instructor support results in the same BLS competencies as instructor-led learning when using the same commercially available video BLS teaching kit revealed no difference between the two groups. No difference was found between the competencies at baseline and 3 months later in each group (Pedersen et al, 2017).

The American Heart Association suggests that, effective from 2018, all students from the United States of America should not graduate high school without completing basic life support training (AHA, 2017).

A study done in Kenya east Africa on teaching basic life support to the digital generation (randomized trial comparing video assisted versus practical simulation) has shown that there is no substantial difference in knowledge retention of BLS between those who received Low-Fidelity Simulation (DVD assisted) and Moderate-Fidelity Simulation education and training. However, there is significant difference in resource allocation and time in Low-Fidelity Simulation compared to Moderate-Fidelity simulation (Bonacaro et al, 2014).

Access to health care service is still limited in the middle and low income countries. Rwanda is one of low income countries with an adult mortality rate at age of 15 to 60 years old of 33.36 per 1000 (Rwanda Demographic National Health Survey 2014-2015).

Young people constitute a large number of the Rwandan population. This means that to create public awareness about out of the hospital cardiac arrest (OHCA) we might also have to revise our methods of education and adapt them in relation to different age groups.

In Rwanda Red Cross Rwanda, the only recognized institution that offers training on first aid and BLS target to provide one first aider for every 50-100 people for high risk interventions, and two first aiders for every 200-500 people for low risk interventions (RED CROSS Rwanda, 2017). As the world is struggling to achieve education for all, we should start giving training about basic life support to as many as possible starting from our students, for them to take this knowledge to their communities and families. The evaluation of effectiveness of video teaching of basic life support among non-health professional students at the University of Rwanda was the aim of this study.

Problem statement

Cardiac respiratory arrest is the most critical condition of the victims whereby, if no intervention, the chances of survival deteriorate progressively and will lead to an irreversible condition. Cardio-respiratory arrest can occur anywhere at any time. If BLS does not get initiated immediately (within 4 minutes) once cardiac arrest is witnessed, brain stem death results/ensues (AHA, 2017).

Each year, more than 350,000 out-of-hospital cardiac arrests (OHCA) occur in the United States. Ninety percent (90%) of people who suffer out-of-hospital cardiac arrests almost die. CPR as one part of basic life support, especially if performed in the first few minutes of cardiac arrest, can double or triple a person's chance of survival (AHA, 2017).

Seventy percent (70%) of out-of-hospital cardiac arrests happen in homes. Unfortunately, only about 46% of people who experience an out-of-hospital cardiac arrest get the immediate help that they need before professional help arrives (AHA, 2017).

According to American Heart Association statistics in 2015, Out-of-Hospital Cardiac Arrest occurred among 326,000 and bystanders' overall intervention was 45.9% with a survivor rate overall of 10.6%. In 37 states of the United States of America, at least 2.4 high school students were trained on CPR (AHA, 2017).

During the clinical experience in accident and emergency department, the researcher has several times received brought in dead body without any attempt of basic life support either by family member or by laypersons.

However, few studies worked on teaching of basic life support to none Health professional students, and so far, to the researcher's knowledge, there is no study that was done on Effectiveness of video teaching of basic life support among none health professional students in Rwanda.

Purpose of the study

The purpose of this study was to assess the effectiveness of video teaching on basic life support knowledge, attitude and its retention of non-health professional students at the University of Rwanda, School of Business and Economics.

Specific objectives

The specific objectives of this study were the following:

- To assess the level of students' knowledge on BLS before and after video teaching (pre and post-test score) in the College of Business and Economics.
- To determine the students' self-evaluation of their BLS competence before and after video teaching (pre and post-test self-evaluation) in the College of Business and Economics.
- To describe the video teaching
- To determine the significance of changes after video teaching immediately and three months later.
- To establish the mode of delivery of BLS education/training preferred by students in the College of Business and Economics

Research question

- ❖ What is the level of the students' knowledge, on BLS before and after video teaching (pre-test) at the College of Business and Economics?
- ❖ What is the level of the students' attitude on BLS before and after video teaching (pre-test) at the College of Business and Economics?
- ❖ What is the difference in the level of knowledge, attitude among the students before and after video teaching in the College of Business and Economics?
- ❖ What is the effectiveness of video teaching based on the difference in the level of the students' knowledge, attitude and retention pre- and post-test immediately and in three months?

Significance of the study

In nursing research

The study shows the applicability of video teaching in teaching of basic life support therefore it can easily help to teach young generation, how they can intervene on their daily basic life once they are in contact with the victim of cardiac arrest.

Once accomplished this study will contribute to the awareness and involving the community in the action of life saving especially the first three phases of the chain of survival.

The study also demonstrates the effectiveness of new methodology of teaching with low cost but adaptive to young people. The study brings new knowledge to the researcher about basic life support teaching in Rwanda as well as in the region.

Nursing practice

This study hopes to contribute to improvement of the intervention system on people who developed cardio-respiratory arrest whereby individuals were trained how to help the victims in families, the communities, as well as activating emergency system.

Therefore trained rescuers or bystanders will be able to maintain brain perfusion of the victim till advanced life support starts. Out of the hospital cardiac arrest is a worldwide challenge that needs an emergency intervention whereby responders should be trained on basic life support. The study hopes to contribute to the reduction of out of the hospital deaths by increasing the possibility of survival for victims of out of the hospital cardiac arrest.

In nursing administration

Once completed this study hopes to help policy makers to set policy regarding BLS teaching at University level in Rwanda more especially University of Rwanda.

Operational definitions

Cardiac arrest here means cessation clinical function leading to poor oxygenation and death of cells (biological death). In this study the focus is out of hospital cardiac arrest.

Basic life support in this particular study refers to the first three phases of the chain of survival. **The following are the steps of the chain of survival:** recognition and activation of the emergency response system, high quality cardiopulmonary resuscitation, rapid defibrillation, basic and advanced emergency medical services, advanced life support and post arrests care (AHA, 2017).

Non-Health Professional Students: in this study, non-health professional students are all students registered at the College of Business and Economics University of Rwanda.

Video Teaching: in this study Video teaching refers to the planned teaching material combined with video with duration of 30 minutes on basic life support designed for non-health professionals. In this study the video has been designed by American Heart Association.

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, and significance of the study including operational definitions to the study.

Chapter two details the literature review pertinent to the topic concepts, theoretical approach and empirical review including identification of gaps.

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.

Chapter four presents analyzed data in tables, statistical analysis and inferential analysis.

Chapter five discusses data from our study in the context of other findings and conceptual framework.

While chapter six concludes on study findings and gives recommendations.

Conclusion

This chapter has described the general overview of basic life support, the background, the problem statement, the objectives, the research questions, and the significance of the study.

The first chapter is introduction and background, chapter two is a literature review while chapter three covers the methodology of the study. The next chapter is all about literature review.

CHAPTER TWOLITERATURE REVIEW

Introduction

This chapter is a summary of previous research on basic life support teaching to lay persons. The chapter has two parts which is theoretical review and empirical review. The theoretical part covers knowledge related to cardiac arrest and basic life support. The empirical review focuses on previous research related to use of video teaching to teach basic life support. Towards the end of this chapter the researcher presents the critical review and gap identification in the reviewed literature.

Search strategy

This chapter demonstrates other related quantitative studies which have been worked on across the world. The articles referenced in this chapter age started with five years then resorted to ten years for the scarcity of literature. The research also used additional literature documents, such as guidelines including those from the American Heart Association and British Heart Foundation. Data bases such as Pubmed, Medline, Cinahl, Hinari have been used in this chapter also. This review of literature will be focusing on education of basic life support using video teaching method.

Theoretical review

BLS definition

Basic life support (BLS) is a level of medical care which is used for victims of life-threatening illnesses or injuries until they can be given full medical care at a hospital. It can be provided by trained medical personnel, including emergency medical technicians, nurses, paramedics, and by qualified bystanders (AHA, 2017).

Definition of cardiac arrest:

Cardiac arrest is the abrupt loss of heart function in a person who may or may not have been diagnosed with heart disease. The time and mode of death are unexpected. It occurs instantly or shortly after the symptoms appear (AHA, 2018).

Signs and symptoms of cardiac arrest

Warning symptoms frequently occur before sudden cardiac arrest, unfortunately most are ignored. Mainly chest pain and dyspnea are the leading symptoms of sudden cardiac arrest. Emergent medical care was associated with survival in patients with symptoms (Eloi M. *et al.* 2015).

Reversible causes of cardiac arrest

The causes of cardiac arrest can be summarized into five H's and five T's, as shown in the following.

