

KNOWLEDGE ON HAND HYGIENE COMPLIANCE
AMONG HEALTH CARE WORKERS AT SURGICAL
WARDS IN HOSPITAL UNIVERSITI SAINS
MALAYSIA

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by

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LIST OF ABBREVIATION

CDC	: Center Disease Control
CME	: Continuing Medical Education
CNE	: Continuing Nursing Education
H ₀	: Null Hypothesis
H _A	: Alternative Hypothesis
HBM	: Health Belief Model
HCAIs	: Health Care Associated Infections
HCWs	: Health Care Workers
HH	: Hand Hygiene
HREC	: Human Research Ethical Committee
KKM	: Kementerian Kesihatan Malaysia
SOP	: Standard Operating Procedure
SPSS	: Statistical Package for Social Science
TDF	: Theoretical Domains Framework
UKJEH	: Unit Kawalan Jangkitan & Epidemiologi Hospital
USM	: Universiti Sains Malaysia
WHO	: World Health Organization

PENGETAHUAN KEPATUHAN PENCUCIAN TANGAN DALAM KALANGAN ANGGOTA KESIHATAN DI WAD SURGERI HOSPITAL UNIVERSITI SAINS MALAYSIA

ABSTRAK

Mempraktikkan kebersihan tangan, melalui kaedah mencuci tangan dengan air dan sabun atau menggunakan sapuan tangan berasaskan alkohol, adalah kaedah yang berkesan untuk mencegah jangkitan. Anggota kesihatan, yang terlibat dalam perawatan pesakit secara langsung atau tidak langsung, tidak mengamalkan pematuhan kebersihan tangan dengan betul kerana pengetahuannya tidak memuaskan. Oleh itu, kajian ini bertujuan untuk mengenal pasti tahap pengetahuan dan halangan pematuhan kebersihan tangan dalam kalangan anggota kesihatan di wad operasi Hospital Universiti Sains Malaysia. Seramai 140 anggota kesihatan dari wad 2 Intan dan 3 Utara mengikut kategori termasuk doktor pakar, doktor perubatan dan operasi, jururawat, ahli fisioterapi, pakar diet dan pembantu penjagaan kesihatan terlibat dalam kajian ini. Kajian ini telah dijalankan dengan menggunakan reka bentuk keratan rentas. Data telah diperolehi melalui satu set soal selidik yang diadaptasi dari Saharman et al. (2019) dan dianalisa menggunakan SPSS versi 26. Pearson Chi-Square digunakan untuk menentukan perkaitan antara ciri sosio-demografi dengan tahap pengetahuan mengenai pematuhan kebersihan tangan. Majoriti responden yang terlibat dalam kajian ini mempunyai tahap pengetahuan yang baik mengenai pematuhan kebersihan tangan (n=120, 86.0%). Terdapat lima faktor iaitu umur, jantina, bangsa, profesion, dan pengalaman kerja menunjukkan bahawa tidak terdapat hubungan yang signifikan dengan tahap pengetahuan yang baik mengenai pematuhan kebersihan tangan di mana nilai $p > 0,05$. Penemuan ini menunjukkan keperluan untuk meningkatkan tahap kesedaran dan menambah baik tahap pengetahuan serta halangan berkenaan pematuhan

kebersihan tangan dalam kalangan anggota kesihatan sebagai langkah pencegahan masalah jangkitan silang di masa hadapan.

KNOWLEDGE ON HAND HYGIENE COMPLIANCE AMONG HEALTH CARE WORKERS AT SURGICAL WARDS IN HOSPITAL UNIVERSITI SAINS MALAYSIA

ABSTRACT

Practices hand hygiene, through methods washing the hands with water and soap or using alcohol-based hand rub, is a effective way to prevent infections. The healthcare worker, who is involved in patient care directly or indirectly, not practice properly on hand hygiene compliance because of their the knowledge were not satisfaction. Thus, this study aims to assess the level knowledge and a barriers on hand hygiene compliance among health care workers in the surgical ward of Hospital Universiti Sains Malaysia. Total of 140 healthcare workers from wards 2 Intan and 3 Utara by category including physicians, specialist doctor, medical and surgical doctors, nurses, physiotherapists, dietitian and health care assistants were involved in this study. A cross-sectional study design was employed. Data was collected through a set of questionnaires adapted from Saharman et al. (2019) and analysed using SPSS version 26. Pearson Chi-Square Test was used to determine the association between socio-demographic characteristics with the knowledge level on hand hygiene compliance. The majority of the respondents in this study had good knowledge level on hand hygiene compliance (n=120, 86.0%). Among the five factors (age, gender, race, profession and work experience) , it also showed that there was no significant association with knowledge level as p -value > 0.05. These findings revealed that there was a need to increase healthcare workers awareness and improve their knowledge level and barriers on hand hygiene compliance as a preventive measure for further in preventing of healthcare associated infection (HCAIs).

CHAPTER 1

INTRODUCTION

1.1 Background to the Study

Practicing hand hygiene, through methods washing the hands with water and soap or using alcohol-based hand rub, is a simple effective way to prevent infections. The healthcare worker, who is involved in patient care directly or indirectly, should be aware how importance of hand hygiene and must be done properly. The studies had shown that the compliance among health care workers is not good. A problems to compliance with hand hygiene have been explained include lack of education, allergic, high work load, working status and not being aware of implementation guidelines. This caused by the knowledge of hand hygiene level had moderate in developed countries (Zakeri et al., 2017).

