



**KNOWLEDGE, ATTITUDE AND PRACTICE ON HAND HYGIENE AND
FACTORS ASSOCIATED TO ITS PRACTICE AMONG HEALTHCARE
PROFESSIONALS IN A PEDIATRIC ONCOLOGY WARD, SAUDI ARABIA**

By

ALDAWSARI MUJIBAH SALEH A

**Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia in
Fulfilment of the Requirements for the Degree of Master of Science**

August 2022

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Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirement for the degree of Master of Science

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August 2022

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Background: Hands are the most common vehicle of pathogen transmission within the healthcare environment. As such, strict hand hygiene is the leading measure for reducing healthcare-associated infections (HCAIs) and preventing the spread of antimicrobial resistance. In addition, these infections are the main cause of morbidity and mortality among children with acute myeloid leukaemia (AML) because of the effect of chemotherapy on immunosuppression. This study is aimed at determining the factors associated with hand hygiene practices among healthcare workers caring for children with leukaemia in a paediatric oncology ward at King Saud hospital in Riyadh, Saudi Arabia. **Methods:** In this cross-sectional study, a total of 190 medical doctors and nurses were evaluated using a self-administered questionnaire to assess their knowledge, attitude and practices regarding hand hygiene. In addition, information regarding socio-demographic characteristics was collected. A simple random sampling technique was used to select the participants from December 2021 until January 2022. The data were analysed using SPSS version 26 for Microsoft Windows. Descriptive statistics (means, median, standard deviations of continuous variables, as well as frequencies and percentages of categorical variables) were used to summarise the data. A chi-square test was used to determine the association between dependent and independent variables. **Results:** This study comprised 190 healthcare workers (74.7% nurses and 25.3% medical doctors) with a response rate of 100%. The mean age \pm SD was 37.8 ± 9.8 years (range 23-83 years). Most of the participants were female (85.8%), Saudis (51.1%) and nurses (74.7%). The majority of the participants had a bachelor's degree (54.7%), followed by postgraduate education (24.2%), and diploma (21.1%). Most of the participants had work experience of 5-15 years (52.1%), followed by those with more than 15 years (25.8%) and less than 5 years (22.1%). Around 54% of participants had good knowledge regarding hand hygiene, 51.6% had a positive attitude regarding hand hygiene, and 55.8% had satisfactory practice of hand hygiene. The education level ($p=0.004$), healthcare workers' knowledge ($p<0.001$) and healthcare workers' attitude ($p<0.001$) were significantly associated with healthcare workers' practice of hand hygiene.

Conclusion: This study established that more than 44% of healthcare workers had unsatisfactory hand hygiene practices. In order to ensure better hand hygiene, effective programmes should be designed to increase healthcare workers' awareness regarding the knowledge, attitude and practice of hand hygiene. Strict guidelines must be implemented to regulate nosocomial infection.



Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Master Sains

**PENGETAHUAN, SIKAP DAN AMALAN TERHADAP KEBERSIHAN
TANGAN DAN FAKTOR BERKAITAN DENGAN AMALANNYA DALAM
KALANGAN PROFESIONAL PENJAGAAN KESIHATAN DI WAD
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Latar belakang: Anggota tangan merupakan sarana paling biasa dalam persekitaran penjagaan kesihatan. Oleh sebab itu, amalan kebersihan tangan yang ketat merupakan langkah utama bagi mengurangkan jangkitan berkaitan penjagaan kesihatan (HCAI) dan bagi mengelakkan penyebaran ketahanan antimikrobial. Di samping itu, jangkitan tersebut merupakan penyebab utama morbiditi dan mortaliti dalam kalangan kanak-kanak leukaemia mieloid akut (AML) disebabkan kesan kemoterapi ke atas imunotindasan. Kajian ini bertujuan untuk menentukan faktor berkaitan dengan amalan kebersihan dalam kalangan pekerja penjagaan kesihatan yang merawat kanak-kanak leukaemia di wad onkologi pediatrik Hospital King Saud di Riyadh, Arab Saudi. Kaedah: Dalam kajian keratan rentas ini, sejumlah 190 orang doktor dan jururawat perubatan telah dinilai menggunakan soal selidik berstruktur sendiri bagi menilai pengetahuan, sikap dan amalan mereka mengenai kebersihan tangan. Di samping itu, maklumat mengenai karakteristik sosiodemografik telah dikumpul. Teknik rawak persampelan mudah telah digunakan untuk memilih responden dari bulan Disember 2021 hingga Januari 2022. Data telah dianalisis menggunakan SPSS versi 26 Microsoft Windows. Statistik deskriptif (min, median, sisihan lazim (SD) pemboleh ubah berterusan, di samping frekuensi dan peratusan bagi pemboleh ubah kategorikal) telah digunakan untuk meringkaskan data. Ujian khi-kuasa dua telah digunakan untuk menentukan perkaitan antara pemboleh ubah bersandar dan tak bersandar. Dapatan: Kajian ini merangkumi 190 pekerja penjagaan kesihatan (74.7% jururawat dan 25.3% doktor perubatan) dengan kadar respons 100%. Min umur \pm SD ialah 37.8 ± 9.8 tahun (julat 23-83 tahun). Kebanyakan responden ialah wanita (85.8%), rakyat Saudi (51.1%) dan jururawat (74.7%). Majoriti responden mempunyai ijazah bachelor (54.7%), diikuti oleh ijazah pascasiswazah (24.2%), dan diploma (21.1%). Kebanyakan responden mempunyai pengalaman bekerja 5-15 tahun (52.1%), diikuti oleh mereka yang melebihi 15 tahun (25.8%) dan kurang daripada 5 tahun (22.1%). Sekitar 54% responden mempunyai pengetahuan yang baik mengenai kebersihan tangan, 51.6% mempunyai

sikap yang positif mengenai kebersihan tangan, dan 55.8% mempunyai amalan kebersihan tangan yang memuaskan. Tahap pendidikan ($p=0.004$), pengetahuan pekerja penjagaan kesihatan ($p<0.001$) dan sikap pekerja penjagaan kesihatan ($p<0.001$) adalah secara signifikan berkaitan dengan amalan kebersihan tangan pekerja penjagaan kesihatan. Kesimpulan: Kajian ini memperlihatkan bahawa lebih daripada 44% pekerja penjagaan kesihatan mempunyai amalan kebersihan tangan yang tidak memuaskan. Bagi memastikan amalan kebersihan tangan yang lebih baik, program yang efektif harus direka bentuk bagi meningkatkan kesedaran pekerja penjagaan kesihatan berkaitan pengetahuan, sikap dan amalan kebersihan tangan. Panduan yang ketat harus diimplementasikan bagi mengawal jangkitan nosokomial.



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This thesis was submitted to the Senate of Universiti Putra Malaysia and has been accepted as fulfilment of the requirement for the degree of Master of Science. The members of the Supervisory Committee were as follows:

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LIST OF ABBREVIATIONS

HCWs	Hands Of Healthcare Workers
WHO	World Health Organization
HH	Hand Hygiene
AML	Acute Myeloid Leukaemia
ALL	Acute lymphocytic leukaemia
CML	Chronic myelogenous leukaemia
CLL	Chronic lymphocytic leukaemia
HAIs	Healthcare-Associated Infections
HCRI	Humanitarian and Conflict Response Institute
CLIC	Childhood Leukaemia International Consortium
ICUs	Intensive Care Units
HCAI	Health Claims for Auto Insurance
KAP	Knowledge, Attitudes, and Practices
UPM	Universiti Putra Malaysia
SD	Standard Deviation
IQR	Interquartile Range
OR	An Odds Ratio
SPSS	Statistical Package for the Social Sciences
NND	Not Normaly Distributed
%	Percentage
e.g.	For Example
χ^2	Chi-Square

CHAPTER 1

INTRODUCTION

1.1 Background of the Study

Healthcare workers often unknowingly carry commensal bacteria and potential pathogens on their hands, thus invariably spreading infection (World Health Organisation [WHO], 2009). Healthcare-associated infections (HAIs) are those that develop when patients are being treated in a healthcare setting—for example, infections acquired during hospitalisation that were not present or incubating at the time of admission. A multifaceted approach is required to prevent such infections (WHO, 2002). There are various ways in which infectious agents can be transmitted, such as through airflow, contact with equipment and direct contact with healthcare workers. Since healthcare workers' contaminated hands are implicated in the transmission of pathogens to vulnerable group, proper hand care can reduce or prevent the transmission of infections (Ki et al., 2019).