Hypoxia

Tension pneumothorax

Hypothermia

Thrombosis, pulmonary

Hydrogen ion (acidosis)

Thrombosis, coronaries

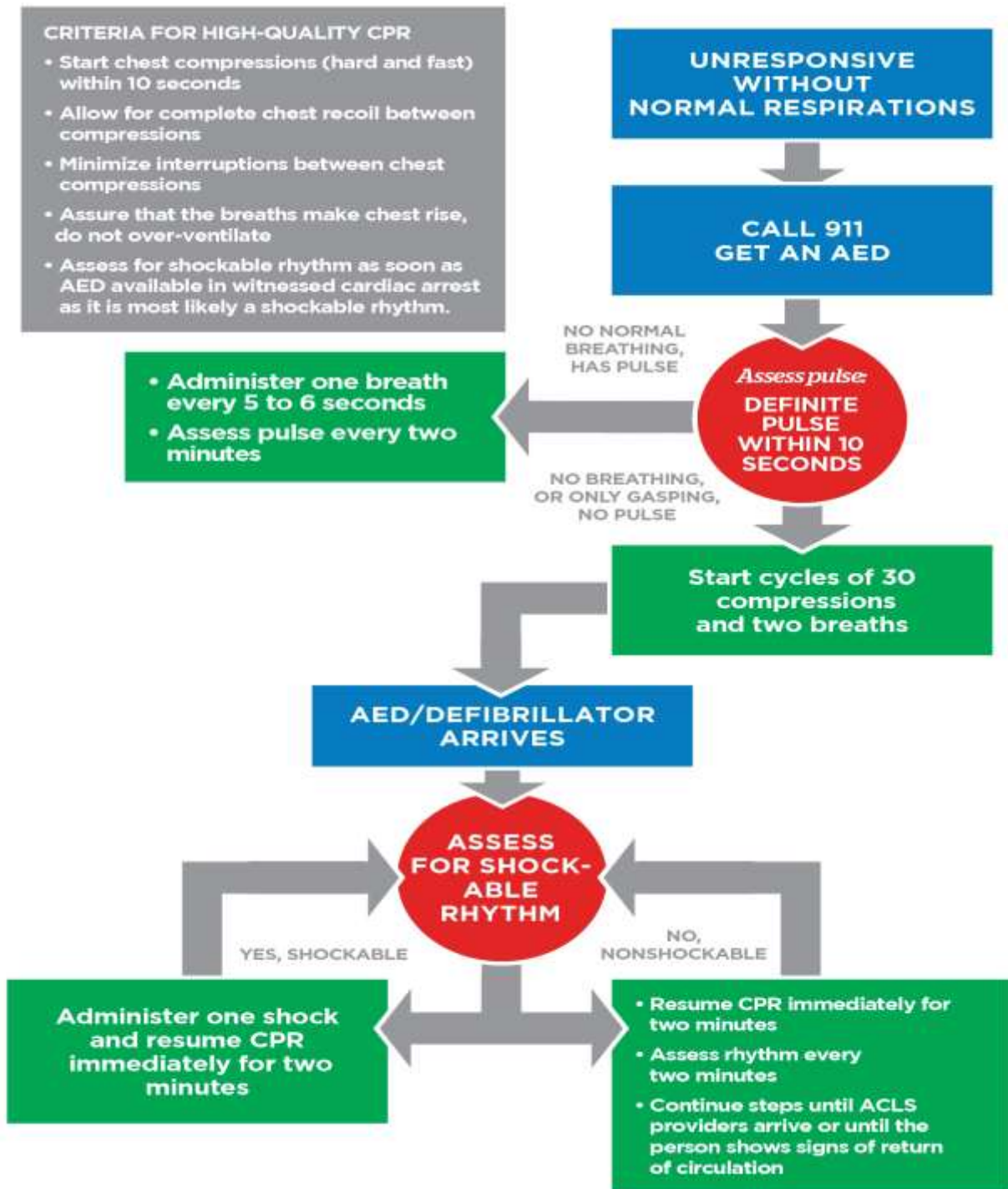
Hypo-/hyperkalemia

Toxins (UK. Guidelines R, 2015)

Hypovolemia Toxins

Adult basic life support

Tamponade (cardiac)



FUGURE 2.1 ADULT BASIC LIFE SUPPORT

OHCA Chain of survival

The chain of survival is just a series of steps (forming a virtual “chain”) which give the best chance of survival from a cardiac arrest (when the heart stops beating).

If all the steps of the chain are followed promptly, then the victim has the best chance of surviving the cardiac arrest (AHA, 2017).

The figure 2.1 below covers the intervention of a layperson emergency medical service and advanced life support. The description in this chapter is limited to a layperson intervention related to our study the steps are listed hereunder.

Early recognition and call for help

Early contact should be made to the emergency services after a cardiac arrest is recognised. In addition, serious conditions which may lead to a cardiac arrest (e.g.: a heart attack) should be recognised and emergency medical help called for promptly (Perkins, *et al*, 2015).

Early Cardiopulmonary Resuscitation (CPR)

Cardiopulmonary resuscitation (CPR) should be started immediately after a cardiac arrest has occurred (i.e. the patient has stopped breathing). Anyone can perform CPR, and ideally there should be no interruption in CPR before the ambulance arrives (Perkins, *et al*, 2015).

Early defibrillation

A defibrillator is an electrical device which delivers electric shock to the heart in an attempt to correct any abnormal electrical activity which has caused the cardiac arrest (Perkins, *et al*, 2015). In basic terms, a defibrillator attempts to “restart” the heart. Earlier defibrillation is associated with better survival from a cardiac arrest (Perkins, *et al*, 2015).

Automated External Defibrillator: An automated external defibrillator (AED) is a lightweight, portable device that delivers an electric shock through the chest to the heart. The

shock can potentially stop an irregular heart beat (arrhythmia) and allow a normal rhythm to resume following sudden cardiac arrest (SCA). SCA occurs when the heart malfunctions and stops beating unexpectedly.

If not treated within minutes, it quickly leads to death. AED can be used out of hospital due to its automatism and easy manipulation (AHA, 2018).

Post resuscitation care

Appropriate advanced post-resuscitation care in a hospital is essential to improving long term survival for the patient. This care should be accessed as quickly as possible after the cardiac arrest has occurred. A strong Chain of Survival can improve chances of survival and recovery for victims of cardiac arrest (AHA, 2017).

The figure below covers, the intervention by lay rescuers, emergency medical service and in hospital advanced life support. The description here, however, is only limited to layperson intervention which is related to the study and covers the initial three phases of the chain of survival.



Figure 2.2. OHCA CHAIN OF SURVIVAL Adopted from American Heart Association

Empirical review

High income country

In a study done by Contri, (2016) in Italy titled "Video-based compression-only CPR teaching: A feasible and effective way to spread CPR in secondary schools" done in Italy where the researcher distributed to a secondary school, a Compression Only CPR (CO-CPR) training kit made up of an educational DVD and 10 inflatable manikins LaerdalMiniAnne Plus.

The educational DVD had three parts or sessions: motivational session, CO-CPR instructions and demonstration, learning by watching video.

The course was administered to 36 students (17 males and 19 females, 17.3 ± 1.5 years old) of a secondary school by two CPR/AED certified teachers though teachers had never followed any type of CPR instructor course. At the end of the course, the researcher assessed knowledge about resuscitation with a questionnaire and they recorded 1-min CO-CPR with a skill evaluator manikin (LaerdalResusciAnne QCPR with Skill reporter software) for each student measuring mean Compression depth (Cdepth), mean compression rate (Crate), percentage of correctly released compressions (Crel%) and percentage of compressions with correct hand position (Chand%). The researchers found that 100% of students knew when to perform chest compressions and when to call EMS, 98% knew how to evaluate if a person had a cardiac arrest; 96% knew the correct BLS sequence (check safety, check consciousness and breath, call EMS, start CO-CPR) and: 92% knew the right chest compression depth and rate. During the practice assessment, the researcher found a median C depth of 45.5mm (95%CI, 40.3–50.3), a median Crate of 118cpm (95%CI, 113.7–127), a median Chand% of 100% (95%CI, 100–100) and a median Crel% of 90% (95%CI, 74.3–97).

Researchers concluded that video-based only CO-CPR training in schools may be feasible and effective with rather good performance results. However, the researcher highlighted that it is reasonable to consider that a short instructor course for teachers could improve students CPR quality (Contri, et al, 2016).

Nielsen et al, (2010) in their study done in the Capital Region of Denmark, titled "Acquisition and retention of basic life support skills in an untrained population using a personal resuscitation manikin and video self-instruction (VSI)", recruited laypersons who had not participated in any BLS training at least during the past 5 years. The BLS skills of 68 untrained laypersons (high

school students, their teachers and persons excluded from mainstream society) were assessed using the Laerdal Resusc Anne and PC Skill Reporting System version 2.0 in a 3 min test. A total score (12–48 points) was calculated and 12 different variables were recorded.

The participants attended a 24-min VSI course (Mini Anne, Laerdal) and took home the DVD and manikin for optional subsequent self-training. Nielsen et al, (2010) repeated the test 3½–4 months later. The study presented the following results. There was a significant increase in the total score ($p < 0.0001$) from 26.5 to 34 points. The participants performed significantly better in checking responsiveness, opening the airway, checking for respiration and using the correct compression/ventilation ratio (all p -values < 0.001).

The compression depth improved from 38mm to 49.5mm and the total number of compressions increased from 67 to 141. The ventilation volume and the total number of ventilations increased, and total “hands-off” time decreased from 120.5 seconds to 85 seconds. Therefore the researchers concluded that untrained laypersons attending a 24 min DVD-based BLS course have a significantly improved BLS performance after 3½–4 months compared to pre-test skill performance. Especially the total number of compressions improved and the hands-off time decreased (Nielsen et al, 2010).