Hand hygiene compliance among healthcare workers is associated with their knowledge and perception (Santosaningsih et al., 2017). Hand hygiene is the simplest and most cost-effective practice for controlling health care associated infections (HCAIs). Level of compliance and non compliance to hand hygiene (HH) among health care workers (HCWs) should be investigated in all health care settings. The studied show, HCWs had satisfactory knowledge level of hand hygiene only 15.5% and 55.8% had a fair level of knowledge (Salama et al., 2017). Knowledge on hand hygiene among physicians and nurses, showed the results a moderate (Dreidi et al., 2016).

Hand hygiene means cleaning the hands by using hand washing (with soap and water), antiseptic hand rub (alcohol based including foam or gel), or surgical hand antisepsis (Center Disease Control, 2020). Hand hygiene is defined method that removes or destroys microorganisms on hands with proper hand washing techniques, adequate drying of hands post washing, and the use of hand sanitisers (Initial, 2020).

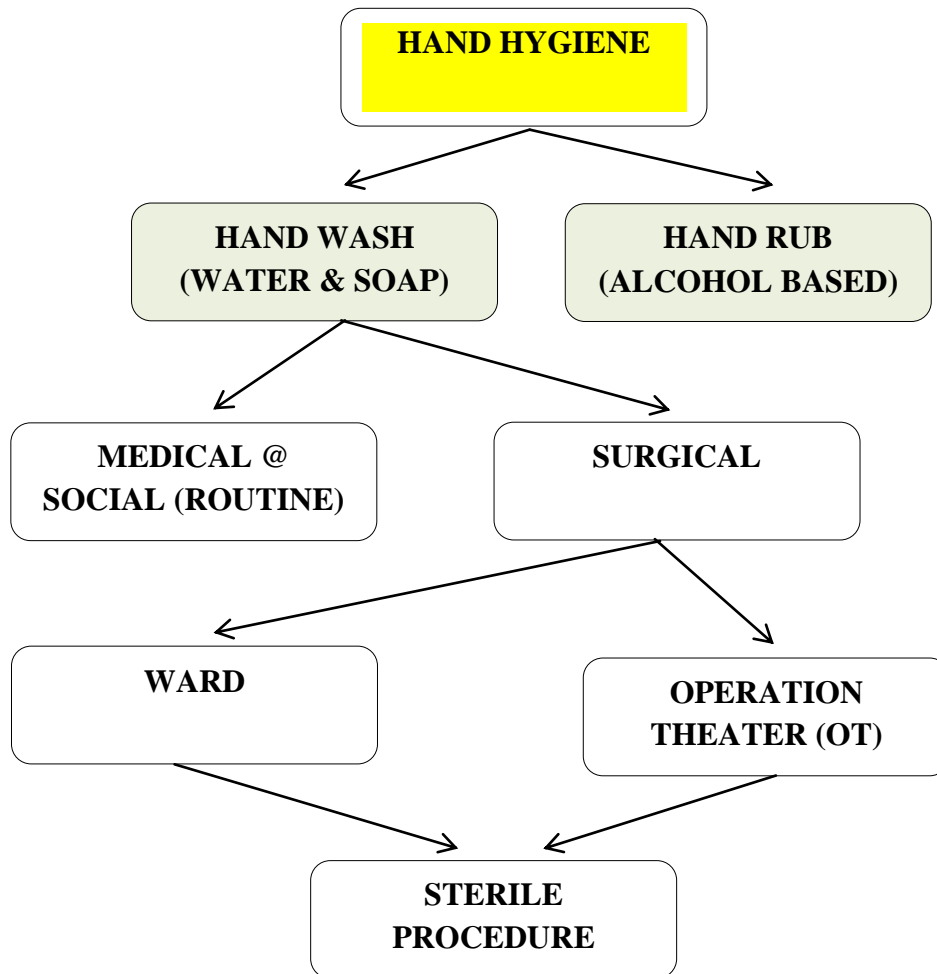


Figure1.1: Types of Hand Hygiene
Source: (Adapted from Baltazar, 2013)

According to Bhattacharya et al. (2020), hand washing is a critical way to prevent the spread of germs by reduces potential pathogens on the hands. Therefore, hand hygiene is considered a primary measure for reducing the risk of transmitting infection among patients and health care workers (Center Disease Control, 2016). Implementation of good hand hygiene practices is the most effective method to reduce the prevalence of healthcare associated infections. Hand hygiene practices to a greater extent are influenced by knowledge level and compliance hand hygiene among health care workers. Hence, improper hand hygiene practices will be increased burden on healthcare systems and leads to emergence of drug resistant bacteria in community (Goyal et al., 2020).

Healthcare associated infections (HCAs) are caused by environmental pathogens or patients endogenous flora. In developed countries, about (5–15)% HCAs case on patients of hospitalized (Organisation World Health, 2017). Healthcare workers (HCWs) hands are the more frequent carriers for the microorganisms. Healthcare providers need to clean their hands many times depending on patients and intensity of care (CDC, 2020). However, hand hygiene compliance rates among nurses and doctors in hospitals are very low. Therefore, improvement in the hand hygiene knowledge a highly significant regarding hand hygiene compliance with multifaceted improvement program includes continuous monitoring and regular interventions (Saharman et al., 2019). Thus, infections are often associated to inadequate hand hygiene practices among healthcare workers and poor clinical conditions during hospitalization (Musu et al., 2017).