According to Sahoo et al. (2018), the term “hand hygiene” (HH) covers both hand washing (which includes using soap and water to remove soil and transient microorganisms from hands) and antiseptic practices (killing microorganisms on hands using an antiseptic solution, a soap containing antiseptic properties or a hand rub containing alcohol). HH also includes fingernail care. Compliance with these recommendations is the most effective way to prevent the spread of microbes in healthcare, thus directly contributing to patient safety (Yehouenou, 2020).

It has been proven that cleaning hands is effective in lowering infection rates (WHO, 2009). HH is considered a best practice among healthcare workers because contaminated hands are the most common transmitter of pathogens. Although HH is relatively simple and straightforward, only 40% of healthcare workers comply with it (Majeed, 2018). Experts advocate improving HH as an essential step towards better public health. Furthermore, preventing communicable diseases is recognised as a convenient, practical, and cost-effective measure in this regard (Sultana et al., 2016).

The primary goal behind the practice of efficient hand washing is to reduce the infection rate among patients, especially the groups that are the most vulnerable (whether due to the nature of their disease or the treatment method), such as children with leukaemia. Leukaemia is considered one of the most common cancers among children. A report published in 2016 that included more than twenty years of data revealed a notable increase in the incidence of childhood leukaemia over time (Steliarova-Foucher et al., 2017). Researchers in Saudi Arabia who investigated childhood leukaemia for 15 years had detected an increment in the incidence rate, especially at young ages. The youngest children (aged zero to 14) had the highest incidence rate (1.0 per 100,000 population). Boys also showed a comparatively higher incidence than girls (Bawazir et al., 2019).

Most patients with leukaemia depend entirely on chemotherapeutic regimens for their treatment. However, chemotherapy is known for its immunosuppressive side effects due to leukopenia or neutropenia (Hansen et al., 2020). This makes patients vulnerable to opportunistic bacterial, viral or fungal infections, which are the leading cause of morbidity and mortality in children with acute myeloid leukaemia (AML) (Lehrnbecher et al., 2004; Hammad et al., 2019). Much research has been conducted to explore ways to minimise and control chemotherapy-related infections for these patients in hospital and in-house settings. A study at a large tertiary care oncology centre in India showed an infection rate of 63% in patients with AML, with respiratory infections making up 47% and fungal pneumonia affecting 55% of patients receiving induction chemotherapy. Treatment-related deaths accounted for 10.7% in all phases, with 7.4% of patients who were undergoing induction chemotherapy dying (Jain et al., 2020).

1.2 Problem Statement

Although the WHO has proposed a nosocomial infection control regime, the high incidence of patients with healthcare-related infections remains a significant health concern and a worrying economic issue worldwide (Bellissimo-Rodrigues et al., 2016). The global percentage of patients with healthcare-related infections ranges between 10% and 25% in developed and developing countries (Rao et al., 2012; Laupland, 2022). HH is among the most effective methods for reducing nosocomial infections, morbidity, mortality and healthcare expenses in hospitalised patients. Hand-washing knowledge, attitudes, and compliance are essential to good HH practice. Despite various efforts to improve knowledge and attitudes regarding hand washing e.g., WHO guidelines, recommendations and programmes, HH compliance is still suboptimal among healthcare workers (Bellissimo-Rodrigues et al., 2016). One study reported that antiseptics were found to be effective in cleaning heavily contaminated hands. This measure, which has a more significant effect than handwashing with soap and water, may reduce the healthcare-associated transmission of contagious diseases. Although the procedure is much simpler, its compliance rate remains lower than 40% among healthcare workers (Artist et al., 2016).