Pedersen et al, (2017) conducted a study on “Novices learning BLS with a commercially available self-learning video kit with and without instructor support – A randomized controlled trial” in Switzerland with the purpose of investigating pure self-learning without instructor support results in the same BLS competencies as instructor-led learning when using the same commercially available video BLS teaching kit. Competencies of first-year medical students were assessed directly after training and three months later.

The baseline results revealed no difference between the two groups for the primary outcome. Early preliminary follow-up data showed a non-significant difference between the two groups (instructor-led 27% (1–59) vs. self-learning 49% (33–75), $p = 0.060$). No difference was found between the competencies at baseline and 3 months later in each group ($p = 0.109$ and 0.505) (Pedersen et al, 2017).

A study was conducted in Belgium by Stoobants, et al (2004) on Schoolchildren as BLS instructors for relatives and friends: impact on attitude towards bystander CPR. Children from primary and secondary school (age span 11–13 years) received a free individual CPR training package containing an inexpensive manikin and a training video. After a CPR training session by

their class teacher, they were invited to teach their relatives and friends. After the training, the trainees of the children were invited to participate in a web survey, containing a test and questions about prior CPR training and about their attitude towards bystander CPR (BCPR) before and after the training.

The researcher measured the impact on the attitude to perform CPR and the theoretical knowledge transfer by the children. The study results has shown that a total of 4012 training packages were distributed to 72 schools of which 55 class teachers subscribed their students (n = 822) for the training programme for relatives and friends .

After a validation procedure, 874 trainees of 290 children were included in the study. In comparison to trainees of secondary school children, trainees of primary school children scored better for the test as well as for the positive change of attitude towards the future ($P < 0.001$) For every child-instructor 1.7 people changed their attitude towards BCPR positively.

These results made the researchers to conclude that instructing schoolchildren to teach their relatives and friends in Basic Life Support (BLS) led to a more positive attitude towards CPR. The results were more positive with trainees from primary schoolchildren than with trainees from secondary schoolchildren (Stroobants, et al 2014).

A study done by Beskind, D. L. *et al.* (2016) in United State of American titled “Viewing a brief chest-compression-only CPR video improves bystander CPR performance and responsiveness among high school students: A cluster randomized trial” was conducted with the objectives: “to determine if a brief video is as effective as classroom instruction for chest compression-only (CCO) CPR training in high school students”. A prospective cluster-randomized controlled trial consisted of three study arms: control (sham video), brief video (BV), and CCO-CPR class. Students were randomized and clustered based on their classrooms and evaluated using a standardized OHCA scenario measuring CPR quality (compression rate, depth, hands-off time) and responsiveness (calling 911, time to calling 911, Starting compressions within 2 min).

Data was collected at baseline, post-intervention and in two months. Generalized linear mixed models were used to analyze outcome data, accounting for repeated measures for each individual and clustering by class. Results show that 179 students (14–18 years) consented in 7 classrooms (clusters). At post-intervention and 2 months, BV and CCO class students called 911 more frequently and sooner, started chest compressions earlier, and had improved chest compression rates and hands-off time compared to baseline.

Chest compression depth improved significantly from baseline in the CCO class, but not in the BV group post-intervention and at 2 months. Conclusions: Brief CPR video training resulted in improved CPR quality and responsiveness in high school students. Compression depth only improved with traditional class training. The researcher concluded and recommended that brief educational interventions are beneficial to improve CPR responsiveness but psychomotor training is important for CPR quality (Beskind, D. L. *et al.* (2016).

Another study was done in Australia by Mardegan, K.J *et al.* (2015) to compare an interactive CD-based and traditional instructor-led Basic Life Support skills training for nurses. Its purpose was to evaluate the effectiveness of an interactive CD-based BLS training programme that included unsupervised manikin practice with a traditional instructor-led BLS training programme involving demonstration and supervised practice". The researcher used a quasi-experimental post-test with follow-up design. The sample was comprised of two cohorts: Novice second-year undergraduate Nursing students (n = 187) and Practicing Nurses (n = 107) in their first year of hospital employment. BLS skill outcomes were assessed at one week and again at eight weeks post training.

The results showed no statistically significant differences between the CD and traditional instructor-led BLS training methods in BLS skills of Novice and Practicing Nurses at one week and eight weeks post training. However the researchers noted a decrement in skills between one week and eight weeks post training across both groups and overall low level of competences.

Mardegan, K.J *et al.* (2015) concluded that the failure to find a difference between the CD-based BLS programme with unsupervised manikin practice and a resource-intensive traditional instructor-led BLS training programme may indicate equivalence of the programmes or, even study design limitations.

According to Mardegan, K. J. *et al.*, (2015) it was concerning that competence displayed by trainees from both groups was less than optimal and therefore they suggested the need for renewed efforts to develop and evaluate BLS training program which can achieve high rates of competence with acceptable skill retention over time (Mardegan, K. J. *et al.*, (2015).

In a study by Biermann, H. *et al.* (2012) done in Germany on "Evaluation of a newly developed media-supported 4-step approach for basic life support training" had an objective to evaluate whether a "media-supported 4-step approach" for BLS training leads to equal practical performance compared to the standard 4-step approach.

The results showed that Participants (age 23 ± 11 , 69% female) reached comparable practical ECC performances in both groups, with no statistical difference after training and six months later. There was also no difference detected in the quality of the initial assessment algorithm or delay concerning initiation of CPR. Overall, at least 99% of the intervention group ($n = 99$; mean 1.5 ± 0.8 ; 6-point Likert scale: 1 = completely agree, 6 = completely disagree) agreed that the video provided an adequate introduction to BLS skills.

The researcher concluded and recommended that the “media-supported 4-step approach” leads to comparable practical ECC-performance compared to standard teaching, even with respect to retention of skills. Therefore, this approach could be useful in special educational settings where, for example, instructors’ resources are sparse or large-group sessions have to be prepared (Biermann, H. *et al.* (2012)

Middle income country

A longitudinal study titled “Teaching basic life support to students of public and private high schools” whereby, Fernandez et al, 2014 carried out a study in one public and one private school, both in the city of Maceio, State of Alagoas, Brazil. According to the researchers these schools were chosen because of their good performance in national examination of 2009 students from each school. They initially passed a pre-test questionnaire on cardiopulmonary resuscitation (CPR) and use of the automated external defibrillator (AED).

They then received theoretical-practical BLS training, after which students were given two theory assessments: one immediately after the course and the other one six months later.

The findings showed that the overall success rates in the prior, immediate, and delayed assessments were significantly different between the groups, with better performance shown overall by private school students than by public school students.

The researchers concluded that before training, most students had insufficient knowledge about CPR and AED; after BLS training a significant immediate and delayed improvement in learning was generally observed among students, particularly among private school students (Fernandez et al, 2014).

A study conducted in Iran (Asia) by Rahmati, et al. (2017), titled “Comparing the Effect of Lecture-Based Training and Basic Life Support Training Package on Cardiopulmonary

Resuscitation Knowledge and Skill of Teachers”. The Aim was to compare the effect of BLS training package and lecturer-based training on cardiopulmonary resuscitation (CPR) knowledge and skills of high school teacher. In this quasi-experimental study with pre-test and post-test design, 120 eligible school teachers (60 persons in each group) employed in high schools were selected through convenience sampling and were randomly allocated to two groups of lecturers and BLS training package. The instruments were comprised of demographic information form, a knowledge questionnaire, and a skill assessment checklist.

The same educational content was presented to both groups designed based on the latest revised standard guidelines of American Heart Association (2010) and relevant books. In the lecture group, theoretical and practical education was performed. The package content included video and educational pamphlets. The data were analyzed using descriptive statistics, Chi-square test, independent sample t-test, and repeated measures of ANOVA in SPSS19. Significance level of 0.05 was considered. Then the results were that Independent t-test showed that there was no significant difference between the two groups in pretest and posttest scores of knowledge, but there was a significant difference in recall score ($P = 0.047$).

Results of t-test showed that there was no significant difference between the two groups in terms of pretest, posttest, and recall scores of skill, while the mean score was higher in the training package group than the lecture group. The researcher concluded and recommended that the results indicated that both educational methods have the same impact on the knowledge and skill of CPR among high School teachers. Thus, the training package can be used as a simple, suitable, and practical method instead of traditional educational methods (Rahmati, et al. 2017).

Low income country

In the study done in east Africa with the title of: “Teaching basic life support to the digital generation: a randomized trial comparing video assisted versus practical simulation”. A prospective two group pre- post- test randomized design with 4-month follow up was conducted to verify the research hypothesis. This study compared two ways of teaching BLS techniques in order to understand which one could be the best between Low-Fidelity Simulation and Moderate-Fidelity Simulation.

A sample (n = 127) of nursing students was selected for this two group pre- post- test conveniently randomized design with 4-month follow up to compare two methods of simulation teaching. Students were allocated to Low-Fidelity (LF) (n = 64) and Moderate-Fidelity (MF) (n = 63) simulation teaching. Early evaluation immediate post intervention demonstrated an increase of knowledge in each group (LF mean pre-test score = 44, immediate post-test score = 62.18, MF mean pre-test score = 42, immediate post-test mean score = 62.18). Post-test 2 (4 months later) showed that there are no significant differences between the two groups in terms of knowledge retention (LF mean score = 65.81, MF mean score = 61.45. p = 0.721). According to the researcher the limitation of this study was a small sample size. The researcher concluded that the two teaching methods are equally effective in acquisition and retention of information on BLS techniques. However, the low fidelity method was more efficient and less resource intensive (Bonacaro et al, 2014).