Effective hand hygiene practice by health care workers is crucial to prevent of healthcare associated infection (HCAIs) accordingly the World Health Organization (WHO) *five moments hand hygiene* (Marin & Bhsc, 2020). The health care worldwide has been always associated with a potential of safety problems to the patient. Poor adherence to hand hygiene practices is one of the most important cause of transmission of HCAIs (World Health Organization , 2009). The aim of this study explain the importance knowledge level on hand hygiene and barriers of hand hygiene compliance in preventing of healthcare associated infection (HCAIs). It measured through a set of self-administered questionnaires based on the Saharman et al. (2019), adapted from WHO's 'Hand Hygiene knowledge questionnaire'.

1.2 Problem Statement

Hand hygiene (HH) is a critical component for hospital acquired infection (HCAIs). This study was designed to develop an intervention approach to improve regarding hand hygiene compliance among healthcare workers in a hospital setting (Mu et al., 2016) . Good knowledge level on hand hygiene compliance among healthcare workers (HCW) were encouraged them to make it a habit in working area and to prevent the infections. Lack of knowledge and not proper hand hygiene practices among healthcare workers has been identified as a core facilitator of hospital acquired infections (Le et al., 2019).

According to (Ahmed et al., 2020), compliance of hand hygiene among health care workers still unsatisfied. Factors affecting to these unsatisfactory results include a lack of knowledge level, awareness about hand hygiene and practices among healthcare workers . In addition, implementation of good hand hygiene practices is the simplest and most effective method to reduce the healthcare associated infections (Goyal et al., 2020).

Healthcare associated infection a cause of high morbidity, disability, reduced quality of life, mortality and increasing costs in health systems (Musu et al., 2017). The health burden of healthcare acquired infections very high about 15% of patients admitted to hospitals are getting of HCAs, in developing countries leading to significant mortality rates (Phan et al., 2018). Therefore, this places significant economic burden on health care expenditure. Next, HCAs potentially complicate during treatment to patient, lead to life threatening and also burden patients economically with prolonged hospital stays (Le et al., 2019).

In Hospital USM, audit hand hygiene compliance was done by Unit Kawalan Jangkitan & Epidemiologi Hospital (UKJEH) in 4 times per years (Jan - Mar, Apr - Jun, July- Sept and Oct - Dec) among healthcare workers in different departments include medical, surgical, ortho, pediatric, obstetrics & gynecology, ophthalmology, otorhinolaryngology, plastic, critical, oncology & hematology as suggested by Kementerian Kesihatan Malaysia (KKM). Audits are conducted in a way by awareness of hand hygiene, the knowledge level and *five moment hand hygiene* observed by opportunities using Annex 34 (Observation form) as recommended by World Health Organisation (WHO) guideline among healthcare workers by departments. Hand

hygiene compliance rate must be above 75% as followed by Kementerian Kesihatan Malaysia (KKM) but the achievement set by Hospital USM is 80%. The results regarding audit hand hygiene in Hospital USM are between 79% to 100%. Through this study, the knowledge level on hand hygiene and a barriers of hand hygiene compliance were assessed among healthcare workers at surgical ward in Hospital USM.

1.3 Research Questions

1.3.1 What is the knowledge level on hand hygiene compliance among healthcare workers at surgical ward in Hospital USM?

1.3.2 What is a barriers of hand hygiene compliance among healthcare workers at surgical ward in Hospital USM?

1.3.3 Is there is any association between demographic data (age, gender, race, profession and work experience) with the knowledge level on hand hygiene compliance among healthcare workers at surgical ward in Hospital USM?

1.4 Research Objectives

1.4.1 General Objective

To assess the knowledge level on hand hygiene and to identify a barriers of hand hygiene compliance among healthcare workers at surgical ward in Hospital USM.

1.4.2 Specific Objectives

- 1) To identify the knowledge level on hand hygiene compliance among healthcare workers (physicians, doctors, nurses, physiotherapist, dietitian and health care assistant) at surgical ward in Hospital USM.

- 2) To identify a barriers of hand hygiene compliance among healthcare workers at surgical ward in Hospital USM.
- 3) To determine the association between demographic data (age, gender, race, profession and work experience) with the knowledge level on hand hygiene compliance among healthcare workers at surgical ward in Hospital USM.

1.5 Research Hypothesis

The hypothesis for this study is:

Ho - There is no significant association between demographic data (age, gender, race, profession and work experience) with the knowledge level on hand hygiene compliance among healthcare workers at surgical ward in Hospital USM.

HA - There is a significant association between demographic data (age, gender, race, profession and work experience) with the knowledge level on hand hygiene compliance among healthcare workers at surgical ward in Hospital USM.

1.6 Significance of the Study

This study provided the information on the knowledge level on hand hygiene and a barriers of hand hygiene compliance among healthcare workers at surgical ward in Hospital USM. The information gained can help in improving knowledge , awareness and practices regarding hand hygiene compliance among healthcare workers at surgical ward in Hospital USM. This concept defines key moments during routine patient care activities when hand hygiene is required to stop transmission of infectious organisms via the hands in healthcare settings. It represents a shift from the traditional ‘two moments’ view of hand hygiene which emphasizes hand hygiene immediately before and at the end of patient care activity.