With high-risk conditions like leukaemia (due to complications such as neutropenia), when chemotherapeutic drugs are intensified and used for a prolonged period, contaminated hands of healthcare givers may be associated with an increased risk of infections for patients. The upper respiratory tract is the most commonly affected, followed by the ears, bloodstream and gastrointestinal tract (Inaba et al., 2017). Previous studies have shown that increased access to different hygiene techniques could minimise hospital-acquired and community-acquired infections among children with leukaemia, thus reducing the number of emergency visits and healthcare costs. Despite the fact that children with leukaemia are at risk of exposure to healthcare-related infections, HH-related knowledge, attitudes and practices are very much lacking in Saudi Arabia. Thus, the purpose of the present study is to assess the factors that affect HH practices among healthcare workers in the paediatric oncology ward at King Saud Hospital. This information will be beneficial for devising relevant measures for promoting HH compliance, thereby minimising the risk of infections, increasing the effectiveness of treatment outcomes, and decreasing medical costs.

1.3 Research Questions

1. What are the socio-demographic characteristics (age, gender, nationality, professional, educational qualification and experience) as well as level of knowledge, attitude and hand hygiene practice among healthcare workers caring for leukaemia children in a paediatric oncology ward in King Saud Hospital, Saudi Arabia?
2. Is there a significant association between socio-demographic characteristics and hand hygiene practice among healthcare workers caring for leukaemia children in a paediatric oncology ward in King Saud Hospital, Saudi Arabia?
3. Is there a significant association between the knowledge and attitudes of hand hygiene and hand hygiene practice among healthcare workers caring for leukaemia children in a paediatric oncology ward in King Saud Hospital, Saudi Arabia?
4. What are the predictors of unsatisfactory hand hygiene practice of healthcare workers caring for leukaemia children in a paediatric oncology ward in King Saud Hospital, Saudi Arabia?

1.4 Objectives

1.4.1 General Objective

The main objective of this study was to determine the factors associated with practising hand hygiene among healthcare workers caring for leukaemia children in the paediatric oncology ward of King Saud hospital in Saudi Arabia.

1.4.2 Specific Objectives

1. To determine the socio-demographic characteristics (age, gender, nationality, professional, educational qualification and experience) and level of knowledge, attitude and hand hygiene practice among healthcare workers caring for leukaemia children in a paediatric oncology ward in King Saud Hospital, Saudi Arabia.
2. To determine the association between the socio-demographic characteristics and hand hygiene practice among healthcare workers caring for leukaemia children in a paediatric oncology ward in King Saud Hospital, Saudi Arabia.
3. To determine the associations of knowledge of, and attitude towards hand hygiene with its practice among healthcare workers caring for leukaemia children in a paediatric oncology ward in King Saud Hospital, Saudi Arabia.

4. To determine the predictors of the unsatisfactory hand hygiene practice of healthcare workers caring for leukaemia children in a paediatric oncology ward in King Saud Hospital, Saudi Arabia.

1.5 Research Hypothesis

1.5.1 Null Hypothesis

- Ho1. There is no significant association between socio-demographic characteristics and the practice of hand hygiene among healthcare workers caring for leukaemia children in a paediatric oncology ward in King Saud Hospital, Saudi Arabia.
- Ho2. There is no significant association between healthcare workers' knowledge and practice of hand hygiene among healthcare workers caring for leukaemia children in a paediatric oncology ward in King Saud Hospital, Saudi Arabia.
- Ho3. There is no significant association between healthcare workers' attitudes towards hand hygiene and its practice among healthcare workers caring for leukaemia children in a paediatric oncology ward in King Saud Hospital, Saudi Arabia.
- Ho4. There are no predictors of the unsatisfactory hand hygiene practice of healthcare workers caring for leukaemia children in a paediatric oncology ward in King Saud Hospital, Saudi Arabia.

1.5.2 Alternative Hypotheses

- H1. There is a significant association between socio-demographic characteristics and the practice of hand hygiene among healthcare workers caring for leukaemia children in a paediatric oncology ward in King Saud Hospital, Saudi Arabia.
- H2. There is a significant association between healthcare workers' knowledge and the practice of hand hygiene among healthcare workers caring for leukaemia children in a paediatric oncology ward in King Saud Hospital, Saudi Arabia.
- H3. There is a significant association between healthcare workers' attitudes towards hand hygiene and its practice among healthcare workers caring for leukaemia children in a paediatric oncology ward in King Saud Hospital, Saudi Arabia.
- H4. There are predictors of unsatisfactory hand hygiene practice of healthcare workers caring for leukaemia children in a paediatric oncology ward in King Saud Hospital, Saudi Arabia.