GAP IDENTIFICATION

After reading the above articles for literature review and made a search on different engines of searching it has shown that only one out of ten researches related to this topic has been conducted on the African continent. Nine out of ten have been done on other continent of the world.

Not one research in this literature review has been conducted in Rwanda. The fact that the research has been done elsewhere constitute the Gap to our setting (Rwanda).

However, this study may be sufficient to demonstrate the worth of testing these interventions in the country and begin to prioritize them.

The above researchers have emphasized on primary and secondary school or to the other lay persons but not considered university students who are not prepared health professionals in their future.

Conceptual framework

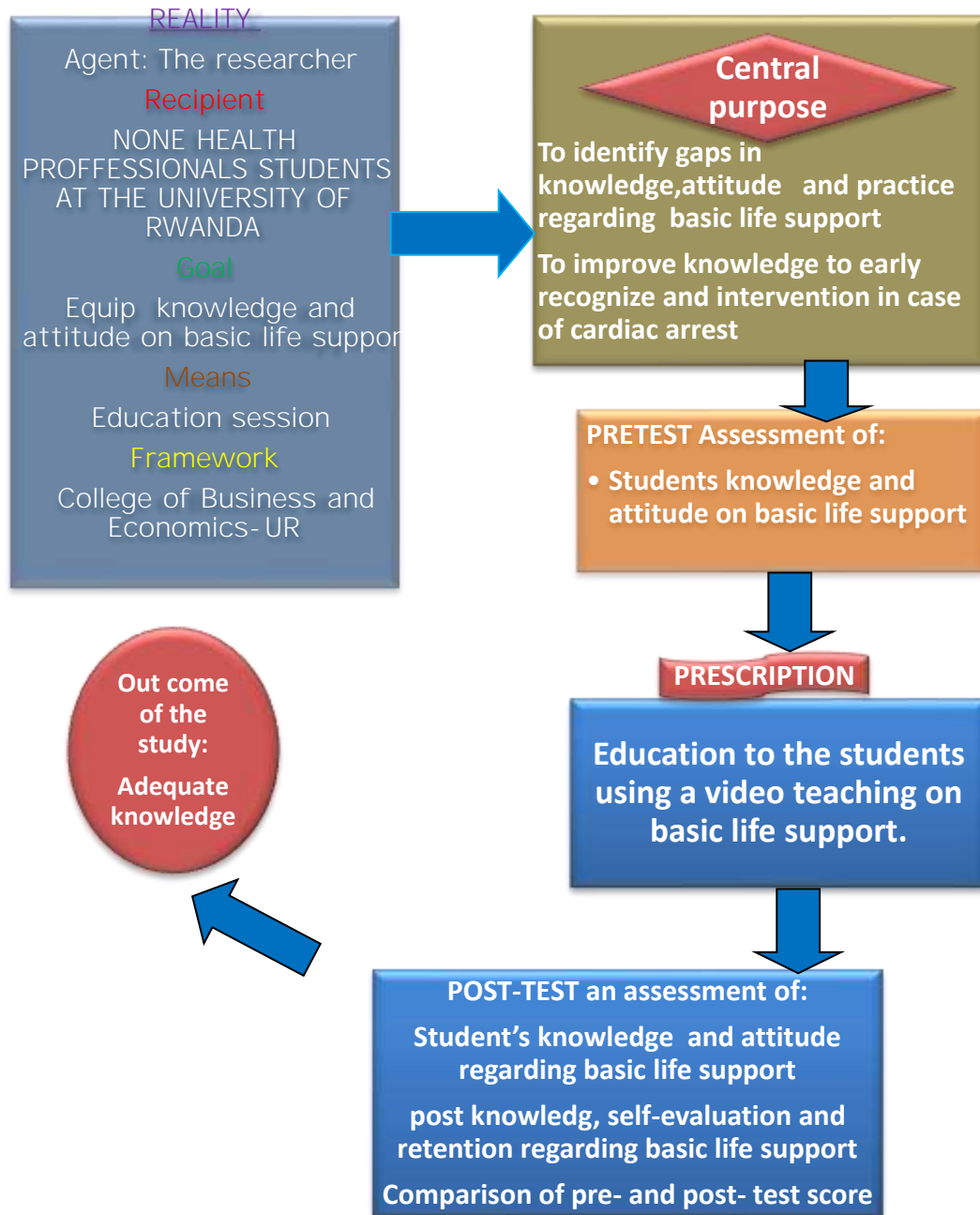
This study used Ernestine Wiedenbach's prescriptive theory as the basis for its conceptual framework, also called "The helping art of clinical nursing". This theory focuses on three main factors: The central purpose, the prescription and the realities.

Figure 2.3 conceptual framework is based on Wiedenbach's prescriptive theory (1990) adapted from a study that was done by Cherian and Karkada, (2015). The choice of this prescriptive theory or conceptual framework has been based on its applicability both in education and clinical practice settings.

The reality, the central purpose, prescription and outcome are four components that make the helping art of clinical nursing, as presented below:

The reality is made of an agent which is the researcher in the context of this study. In addition it includes the recipient, goal, means and framework. **Recipients**, in our study context is non- health professional' students at the University of Rwanda.

The **goal** was to equip the students with the knowledge on basic life support. The means is the education session, and the framework is College of Business and Economics –UR as the context. The **central purpose** in the context of this study was to identify gaps in knowledge and practice regarding basic life support but also to improve knowledge to early recognize and intervene in case of cardiac arrest. This was done through pre-test assessment. The third component is **prescription** in our context is education to the students using a video teaching on basic life support. It was done through education using a video. The fourth component is the **outcome** of our study expected to be adequate knowledge and attitude regarding basic life support.



Baseline data collection \rightleftharpoons **intervention** \rightleftharpoons **outcomes (post-test)** \rightleftharpoons **retention test**

Figure 2.3. Illustrating a Conceptual framework adopted and adapted from a study that was done by Cherian and Karkada, (2015).

Conclusion

This chapter described the global overview of teaching basic life support (BLS) to laypersons using video teaching to show the effectiveness of the video teaching. However, ninety percent of the research available were done out of Africa only one study was done in east Africa. None were conducted in Rwanda to the knowledge of the researcher. Putting these findings into the context of Rwanda may deserve a research study to produce evidence. The chapter also comprises of the theoretical framework and the conceptual framework.

Therefore considering the need for early initiation of CPR, taking into consideration the number of young people in Rwanda, training the laypersons would be required. Since the number of trained personnel to train others on BLS may be limited, video teaching method once tested may be the solution to that concern.

The following is chapter III. It will be focusing on study methodology.

CHAPTER THREE: METHODOLOGY

Introduction

Chapter three describes the methodology that was used in this study. It comprises a description of the study approach, study design, the study area, the sampling strategy and the sample size, the data collection tools and procedures, the data analysis and management, the ethical considerations and the study limitations.

Study approach

The study adopted a quantitative approach. A quantitative approach is that which uses numbers to clarify the magnitude of the research question (Creswell, 2014). This approach assisted the researcher to collect the data on the knowledge of non-health professional students before and after training, analyze statistically and generalize to the target population.

Study design

A research design is a strategy that is used to find responses to research questions and specify the variables to be considered, the type of data which are to be collected, the methods and the time of data collection (Polit and Beck, 2008). In this study the researcher used a quasi-experimental research design, whereby a test on knowledge regarding basic life support was conducted using a questionnaire then the students were shown a video teaching (Manipulation) and the same questionnaire was distributed and answered. Three months later the researcher collected same data to analyze knowledge retention. The three results were captured and analyzed using a statistical test.

The study setting

The study was conducted at the University of Rwanda College of Business and Economics which is one among colleges of the University of Rwanda. It is located at Gikondomain campus, in Kicukiro District which is one among three districts of Kigali City, Rwanda (University of Rwanda, 2017).

Current enrolment is 30,140 students distributed by College as follows: 5996 students of the College of Science and Technology (CST), 4134 Students of the College of Medicine and Health Sciences (CMHS), 5907 Students of the College of Education (CE), 8413 Students of the College of Business and Economics (CBE), 2,381 Students of the College of Arts and Social Sciences (CASS), and 3309 Students of the College of Agriculture, Animal Sciences and Veterinary Medicine (CAVM). Female are 33% and 67% are males (UR, 2018).

Population

The research population refers to the entire group of people or things or events in which the researcher is interested (Creswell, 2014). In this research the population were non-health professional students at the University of Rwanda, College of Business and Economics (UR-CBE) chosen randomly among all other colleges CMHS excluded. The total number of targeted students per year in the UR/ CBE are as follows: The total number of students per year in the UR/ CBE are as follows: Year one **3746 students** Year two: **2736 students**, Year three: **1931 students**.

Sampling strategy

A sample is a portion which is taken from the population to represent the whole population for inference. Sampling is a process to determine appropriate sample that will represent the population (Polit and Beck, 2008). In this study a stratified random sampling method was used. The strata were representing levels of education (year one, year two, year three) Students in the same year were considered as uniformed group of students without differentiations in knowledge regarding basic life support.