Therefore, in this study effective measure for preventing healthcare associated infections (HCAIs). Even healthcare providers are at risk of getting an infection while they are treating patients. Hand hygiene is a basic requirement for paramedic in a hospital setting today. Keeping in mind the drastic consequences of the spread of hospital associated infections, it is evident that hand hygiene should be stressed upon. The rising incidence of healthcare associated infections (HCAIs) and their complications can be prevented by raising awareness about hand hygiene practices through the health education and awareness programme plan in future.

Thus, this study can improving the quality of care to patients and improving patient safety. Clean hands can protect a patient in a healthcare facility. Hand hygiene should be a topic of conversation between healthcare providers and patients. Healthcare providers can explain how and why they clean their hands before, after, and sometimes during patient care, and let patients know it's ok to ask about hand hygiene. Patients and their visitors can protect themselves by cleaning their own hands often.

1.7 Conceptual and Operational Definitions

1.7.1 Knowledge

Awareness, understanding or information that has been obtained by experience or study, and that is either in a person's mind or possessed by people generally (American Dictionary, 2020). In this study, understanding, knowledge on hand hygiene compliance among healthcare workers at surgical ward in Hospital USM have been assessed in the section B (Knowledge) of the questionnaires.

1.7.2 Hand Hygiene Compliance

Hand hygiene is the most important to avoid the transmission of harmful germs and prevent healthcare associated infections (World Health Organization, 2017). Hand hygiene is considered a primary measure for reducing the risk of transmitting infection among patients and healthcare workers (Boyce, J.M., Pittet, 2002). Compliance defines the act of obeying an order, rule, or request (Cambridge Dictionary, 2019). Hand hygiene compliance is by the World Health Organisation (2009) as an action of performed at any of the following moments (*five moments of hand hygiene*). In this study, hand hygiene compliance will be referring regarding knowledge level on hand hygiene and a barrier of hand hygiene compliance among healthcare workers at surgical ward in Hospital USM will be assessed in the section B (Knowledge) and section C (Barriers) of the questionnaires.

1.7.3 Health Care Workers

Health care worker are paid and unpaid persons serving in healthcare settings, who are delivers care and services to the sick persons either directly as doctors and nurses or indirectly as aides, laboratory technicians, or medical waste handlers (Centers for Disease Control and Prevention, 2020). In this study, healthcare workers focus only physicians, doctors, nurses, physiotherapist, dietitian and health care assistant at surgical ward in Hospital USM.

1.7.4 Surgical Ward

The surgical unit includes an inpatient ward, a surgical outpatient clinic, an oncological outpatient clinic and an outpatient clinic of physical and rehabilitation medicine. Thus, a surgical ward takes care of patients with surgical conditions which include laminectomy, craniotomy, septoplasty, appendectomy, hysterectomy, maxillofacial surgery among others (*Surgery Ward*, 2019). Surgical wards in Hospital USM includes Cardiac surgery, Pediatric surgery, Orthopedic surgery , Traumatology, Ophthalmology, Otolaryngology, Neuro surgery, Plastic surgery, Vascular Surgery, Urology and General surgery. In this study, surgical ward focus only general surgical ward at 2 Intan (Male Surgical Ward) and 3 Utara (Female Surgical Ward) because of hand hygiene compliance rate unsatisfactory and increase the infection rate (Ukjeh, 2020). Another reasoning we choose the general surgical ward because of the time consuming.

CHAPTER 2

LITERATURE REVIEW

2.1. Introduction

This chapter reviewed the current literature related to knowledge on hand hygiene compliance among healthcare workers at surgical wards in hospital USM. Literature search was done by using main keywords knowledge, hand hygiene compliance, healthcare workers and surgical ward. Overall Audit Hand Hygiene in Hospital USM was done four times per years, including Audit Hand Hygiene by Departments, Audit Hand Hygiene Ward Surgery (2 Intan & 3 Utara) as targeted wards and relationship with Healthcare Associated Infections (HCAIs) from January to December 2020 in Hospital USM (Ukjuh, 2020). Hence, it showed in the Table 2.1 to Table 2.4 as below. This chapter also discussed the theoretical framework that was used in this study.

Table 2.1: Overall Audit Hand Hygiene in Hospital USM

No	Months	Results (%)
1.	Jan – Mar	90
2.	Apr – Jun	88
3.	Jul - Sept	86
4.	Oct - Dec	88

Table 2.2: Audit Hand Hygiene by Departments in Hospital USM

No	Departments	Month	Results (%)	Month	Results (%)	Month	Results (%)	Month	Results (%)
1.	Medical	Jan – Mac	84	Apr – Jun	80	Jul- Sept	79	Oct - Dec	83
2.	Surgical		90		92		84		93
3.	Ortho		85		88		82		91
4.	Pediatric		91		92		90		89
5.	Ophthalmology		83		74		79		86
6.	Critical		91		96		95		94
7.	Obstetrics & Gynecology,		92		90		88		84
8.	Psychiatry		100		96		93		87
9.	Others*		95		88		89		89

Others* : Otorhinolaryngology, Plastic, Oncology & Hematology

Table 2.3: Audit Hand Hygiene Ward Surgery (2 Intan & 3 Utara) in Hospital US

Bil	Wad	Results %			
		Jan - Mar	Apr - Jun	Jul - Sept	Oct - Dec
1	2 I	88	97	83	91
2	3 U	83	88	74	95