1.6 Conceptual Framework

Figure 1.1 shows a conceptual framework for the association of socio-demographic characteristics with HH as well as the association of knowledge of, and attitude towards HH practice among healthcare workers caring for leukaemia children in a paediatric oncology ward in King Saud Hospital, Saudi Arabia. The dependent variable in this study was HH practice. The three independent variables in this study were socio-demographic characteristics, knowledge, and attitude toward HH. The arrows signify the relationship between the dependent/outcome and the independent/explanatory variables. This framework was developed based on relevant literature reviews on HH practice and associated HH factors among healthcare workers (Bukhari et al., 2011; Aledeilah et al., 2018; Bakarman et al., 2019).



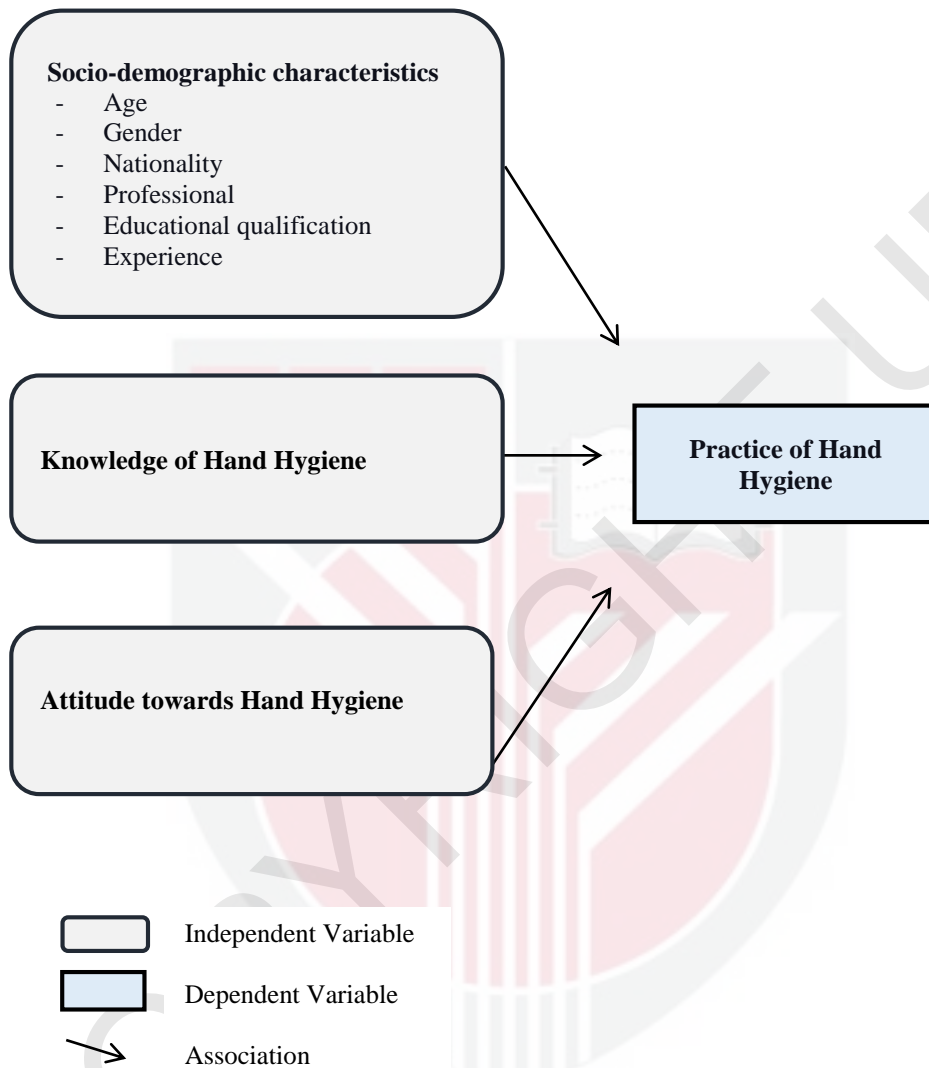


Figure 1.1: Conceptual Framework of Variables associated with Hand Hygiene

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