Table3.1: Portion of sample in each stratum (year one, year two, and year three)

	First year portion	Sample	Second year portion	Sample	Third year portion	Sample	Total
Population	3746		2736		1931		8413
Sample	$=382*3746/$ 8413	170	$=382*2736/$ 8413	124	$=382*1931/8413$	88	382

Sample size calculation

- The sample size was calculated using Taro Yamane sampling calculation formula.

T a r o Y a m a n e ' s F o r m u l a

$n=N/(1+Ne^2)$ Where n= corrected sample size,

N = population size, and

e = Margin of error (MoE),

e = 0.05 based on the research condition.

$N= 8413n=N (1+8413*(0.05)^2$

- $n=N(1+8413*0.002$ $n=8413/22n=N(1+21)$
- **N=382**

The sample of 382 above was further divided into the three strata by multiplying the sample with the year population divided by total population. See Table 3.1 for the strata.

Intervention description

After receiving permission from the University of Rwanda authorities the researcher put selected sample into four groups in prepared classroom. The researcher reminded the participants the right to withdraw from the research at any time. Questionnaires were distributed for pre-test assessment. After collection of questionnaires the video teaching on basic life support was played and projected for all groups. The video took only thirty minutes. Participants were allowed to

interrupt and request the replay and increased time up to one hour and half. The researcher administered the questionnaire after video play for post-test assessment. The researcher communicated to the participants the venue and time of retention assessment. After three months participants were put into the same groups and questionnaires were administered to assess the retention knowledge and attitude.

Description of study tool

In this study the researcher used a Questionnaire adapted and adopted from the previous similar published research.

The tool was requested from the researcher who accepted and provided authorization in writing to use his tool (See appendix VI). The instrument is composed of section I which is identification of participants (demographic data), section II which is information related to Basic life support knowledge and section III that covers participant self-evaluation (attitude).

Validity and Reliability of Research Instruments

Validity is the relevance of the research instrument to measure what is supposed to measure while reliability is the reproducibility of the instrument to measure the same variable at the different point in time (Polit and Beck, 2008).

Test retest reliability means giving the same test twice to the same people at different times to see if the scores are the same. Test re-test reliability was established through calculating the coefficient between the two post-test immediately and three months later. The correlation results will be presented in chapter four under results. The pre-test may not help because the video teaching was the intervening or confounding factor making the scores to vary greatly. The previous researcher, who used this instrument, in order to validate the instrument, used seven experts and six laypeople to examine the text, considering the scope, objectivity, and pertinent criteria. The experts included three doctors, three nurses, and one fire fighter. The laypeople group comprised of two representatives of each educational degree: elementary, high school, and university. After being analyzed, the instrument was restructured according the critiques and suggestions observed and accepted by the researchers.

The Cronbach's alpha statistics were also done and found to be 0.615. A content validity was performed where the items in the instrument were matched with the objectives. To make sure that the instrument was addressing all the objectives of the study. See table 3.2 below.

Face to face validity was also checked by choosing experts in the field to look at the instrument for adequacy of content beside the supervisors.

The study was approved by the supervisors and independent Review Board (IRB). However piloting the instrument in the Rwandan context was done to accommodate cultural differences since the instrument originated from a developed country, for example, a sample of students from Nyarugenge campus was used for a pilot study and calculation of Cronbach's Alpha.

Table 3.2: Content validity of data collection instrument

Objectives	Instrument items
To assess the level of student' knowledge on BLS before and after video teaching (pre and post-test score) in the College of Business and Economics	Part II: A-L: test
To assess the level of student' attitude on BLS before and after video teaching (pre and post-test score) in the College of Business and Economics	Part III: M-Q: Self evaluation
To compare the student knowledge on BLS in pre and posttest in the College of Business and Economics	Statistical analysis
To compare the student attitude on BLS in pre and posttest in the College of Business and Economics	Statistical analysis
To determine the level of retention of knowledge on BLS at three months posttest.	Part II: A-L: test
To determine the level of retention of attitude on BLS at three months posttest.	Part III: M-Q: Self evaluation
To determine the effectiveness of video teaching based on the difference in level of the students' knowledge and retention pre and posttest immediately and in three months.	Statistical calculation

C R O N B A C H ' S A L P H A (c o e f f i c i e n t a l p h a)

This measures the reliability or internal consistency <0, 9 excellent, <0.8 good, < 0.7 acceptable, <0.6 questionable,

In this study the researcher calculated the Cronbach's Alpha of the tool (Questionnaire) using pilot test on ten students from college of science and technology. The results have come up with CRONBACH'S ALPHA (coefficient alpha) of: 0. 615 which is acceptable.

Table 3.3: Reliability Statistics (Cronbach's alpha)

Cronbach's Alpha	N of Items
.615	13

Data collection procedures

Data collection is the process of gathering information needed for research. The data may be collected in numbers or words (Creswell, 2014). Data collection methods are approaches used to gather information for research and those are observation, interviews, and questionnaires. In the case of this study a questionnaire was used. After obtaining permission for data collection, the researcher made appointments with management of UR/ CBE and explained the purpose, process and ethics considerations. Once the management authorized, the researcher invited the students in collaboration with students' representatives. The procedure was class by class.

The researcher arranged the classroom to accommodate students for watching using the video in collaboration with information and technology (IT) department, Director of Estate and Student Welfare Directorate. Information document before the consent form were given to the students who accepted to sign the consent.

Students were put together in a prepared room to watch the video. Students who constituted the sample filled the questionnaires, just before the presentation of the video. Then the researcher conducted the post-test immediately after a complete manipulation and three months later our participants were assembled together and did the retention test.

This study used a questionnaire adapted from questionnaires used by other researchers for data collection; the questionnaire is attached as appendix III.

Data analysis

Questionnaires were collected and data entered as descriptive data, in the computer as nominal and categorical variables. Categorical variables were coded to enable the statistical analysis. Descriptive data were entered into the Statistical Package of Social Sciences (SPSS) version 20, then analyzed using frequencies, and means. Paired T test at a level of 95% of confidence

interval were calculated to determine associations between variables and statistical significance using p value <0.05 . Data were presented in the form of tables and graphs.

Ethical considerations

A letter for ethics clearance was acquired from the Independent Review Board (IRB) from the College of Medicine and Health Sciences, and was presented to the College of Business and Economics authorities, where the study was carried out, with permission.

The researcher observed the ethical principles such as non-maleficence, and obtained informed consent from the research participants including confidentiality.

The researcher also gave participants the right to withdraw from this research at any point of the study process. Prior to data collection, the researcher explained the nature of the study to the participants, and clarified that the participation was voluntary. This was also clearly explained in an Information document before the consent form was given for signature (Appendix IV and V).

The participants were distributed an informed consent form in English or Kinyarwanda version based on participant choice.

Questionnaires were in respect of anonymity whereby participants were assigned codes to use on their questionnaire. For the pre-test the code preceded by the letter (A) post-test questionnaire code were the same preceded with letter (B) retaining test were the same preceded by letter (C). Although this study was by its nature of a minimum potential harm such as student study revision interruption, the researcher ensured that there was no harm to the participants by not taking too much time as the video is only thirty minutes. Consent form was translated in local language to facilitate a well understanding before consenting.

The study limitation

This study was limited to none health professional students therefore cannot be generalized to health professional students.

The fact that the number of people who attended university is still low in low income countries, which can be the case in Rwanda, constituted a limitation to the study.

Financial means to buy the video constitute a limitation though means created themselves. Time factors also: that the researcher was studying coursework too, constituted a limitation to the research process.

Data management

Soft data were stored in a computer with a password known by the researcher only, and hard data were kept in a locked cupboard at a place which is safe and secured, and none had access to the data, except the researcher and supervisors. In addition, those data will continue to be kept up to five years, then after five years the paper will be shredded and incinerated as per university policy.

The confidentiality of data will be ensured by not linking the data to the identification of the participant even during dissemination. Findings will be communicated to the authorities from the UR/CMHS and the participating college (UR/CBE) will be given feedback.

Data dissemination

The findings were reported to UR/CMHS in the form of a presentation to the examination panel. Once passed a copy of the complete thesis was posted to the library so that our study findings can be used by the academic community and researchers for further research. Once the study is accomplished the researcher intends to present data in relevant conferences as well as to publish the findings in a scientific journal.

Conclusion

This chapter described the study approach that was quantitative, study design that was quasi experimental design; the study setting was at University of Rwanda College of Business and Economics in Kicukiro District, Kigali Rwanda. The sampling strategy was stratified random sampling method where by each class from year one to year three were represented. Data collection methods used an adopted questionnaire which was validated and found to be reliable.

Data collection procedures were in respect to the academic and ethical regulations, data analysis was done using SPSS version 20 with descriptive and inferential statistics. Data management respected the regulations of the university in terms of keeping records, and ethical consideration respected the participants as participation was voluntary with informed consent, data dissemination also will be done for academic purposes.

CHAPTER FOUR: RESULTS

4.1 Introduction

This chapter presents the study results according to the objectives of the study, that were firstly to describe the knowledge of none health professional students on basic life support before video teaching after video teaching and three months later knowledge retention test were done.

The independent variables include: effectiveness of video teaching. The dependent variables were basic life support knowledge, self perceptions and its retention among non-health professional students? Significant relationships among variables were also determined.