Table 2.4: Healthcare Associated Infections (HCAIs) Ward 2 Intan & 3 Utara (January – December) 2020 in Hospital USM

Ward	Types Of HCAIs	Jan	Feb	Mac	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
2I	Hospital Acquired Pneumonia (HAP)	0	0	1	0	2	0	0	1	0	0	1	1
	Surgical Site Infection (SSI)	0	0	0	1	0	0	1	0	0	0	0	0
	Cerebrospinal Fluid Infection (CSF)	0	0	0	1	0	0	0	0	1	0	0	0
	Urinary Tract Infection (UTI)	0	0	0	0	0	0	1	0	0	0	0	0
	TOTAL	0	0	1	2	2	0	2	1	1	0	1	1
3U	Hospital Acquired Pneumonia (HAP)	0	1	0	0	0	2	0	0	2	0	1	0
	Thrombophlebitis	0	0	1	0	0	0	0	0	0	0	0	0
	Catheter-Related Bloodstream Infection (CRBSI)	0	0	0	1	0	0	0	0	2	0	0	0
	Bloodstream Infection (BSI)	0	0	0	0	1	0	0	0	1	0	0	0
	Surgical Site Infection (SSI)	0	0	0	0	0	1	0	1	0	2	0	0
	Cerebrospinal Fluid Infection (CSF)	0	0	0	0	0	1	0	0	0	0	0	0
	TOTAL	0	1	1	1	1	4	0	1	5	2	1	0

(UKJEH, 2020)

2.2 Review of related literature

2.2.1 Knowledge

Hand hygiene is effective ways to control healthcare related infection. The main healthcare workers contacting with patients are nurses and physicians, which is the vector in chain of infection. Hand hygiene compliance rates among nurses and doctors in hospitals are often very low due to lack of knowledge about hand hygiene (Saharman et al., 2019). Females had higher knowledge scores compared to males. However, the study done among health professionals in Dubti Referral Hospital Ethiopia, Southeast Ethiopia, in which 82.9% had good knowledge and 17.1% had poor knowledge (Jemal, 2018). Based on the study done among 200 nurses and physicians, the results showed

that the participants had a moderate knowledge regarding the hand hygiene (Dreidi et al., 2016). This phenomenon was also recently reported for hand hygiene compliance in a hospital setting (Baier et al., 2020). Practicing hand hygiene, either washing the hands with water and soap or using alcohol based hand rub, is a simple effective way to prevent infections . Any healthcare worker, who is involved in patient care directly or indirectly, should be aware of hand hygiene importance and also be able to carry out hand hygiene properly (Zakeri et al., 2017).

2.2.2 Hand Hygiene Compliance

Hand hygiene compliance including knowledge on hand hygiene, training, availability of adequate soap and water, availability of alcohol-based hand rub, and attitude of health care providers (Engdaw et al., 2019). Studies substantiate the connection between hand hygiene and healthcare associated infections (HCAIs); however, hand hygiene compliance among healthcare workers (HCWs) remains alarmingly low, with average rates 40% to 50%, in spite of widespread education and awareness.

Hand hygiene compliance in healthcare setting can monitored directly or indirectly. Direct methods include direct observation, patient assessment or health care workers (HCW) self-reporting while indirect methods include monitoring consumption of products, such as soap or handrub, and automated monitoring of the use of sinks and handrub dispensers (World Health Organization, 2009). A recent study by Chang et al., (2016), indicates that entry and exit compliance may be the more feasible option for direct observation of hand hygiene compliance.

Hand hygiene is any action of hand cleansing includes hand washing with antimicrobial soap (detergent) containing an antiseptic agent dislodge transient microorganisms or other contaminants from the skin to facilitate their subsequent removal by water and alcohol based hand rub containing preparation such as liquids, gels and foams (WHO, 2009). Hand hygiene is a general term referring of hand cleansing includes applying an alcohol based handrub to the surface of hands or washing hands with the use of a water and soap or a soap solution, either non antimicrobial or antimicrobial (Hand Hygiene Australia, 2009). Hand hygiene is wash hand properly and thoroughly with soap and water (Senin & Eksan, 2012)

Hand wash is wash the hands with soap and water when hands are visibly dirty or visibly soiled with blood or other body fluids or after using the toilet. If exposure to potential spore forming pathogens is strongly suspected or proven, including outbreaks of *Clostridium difficile*, hand washing with soap and water is the preferred means. Then, performed with seven (7) steps as recommended by World Health Organization (WHO) within 40 to 60 seconds. Steps of hand washing:

- Step 1: Wet your hands and apply enough liquid soap to create a good lather
- Step 2: Rub palms together
- Step 3: Rub the back of hands
- Step 4: Interlink your fingers
- Step 5: Cup your fingers
- Step 6: Clean the thumbs
- Step 7: Rub palms with your fingers

However, hand rub is preferred for routine hygienic hand antisepsis if hands are not visibly soiled. It is faster, more effective, and better tolerated by your hands than washing with soap and water. Then, performed with seven (7) steps as recommended by World Health Organization (WHO) within 20 to 30 seconds. Steps of hand rub:

- Step 1: Apply a palmful of the product in a cupped hand, covering all surfaces
- Step 2: Rub palms together
- Step 3: Rub the back of hands
- Step 4: Interlink your fingers
- Step 5: Cup your fingers
- Step 6: Clean the thumbs
- Step 7: Rub palms with your fingers.

The action or fact of complying with a wish or command ‘the ways in which the state maintains order and compliance (Oxford Dictionary, 2020). The act of obeying an order, rule, or request (Cambridge Dictionary, 2020). Training, attitude, the presence of alcohol based hand rub in the working area, the presence of adequate soap and water in the working area were significantly associated with hand hygiene compliance (Engdaw et al., 2019). The concept of ‘*Five Moments for Hand Hygiene*’ described in the WHO Guidelines on Hand Hygiene in Health Care, defines the key moments when health care workers should perform hand hygiene in order to break the transmission of infectious organism via the hands. The concept stipulates that healthcare workers perform hand hygiene before touching and after touching a patient, before sterile or aseptic procedure, after touching patients’ environment and after exposure to blood or body fluids (GU, 2015)

2.2.3 Health Care Worker

The organized provision of medical care to individuals or a community '*healthcare professionals*' (Oxford Dictionary, 2020). The set of services provided by a country or an organization for the treatment of the physically and the mentally ill (Cambridge Dictionary, 2020). Healthcare workers include physicians, nurses, emergency medical personnel, dental professionals and students, medical and nursing students, laboratory technicians, pharmacists, hospital volunteers, and administrative staff (Centers Control Diseases, 2016). Health workers are people whose to protect and improve the health of their communities (World Health Organization, 2006).

2.2.4 Surgical Ward

Surgical used in or connected with surgery. Ward is a separate room or area in a hospital for people with the same type of medical condition (Oxford Dictionary, 2020). The arrangement of the patients in the general surgical wards and those in the trauma surgical wards (*English*, 2020). A surgical ward admits patients through the surgical clinic, casualties such as road traffic accidents, assault cases or trauma patients (St.Kizito Hospital, 2017). Thus, a surgical ward is for patients waiting or recovering from surgical interventions (Quora, 2019). The incidence of nosocomial infection (NI) was higher among the patients of medical ward about 28% others than surgical ward about 24.5% (Ginawi et al., 2014). The prevalence of healthcare associated infections (HCAs) was highest in intensive care units (ICUs) about 34.5%, followed by surgery ward about 13.5% and medicine ward about 4.5% (Razine et al., 2012).

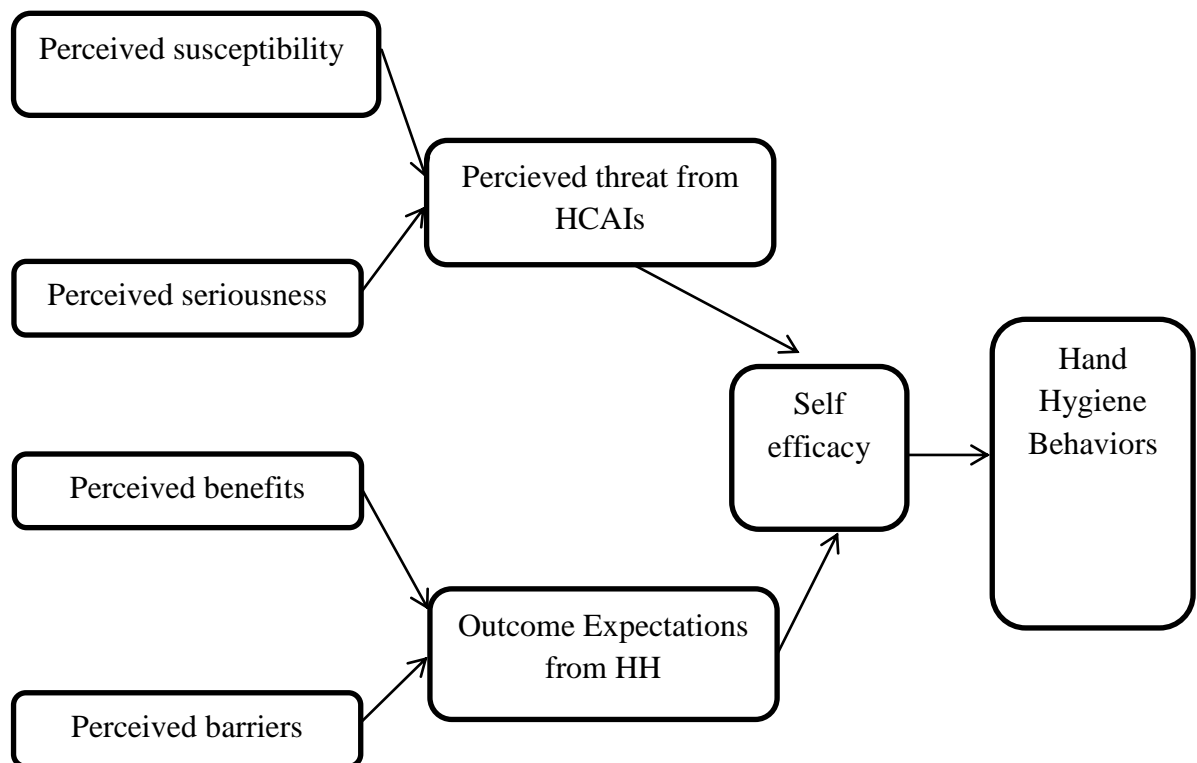
2.3 7 Theoretical and Conceptual Framework of the Study

Theories are formulated and developed by researchers to explain, make predictions, understand phenomena, challenge and extend existing knowledge within the limits assumptions. In theoretical framework, the theories support that research and showing in established ideas (St.Kizito Hospital, 2017).