This part of the study presents the results from Quasi experimental study conducted among University students of University of Rwanda, College of Business and Economics in Gikondo Campus in 2019. Visit was conducted in between middle February and May 2019, questions were asked in order to know from the respondents their knowledge on basic life support. The results of socio-demographic characteristics of respondents, objective questions and self-evaluation results (attitude) are going to be presented in this chapter. The data were entered in SPSS 20.0, descriptive and inferential statistical analyses were used to analyze demographic characteristics of the respondents and performance scores of the participants respectively. Here, paired sample T Test was used to test the significance.

4.1 DEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS

The demographic characteristics of the participants are represented by age, year of education and the academic department or faculty and by gender of the respondents.

From table 4.1 below, it is clear that the majority of the participants (54.7%) were males while 45.3 were females. The majority of the respondents (76.2%) were aged between 21 and 25 years of age where 40.6% of them were males and 35.6% were female of the same age group. At the second place we have respondents aged between 17 and 20 years old equaling to 13.4% where 8.1% of them were males and 5.2% were female of the same age group. The age group coming on the third place was between 26 and 30 years old encompassing 9.4% of the respondents (5.5% male and 3.9% female), 0.8% of the participants were aged between 30 and 35 years old while 0.3% were aged 36 years and above. It is deduced that the participants of this study are youth of less than thirty years old

With regard to year of education level, the majority of respondents (44.5%) were in the year one, followed by 32.5% studying in the year two, while 23.0% were studying in year three. The dominant percentage of male respondents (23.8%) were registered in year one while 20.7% were female registered in year one too.

Slightly concerning the departments from which the participants were studying, the study highlights that the majority of respondents (27.7%) were studying in Insurance, followed by 27.0% studying in Finance, 22.3% were in marketing while 11.3% were in banking, 11.0% studied BIT and only 0.8% did not mention their respective department.

Table 4.1: Demographic characteristics of the respondents (N=382)

		Gender					
		Male		Female		Total	
		fi	%	fi	%	fi	%
Age of participant	17-20	31	8.1	20	5.2	51	13.4
	21-25	155	40.6	136	35.6	291	76.2
	26-30	21	5.5	15	3.9	36	9.4
	30-35	2	0.5	1	0.3	3	0.8
	36 and above	0	0.0	1	0.3	1	0.3
	Total	209	54.7	173	45.3	382	100.0
Year of education level	Year one	91	23.8	79	20.7	170	44.5
	Year two	70	18.3	54	14.1	124	32.5
	Year three	48	12.6	40	10.5	88	23.0
	Total	209	54.7	173	45.3	382	100.0
Academic department/faculty	Marketing	39	10.2	46	12.0	85	22.3
	Insurance	58	15.2	48	12.6	106	27.7
	Finance	63	16.5	40	10.5	103	27.0
	Banking	24	6.3	19	5.0	43	11.3
	BIT	23	6.0	19	5.0	42	11.0
	Department not mentioned	2	0.5	1	0.3	3	0.8
	Total	209	54.7	173	45.3	382	100.0

Source: Field data, 2019

4.2 PRESENTATION OF FINDINGS

This section contains the results on the questions assessing the knowledge of the respondents on basic life support. The performance of respondents on each variable is analyzed and presented in the table 4.2 below, where the percentage marks during three round visits and p-values have been analyzed. The test used here is paired sample T Test.

In the assessment of the performance of respondents before video teaching and after video teaching, the researcher compared their performance before and after video teaching. Then, the comparison between their performance after video teaching and after three months was made to evaluate the capacity of the participants in retaining what they had known three months before. The sample size was 382 respondents. The output of the analysis is highlighted herein.

The respondents were asked to answer how to verify if the victim needs CPR, the percent mark they scored prior to training was 3.14% while post training they got 88.7% and p-value is 0.000 indicating the significance of mean score on the mentioned question. This reveals that video teaching they received had increased their knowledge on the way of verifying if victim needs CPR. The findings indicate that after three months, respondents still remembered what they were trained at an average of 87.2%, this is justified by $p=0.447$ which is not significant. It is clear that slight difference observed in the results obtained after video teaching and after three months is not significant to that they had forgotten what they had learnt.

When asked on how to call for help, mean percentage mark registered before training program was 6.5% and after training 75.9% ($p=0.000$) are very significant since p-value is less than 0.05. By comparing mean percentage registered after training (75.9%) and three months later 75.1% ($p=0.785$) the study proved that slight difference of percentage marks is not significant since its p value is greater than 0.05.

The researcher wanted to know if the respondents had some information on when to stop CPR. The percentage marks got by respondents are, prior to training: 11.5%, Post training: 72.5%, $p=0.000$. The study revealed that training program has increased knowledge of respondents on when they would stop CPR since p value is 0.000. By analyzing the difference recorded between percentage marks of after training and three months later post training it was 72.5% and three months later it was 72.8%, $p=0.930$. This is not statistically significant as p-value is greater than 0.05. This implies that knowledge acquired during training facilitation remained even after some period of time.

Though table 4.2 below, it is clear that the training facilities increase the knowledge of respondents on: Facilitating the victim's respiration in case of backbone damage: How is the mouth-to-mouth respiration performed, if they should perform mouth-to-mouth respiration in an unknown person, without protective equipment, if they would perform a cardiac massage, even when not having performed mouth-to-mouth respiration, function of the cardiac massage (CPR), position in which the victim must be, so that a cardiac massage is performed, appropriate body location for the performance of a cardiac massage, quality of CPR, situations in which an AED can be used safely, and what should be done next if a patient is choking and does not respond to choking maneuver as approved by the increasing mean percentage marks from prior to training to post training, $p=0.000$.

The difference between scores obtained in post training evaluation and after three months later is not statistically significant since p - values are greater than 0.05 for all variables analyzed except for the question "How is the mouth-to-mouth respiration performed" where $p=0.036$ by comparing test mean scores of post training and after three months. Here, one respondent did not answer the question before and after video teaching on basic life support and 2 of them left the same question not answered three months later. This is why their p value ($p=0.036$) seemed to be significant.

The study therefore deduces that video teachings on basic life support indeed greatly improved the knowledge of respondents, as overwhelmingly attested to by the findings, going by the high levels of agreement from respondents.

Table 5: Knowledge of respondents on Basic Life Support before and after video teaching, and after three month by variable (N=382

Variables	N	Prior to training (%)	Post training (%)	p-Value	N	Post Training (%)	After 3 month (%)	p-Value
Verifying if the victim needs CPR	382	3.14%	88.7%	0.000	382	88.7%	87.2%	0.447
How to call for help	382	6.5%	75.9%	0.000	382	75.9%	75.1%	0.785
When would you stop CPR	382	11.5%	72.5%	0.000	382	72.5%	72.8%	0.930
Facilitating the victim's respiration in case backbone damage is under suspicion	382	4.7%	79.8%	0.000	382	79.8%	79.6%	0.923
How is the mouth-to-mouth respiration performed	381	8.4%	83.7%	0.000	380	83.7%	77.9%	0.036
Would you perform mouth-to-mouth respiration in an unknown person, without protective equipment?	382	41.9%	81.7%	0.000	382	81.7%	78.0%	0.202
Would you perform a cardiac massage, even when not having performed mouth-to-mouth respiration	382	8.4%	78.5%	0.000	382	78.5%	76.4%	0.487
The function of the cardiac massage (CPR) is to push blood to vital organ such as brain	382	2.9%	79.6%	0.000	382	79.6%	76.7%	0.341
In what position must the victim be, so that a cardiac massage is performed?	382	14.1%	79.1%	0.000	382	79.1%	74.3%	0.139
What is the appropriate body location for the performance of a cardiac massage	382	3.7%	81.2%	0.000	382	81.2%	76.4%	0.109
Tickling the quality of CPR	382	4.2%	81.4%	0.000	382	81.4%	79.8%	0.588
Situations in which an AED can be used safely	382	2.4%	76.4%	0.000	382	76.4%	75.9%	0.868
A patient is choking and do not respond to choking maneuver what next?	382	6.5%	73.8%	0.000	382	73.8%	73.0%	0.804

Source: Field data, 2019 **95% Confidence Interval of the Difference**

Overall performance score of respondents before and after video teaching and then after three months period.

To assess the overall performance of all respondents prior to training, post training and after three months, the researcher used paired sample T Test of percentage marks accumulated before video teaching, after video teaching and after three months. As illustrated in table 4.3 below, the mean percentage marks registered before video teaching (9.102%) and after video teachings (79.4%) is statistically significant as $p=0.000$. Even after three months, 77.145% the difference mean remain statistically significant ($p=0.000$).

Table 4.3: Overall performance scores of respondents before and after video teaching and then after three months period (N=382)

Variables	Prior to training (%)	Post training (%)	p-Value	Post Training (%)	After 3 months (%)	p-Value
Comparison of percentage marks of prior and post video teaching and after three months	9.102%	79.420%	0.000	79.420%	77.145%	0.000

Source: Field data, 2019 95% Confidence Interval of the Difference

Performance by gender, age, year of education, and academic department

It is important to analyze the performance of respondents by their demographic characteristics because we will be aware about which population sector in terms of age, gender and year of study or departments will be keen to learn and target for capacitating with BLS.