The theoretical and conceptual framework is the path of research in theoretical constructs. The aim is to make research findings more meaningful, acceptable in the research field and ensures generalizability (Manca, 2018). Therefore, the theoretical framework is not something readily found within the literature (Research Guides, 2020). Thus, the theoretical framework is the structure that can hold or support a theory of a research study, introduces and describes the theory which explains why the research problem under study exists. Hence, a theoretical framework also consists of concepts, definitions, and existing theories are used for particular study (Trochim, 2006).

Insufficient behavioral theory regarding health care workers (HCWs) hand hygiene compliance cause of result in suboptimal design and limit effectiveness of hand hygiene interventions. A behavioral theory framework is future intervention design using a behavioral theory framework and future intervention design (Fuller et al., 2014). There are several barriers to hand hygiene compliance that persist in long-term care. A behaviour change theory informed framework such as the Theoretical Domains Framework (TDF) can be helpful to identify those barriers (Smith et al., 2019).

The conceptual framework for the study was the Health Belief Model, Figure 2.1. Four psychologists developed this social cognitive model in the 1950s to identify barriers to preventive health programs (Rosenstock, 1974). The Health Belief Model (HBM) used to understand differing behaviors or attitudes and tested by theoretical model to measure healthcare workers attitudes on hand hygiene (Kretzer & Larson, 1998). Furthermore, the Health Belief Model allowed the researcher to identify the barriers of hand hygiene compliance , thus making it a good fit for a feasibility study.



Note: HCAIs = Healthcare Associated Infections, HH = Hand Hygiene

Figure 2.1: Theoretical Framework of HBM

Source: (Adapted from Rosenstock, 1974)

As mentioned earlier, HBM used in this study to guide the researcher understand regarding hand hygiene compliance among health care workers. Refer to Figure 2.2 for the conceptual framework of hand hygiene compliance modified from HBM. The original model had four constructs: perceived susceptibility, perceived seriousness, perceived benefit, and perceived barriers to action (Rosenstock, 1990).

According to the theory, for individual who take preventive action, such as hand hygiene, the individual must first perceive is personally susceptible to a health risk, such as a healthcare associated infection. Next, must have at least a moderately serious impact on component of life. Furthermore, preventive health action must be beneficial, reducing the individual's susceptibility or the seriousness of the health risk. Lastly, preventive health action must not exceed tangible or psychological costs (Rosenstock, 1974). In other words, when an individual believes a health risk can be avoided, a positive expectation that recommended action will lead to avoiding and believes can successfully the individual is more likely to complete the advised preventive health action.

The purpose of this study were to assessed the knowledge level on hand hygiene, and to identify a barriers of hand hygiene compliance among health care workers at surgical ward in Hospital USM using Saharman et al. (2019) questionnaire, adapted from WHO's 'Hand Hygiene knowledge questionnaire'. Although this tool is established and widely accepted, there was no reported reliability or validity data found in the literature.

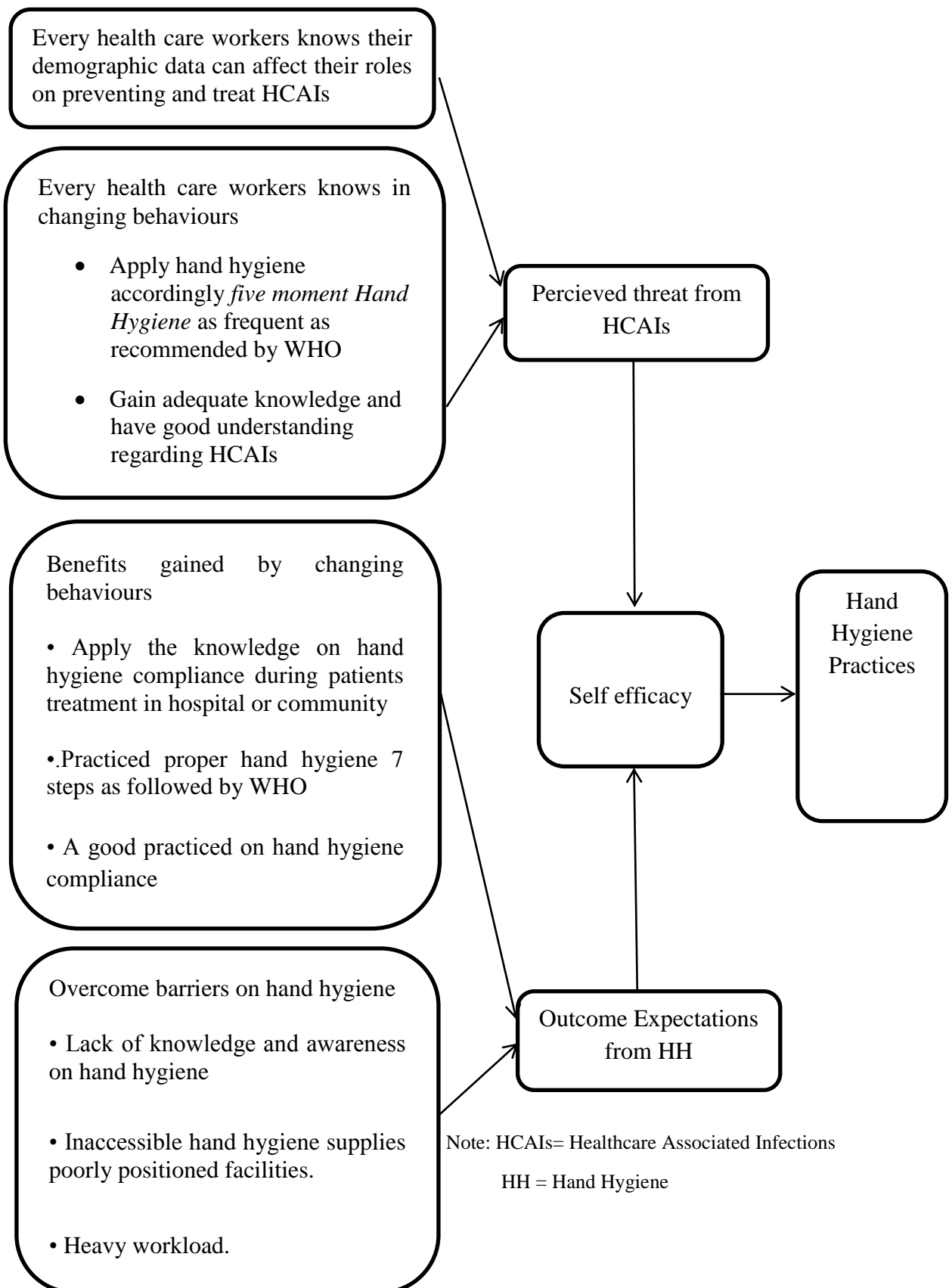


Figure 2.2: Conceptual Framework of Hand Hygiene Modified from HBM

CHAPTER 3

METHODOLOGY

3.1 Introduction

In this chapter, all the information about the study in terms of research design, the population and setting of the study, the sampling method, variables, instrumentation, ethical consideration, data collection plan including data analysis plan were discussed.

3.2 Research Design

This study applied descriptive study using quantitative approach to assess the knowledge level on hand hygiene and a barriers of hand hygiene compliance among health care workers at surgical ward in Hospital USM through a cross sectional survey. The data collected from the entire population and basic statistics such as frequency, percentage, mean, standard deviation and distribution score were reported. Cross-sectional studies were characterized by the collection of relevant data at a given point in time. Therefore, all data were collected and referred to the time at or time around of the data collection (Kesmodel, 2018).

3.3 Study Setting and Population

A healthcare worker is one who delivers care and services to the sick and ailing either directly as doctors and nurses or indirectly as aides, helpers, laboratory technicians, or even medical waste handlers. In this study, health care workers focus only physicians, doctors and nurses at surgical ward in Hospital USM. Surgical wards in Hospital USM includes Cardiac surgery, Pediatric surgery, Orthopedic surgery , Traumatology, Ophthalmology, Otolaryngology, Neuro surgery, Plastic surgery, Vascular Surgery, Urology and General surgery. However, in this study, surgical ward

focus only at 2 Intan (Male Surgical Ward) and 3 Utara (Female Surgical Ward) because of hand hygiene compliance rate unsatisfactory and increase the infection rate. Deal with the head department of surgery, approach the research questionnaire and get the permission. Next, deal with the head nurse of each unit, approach the research questionnaire, get the permission and the name lists were obtained accordingly staff roster by category including physicians, specialist doctor, medical and surgical doctors, nurses, physiotherapists, dietitian and health care assistants were involved in this study. Table 3.1 below shows the total number of health care workers at surgical wad (2 Intan & 3 Utara) in Hospital USM.

Table 3.1: The Total Number of Health Care Workers at Surgical Ward (2 Intan & 3 Utara) in Hospital USM.

Health Care Worker	Ward	
	2 Intan (Male Surgical)	3 Utara (Female Surgical)
Physicians	10	10
Doctors	58	56
Nurses	29	27
Physiotherapist	4	4
Dietitian	2	2
Health care assistant	9	9
TOTAL	112	108
GRAND TOTAL	220	

3.4 Sampling Plan

3.4.1 Sample criteria

The sample obtained by following the inclusion and exclusion criteria as below:

Inclusion Criteria

- 1) Health care workers from surgical ward at 2 Intan (Male Surgical Ward) and 3 Utara (Female Surgical Ward) in Hospital USM.
- 2) Registered physicians, doctors, nurses, physiotherapist, dietitian and health care assistant
- 3) Working experience more than 3 years
- 4) Open to male and female staffs
- 5) Understand in English

Exclusion Criteria

- 1) Health care workers from Medical, Critical, Ortho, Pediatric, Obstetrics & Gynecology, Ophthalmology, Otorhinolaryngology, Critical, Oncology & Hematology and Emergency Unit in Hospital USM.
- 2) Health care workers that undergoing working outside from the hospital.

3.4.2 Sample Size Estimation

A sample size estimation procedure for diagnostic test studies based on the desired likelihood ratio confidence interval and should be extended to studies analyzing diagnostic tests (Simel et al., 1991). Sampling methods are used to select a sample from within a general population and proper sampling methods are important for eliminating