Results from the table 4.4 below, shows that the performance of respondents by gender have been recorded. Males scored 9.275% prior to video teachings while females got 8.893% before. Post video teaching percentage marks were as follows: males: 79.131%, females: 79.769%, after three months percentage marks males were: 76.886%, females: 77.457. It is deduced that females performed better than males during the study.

The performance by age also has been highlighted where respondents aged above 30 years old performed well more than other age groups; performance by level of the study demonstrated that year three performed well generally. Performance by academic department shows that also respondents from department not mentioned performed well after video teaching and three months later.

Table 4.4: Respondents’ performance by gender, age, year of education, and academic department (N=382)

Variables	Response categories	Prior to video teaching percentage marks	post video teaching percentage marks	After three months percentage marks
		Mean (%)	Mean (%)	Mean (%)
Gender	Male	9.275	79.131	76.886
	Female	8.893	79.769	77.457
	Total	9.102	79.420	77.145
Age of participant	17-20	9.502	78.431	77.074
	21-25	9.040	79.593	77.187
	26-30	9.188	79.274	76.709
	30-35	7.692	82.051	76.923
	36 and above	7.692	76.923	84.615
	Total	9.102	79.420	77.145
Year of education level	Year one	9.502	79.321	76.923
	Year two	8.623	79.467	76.861
	Year three	9.003	79.545	77.972
	Total	9.102	79.420	77.145
Academic department/faculty	Marketing	9.774	79.367	77.828
	Insurance	9.361	79.971	77.068
	Finance	9.037	79.313	76.923
	Banking	8.766	78.354	76.386
	BIT	7.875	79.304	77.106
	Department not mentioned	5.128	82.051	79.487
	Total	9.102	79.420	77.145

Source: Field data, 2019

Self-evaluation session (self-perceptions)

In the evaluation of BLS skills/knowledge/perceptions, the researcher had asked the respondents to rank their skills or knowledge of BLS prior and after participating in training. Only 0.6% highlighted competent and outstanding when answering together (Prior to training) but after training 97.1% reported that they were competent or outstanding in the BLS skills. Therefore, it is evident that video teachings increase the competence, knowledge and skills of participants about basic life support as attested by high levels of agreement from the respondents. See table 4.5 below.

Table 4.5: Participants self perception on their skills prior and after participating in training

Level of skills	Prior to training		Post training	
	Fi	%	fi	%
Not competent	347	90.8	2	0.5
Quit competent	29	7.6	1	0.3
Average	4	1.0	7	1.8
Competent	1	0.3	122	31.9
Outstanding	1	0.3	249	65.2
Total	382	100.0	381	99.7

Source: Field data, 2019

Modes preferred by respondent in which Education materials may be delivered

Respondents were asked to tick modes of choice preferred by them in which education materials may be delivered to them. The study revealed that the majority of respondents (80.4%) highlighted “self-directed on CD room” while 7.3% said “print based”, 6.3% preferred “self-directed on internet” and finally only 6.0% marked that they prefer “face to face” mode. See Table 4.6 below.

Table 4.6: Modes preferred by respondent in which Education materials may be delivered (N=382)

	Status of the answer	Frequency	Percent
Modes by which education materials may be delivered	Face to face	23	6.0
	Print based	28	7.3
	Self-directed on CD room	307	80.4
	Self-directed on internet	24	6.3
	Total	382	100.0

Source: Field data, 2019

Conclusion

This chapter presented findings, analysis were done using software SPSS 20.0. The data were entered in SPSS 20.0, descriptive and inferential statistical analyses were used to analyze demographic characteristics of the respondents and performance scores of the participants respectively. Paired sample T Test was used to test the significance. Cronbach’s alpha was calculated to ensure reliability Statistics which produced the results as coefficient alpha of: 0.615 which is acceptable. Tables in this chapter show: Demographic characteristics of respondents, knowledge of respondents on basic life support before and after video teaching, and after three month by variable, Overall performance score of respondents before and after video teaching and then after three months period, Performance by gender, age, year of education, and academic department, participants attitude on skills prior and after participating in training, modes preferred by respondent in which education materials may be delivered.

The next chapter will discuss the study findings in accordance with the other literature.

CHAPTER FIVE: DISCUSSION

5.1. Introduction

This chapter will discuss on different findings about the demographics of participants, which include their levels of education, age and gender, In addition, will be discussed, findings on the knowledge of students before video teaching, the knowledge of students after video teaching including the retained knowledge after three months post video teaching, in the context of other similar or contradictory studies and the conceptual framework. The significant associations will also be discussed, and the chapter will end up with the conclusion and recommendation.

5.2. Discussion of demographic findings

In this study the performance of respondents by gender has been recorded. Males scored 9.275% prior to video teaching while females got 8.893% before. Post video teaching percentage marks were as follows: males: 79.131% and females: 79.769%, after three months percentage marks were males: 76.886% and females: 77.457.

It is therefore deduced that females slightly performed better than males which is contrary to the study done by Stroobants, J. *et al.* (2014) titled Schoolchildren as BLS instructors for relatives and friends: Impact on attitude towards bystander CPR which revealed that Gender had a significant difference with males scoring better – $P = 0.008$).

5.3. Discussion on effectiveness of video teaching on knowledge regarding BLS

In this study the overall performance of all respondents prior to training, post training and after three months is presented. The researcher used paired sample T Test to compare the means of overall percentage marks obtained before video teaching, after video teaching and after three months. The mean percentage marks registered before video teaching (9.102%) and after video teachings (79.4%) is statistically significant as $p=0.000$. Even after three months, 77.145% the difference mean remain statistically significant ($p=0.000$).

This is similar to the study done by Nielsen, A. M. *et al.* (2010) titled Acquisition and retention of basic life support skills in an untrained population using a personal resuscitation manikin and video self-instruction (VSI). They found a significant increase in the total score 3–4 months after the course ($p < 0.0001$) from 26.5 (39% of the maximum score) to 34 (61% of the maximum score) points

The present study also has similar results with the study done by Contri, E. *et al.* (2016) titled Video-based compression-only CPR teaching: A feasible and effective way to spread CPR in secondary schools. The study results showed that 100% of students knew when to perform chest compressions and when to call EMS, 98% how to evaluate if a person had a cardiac arrest; 96% knew the correct BLS sequence (check safety – check consciousness and breath – call EMS – start CO-CPR); 92% knew the right chest compression depth and rate. During the practice assessment, they found a median C depth of 45.5mm (95%CI, 40.3–50.3), a median C rate of 118cpm (95%CI, 113.7–127), a median C hand% of 100% (95%CI, 100–100) and a median C rel% of 90% (95%CI, 74.3–97). In this study the researchers concluded in their study that video-based only CO-CPR training in schools may be feasible and effective with rather good performance results. The researcher highlighted that, it is reasonable to consider a short instructor course for teachers that could improve students CPR quality.

This study is contrary to Mardegan, K. J., Schofield, M. J. and Murphy, G. C. (2015), in their study titled Comparison of an interactive CD-based and traditional instructor-led Basic Life Support skills training for nurses. Results indicate that there was very low retention of skill competence at eight weeks post training with no statistically significant differences ($p \leq 0.05$), between those who undertook the CD or traditional programme for the Novice (39–42%), Practising Nurses (38–44%) and when the cohorts were combined (41%).

Saša Sopka *et al.* (2012) in their study titled Evaluation of a newly developed media-supported 4-step approach for basic life support training concluded that the “media-supported 4-step approach” leads to comparable practical ECC-performance compared to standard teaching, even with respect to retention of skills. Therefore, the “media-supported 4-step approach should be useful in special educational settings where, for example, instructors’ resources are sparse or large-group sessions have to be prepared.

5.4. Discussion on self-perception of student before and after video teaching.

In this study the evaluation of respondent's attitude was assessed, the researcher asked the respondents to rank their skills or knowledge of BLS prior and after participating in training. Only 0.6 % highlighted competent and outstanding when answering (Prior to training) but after training 97.1% reported that they were competent or outstanding in the BLS skills. Therefore, it is evident that video teachings increase the competence, knowledge and skills of participants about basic life support as attested by high levels of agreement from respondents. Similarly to the study done by Stroobants, J. *et al.* (2014) on Schoolchildren as BLS instructors for relatives and friends: Impact on attitude towards bystander CPR _ Instructing schoolchildren to teach their relatives and friends in Basic Life Support (BLS) led to a more positive attitude towards BCPR.

In the same context the study done by Saša Sopka *et al* (2012), on "Evaluation of a newly developed media-supported 4-step approach for basic life support training" Overall, at least 99% of the intervention group (n = 99; mean 1.5 ± 0.8; 6-point Likert scale: 1 = completely agree, 6 = completely disagree) agreed that the video provided an adequate introduction to BLS skills.

5.5. Conclusion

This chapter discussed on the findings about demographic data, whereby female performed better in this study than male. Findings on effectiveness of video teaching on improving knowledge and its retention has been discussed. The increases of knowledge were found to be associated with video teaching. The chapter also accommodates discussion on respondent self-perception of their competence pre and post video teaching and found that video teaching has increased positively participant's attitude towards their competence.

The next chapter concludes on this study and gives recommendations accordingly.

CHAPTER SIX: CONCLUSION AND RECOMMENDATION

6.1. Introduction

As previously mentioned in chapter one, this study aimed to assess the effectiveness of video teaching on basic life support knowledge, self-perceptions and its retention by non-health professional students at the University of Rwanda, School of Business and Economics. This chapter draws the conclusion of this study and provides recommendations that are needed, with regard to the objectives that were intended.

6.2 conclusions

To summarize on this study, anyone can save life with early CPR initiated and the chance of survival increases for the victim. No matter how fast the responding medical team either in developed or developing countries the role of laypersons remain crucial in life saving. In chapter one the study had the objectives of the study which were to assess the effectiveness of video teaching on basic life support knowledge, self-perception on their BLS skills and its retention of non-health professional students at the University of Rwanda, School of Business and Economics. In chapter two, the literature shows that where applied teaching lay people has been effective across the world. Chapter three described the procedure of collecting data from College of Business and Economics, pretest, posttest and retention test after three months. The fourth chapter has presented data analyzed using SPSS v20 with statistical and inferential analysis. Chapter five compared the findings of this study to other studies and findings showed that both to knowledge and self-perceptions, video teaching has been effective to both knowledge and self-perception. However there is a need to do further research on basic life support teaching in the community.

6.3 Recommendations of the study

In this study, the overall performance of all respondents prior to training, post training and after three months is analysed. The researcher used paired sample T Test of percentage marks accumulated before video teaching, after video teaching and after three months. The mean percentage marks registered before video teaching (9.102%) and after video teachings (79.4%) is statistically significant as ($p=0.000$). Even after three months, 77.145% the difference mean remain statistically significant ($p=0.000$). Therefore the study concluded that the video teaching is an effective method of teaching basic life support to non-health students.

The researcher also asked the respondents to rank their skills or knowledge of BLS prior and after participating in training. Only 0.6 % highlighted competent and outstanding when answering (Prior to training) but after training 97.1% reported that they were competent or outstanding in the BLS skills. Therefore, it is evident that video teaching increases the competence, knowledge and skills of participants about basic life support as attested by high levels of agreement from respondents.

Therefore, we recommend to:

6.3.1. To the Ministry of Education

In education: To provide knowledge regarding basic life support to all students at the university level.

In research: to encourage further research regarding basic life support education and dissemination to the community.

6.3.2. To the Ministry of Health

In research: there is a need of further research on basic life support and using available methodologies in the community.

In policy making: to set policy that promotes an increase of knowledge regarding basic life support to all.

6.3.3 To the University of Rwanda and other Researchers

In research: There is a need to do further research on effectiveness of video teaching most importantly experimental research would clearly show the privilege of such methodology.

In education: As an academic program starts with orientation day, the researcher recommends to provide basic life support to all students during induction period of time using such video teaching across all campuses.

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Appendix I. : Questionnaire

Data collection instrument Basic life support

Kigali, ____ / ____ / ____

I. DEMOGRAPHIC DATA

- A. Identification initials: _____
- B. Age: (17-20);(21-25); (26-30); (31-35); 36 and ABOVE
- C. Gender: () f () m
- D. Education level: _____
- E. Origin(Department/ faculty):

II. BASIC LIFE SUPPORT

A. How to verify if the victim needs CPR?

- 1. Looking at the chest, belly movement
- 2. Call him in his name
- 3. Tap on both shoulders and shout
- 4. I don't know

B. How to call for help

- 1. Call your friend phone number
- 2. Call police phone number
- 3. Call 912
- 4. I don't know

C. When would you stop CPR?

- 1. after 5 minutes
- 2. after one hour
- 3. When the victim react or emergency (medical) team arrive.
- 4. I don't know

D. How is it possible to facilitate the victim's respiration in case backbone damage is under suspicion?

1. Anyhow
2. Raising the victim's head
3. Lowering the victim's head and raising the victim's chin
4. Sitting the person down
5. I don't know

E. How is the mouth-to-mouth respiration performed?

1. Leaning the victim's head backwards, opening his mouth, filling the chest with air, blow in the victim's mouth.
2. Make the victim's head backward, closing nose, opening his mouth, filling the chest with air, Blow in the victim's mouth.
3. To blow inside the person's mouth.
4. I don't know

F. Would you perform mouth-to-mouth respiration in an unknown person, without protective equipment?

yes no

H. Would you perform a cardiac massage, even when not having performed mouth-to-mouth respiration?

yes no

H. the function of the cardiac massage (CPR) is to push blood to vital organ such as brain. (yes) (no)

I. In what position must the victim be, so that a cardiac massage is performed?

- 1- Laid on his back, on a plane and rigid surface, with his head slightly inclined backwards.
- 2- Laid on his back
- 3- In any position
- 4- He must remain in the same position after passing-out
- 5- I don't know

J. What is the appropriate body location for the performance of a cardiac massage?

- 1- Two fingers before the edge of the middle-chest bone
- 2- On the heart

3- () On the middle chest

4- () Anywhere

5- () I don't know

K. Do you know how the cardiac massage should be performed,?

Yes () no, ()

L. Among the following tick the quality of CPR

1. Rapidly

2. Slow and not painful

3. Push hard and fast

4. All above

5. None of them

6. I don't know

L. An AED can be used safely in which of the following situations

Except:

1. Victim lying in the snow

2. Victim with an implanted pacemaker

3. Victim with a transdermal medication patch on

4. Victim lying partially in water

N. A patient is choking and do not respond to choking maneuver what next?

1. Leave him/ her a moment

2. Call a friend of him

3. Take him to the hospital

4. Lay him/ her down, call for help and start CPR

5. I don't know.

Part III Self-evaluation session (self-perception)

O. Delivery of education contents:

Education materials may be delivered in the following modes. Which one do you prefer?

1. Face to face lectures
2. Print based (on paper) self-directed learning packages
3. Self-directed learning packages on CD ROM
4. Self-directed learning packages on internet
5. No preference

Q. How would you rate your BLS skills prior to participating?

In this program (1 = not competent , 5 = outstanding) 1 2 3 4 5

R. How would you rate your BLS skills after completing the

Program (1 = not competent , 5 = outstanding) 1 2 3 4 5

S. Following completion of the program, if you were

Now required to perform BLS in an emergency:

Do you think you could? Yes No

How confident do you feel?

(1 = not confident , 5 = very confident) 1 2 3 4 5

Thank you

APPENDIX II : Information document

Dear Participant,

I, KAYUMBA Jean de Dieu, a Masters student at UR/CMHS, School of Nursing, we are conducting this study on the “effectiveness of video teaching on basic life support knowledge and retention of non-health professional students at the university of Rwanda”. To complete this study, we would like to invite you to participate in the study and provide information that is required. We therefore need to provide you the following information regarding this study. We will collect information on demographic data, knowledge regarding basic life support, and self-evaluation on knowledge. We shall provide you an education session on basic life support (how to save life) the questionnaire will be given to assess your knowledge after the learning session. We would suggest you to attend the one hour test three months later after the education session.

Your participation in this study is voluntary; and there is no obligation to do so.

If you consent to participate, you have the right to withdraw any time if you feel uncomfortable to continue, and without any inconvenience.

Only your participation will inconvenience your time, as your contribution that we are requesting. The completion of the session will take about one hour, for three days.

The individual responses you will provide will be kept confidential, and they will not be linked to your name.

To your identity through the data management process and the questionnaire will not require you to put your name, only your signature will be needed for consent.

The data collected from you will be captured in the computer using codes and this data will be analyzed without any link to these facilities in such a way that it is not possible to link any information to its source.

You are free to ask any question for more clarification, and the data collector will be there to respond accordingly. Below are addresses for the researcher that you may contact if you need to do so.

Thankyou,

Jean de Dieu KAYUMBA

Email: kayumba5j5@gaimail.com

Phone: 0788543032

Date & Signature

Supervisor:

MRS Florence Mukarugwiza

Address

Phone number

Co-supervisor:

Prof, Busisiwe Rosemary Bhengu

School of nursing and midwifery

College of Medicine and Health Sciences.

Remera campus

University of Rwanda

Kigali

Phone number +250782333732

Appendix III: Consent form (English)

Consent Form

Declaration

I..... (Initials of the participant),

By signing this document, I give my consent to participate in the study entitled “**effectiveness of video teaching on basic life support knowledge and retention of non-health professional students at the University of Rwanda**”.

Written and oral information was provided to me, and I understood the nature of the study, and found convenient to participate in the study.

I was informed that the participation in the study is voluntary, and I guarantee my participation freely.

It was agreed that I can withdraw from the study if I opt to do so without any inconvenience, and that the information I will provide will be kept confidential, and will not be linked in any manner to my identification throughout the whole research project.

Names

Signature

Witness

Names

Signature.....

Appendix IV Amasezeranoyokumenyesha no kwemera (Mukinyarwanda)

Njyewe

Nemeyekugirauruhare muri ububushakashatsi maze gusobanurirwa ,gusoma no kumvanezaicyobugaje.

Numviseimpamvuyabwokoariugeragezauburyobwokwigishaubutabazibwibanzechakoreshejweam ashushoasobanuye.

Nahaweumwanyanuburenganzirabwokubazaibibazobyosebirebanan’ubushakashatsikandinasoba nuriwekomfiteuburenganzirabwokwikura muri ububushakashatsiigihecyosenabishakantampamvuntanze.

Amazina:

Umukono:.....

Umutangabuhamya

Amazina :

Umukono:.....

Appendix V Permission and authorization to use questionnaire

