



UNIVERSITI PUTRA MALAYSIA

***OCCUPATIONAL HAND CONTACT DERMATITIS AND ITS ASSOCIATED
FACTORS AMONG NURSES IN PUBLIC HOSPITAL, SELANGOR, MALAYSIA:
A CROSS SECTIONAL STUDY***

NOOR SHAFIQAH BINTI SALIZAM

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HEALTH SCIENCES, UNIVERSITI PUTRA MALAYSIA, IN
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ABSTRACT

Background: Nurses are at high risk of exposure to hand contact dermatitis. Hand contact dermatitis is an acute or chronic skin condition of the dorsal and palmar site of the hands. It caused by several factors which trigger the inflammation of the skin. Occupational hand contact dermatitis (OHCD) affects the hands and may have an extensive impact on a nurse's ability to perform a job and impact toward nurses' quality of life. **Objective:** To study the prevalence of occupational hand contact dermatitis and its associated factors among nurses at Serdang Hospital. **Methods:** This study was a cross sectional study where 222 nurses from Serdang Hospital in Selangor participated in this study. Convenience sampling was used in the study and the assisted self-administered questionnaire was given to the prospective participants. The questionnaire was adapted from Smit 1992 and Nordic Occupational Skin Questionnaire 2002 which comprised of 44 questions divided into four sections. The purpose of the study was explained by researcher to the participant. **Data Analysis:** SPSS version 27 was used for data entry and analysis. Association between the occupational hand contact dermatitis (OHCD) and associated factors was analyzed using Pearson Chi-square test. **Results:** The response rate was 54%. The prevalence of OHCD among staff nurses of Serdang Hospital was 30.8%. Working department, frequency of hand washing, skin symptom with hand washing liquid or soap and eczema history were found associated with OHCD. **Conclusion:** OHCD showed to be a problem among staff nurses at the study location with a prevalence of 30.8%. Further intervention should be taken to prevent OHCD among staff nurses.

Keywords: Contact Dermatitis, Occupational Skin Disease, Hand Skin Condition, Nurses, Hospital,

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LIST OF ABBREVIATION

OHCD	Occupational hand contact dermatitis.
ICD	Irritate contact dermatitis
ACD	Allergic contact dermatitis
OSD	Occupational Skin Disease
HE	Hand Eczema

CHAPTER 1

INTRODUCTION

1.0 Background of Study

Nurses are at risk of exposure to occupational hand skin disease. This occupational hand skin disease is one of the most common work-related problems. Occupational Hand Contact Dermatitis (OHCD) is one of the most common skin diseases among nurses. Among healthcare workers, nurses have the highest prevalence of occupational hand contact dermatitis (OHCD). (Huzafah, 2019). There are about 70% to 90% incidents of occupational contact dermatitis (OCD) to accounts of all occupational skin diseases (Mekonnen, 2019).

Occupational hand contact dermatitis is the acute or chronic skin condition of the dorsal and palmar site of the hands. This condition is called eczematous disorder. Eczematous disorder is itchy inflammatory conditions due to an immune reaction of the skin. The symptoms shown by those who suffer from contact dermatitis is depends on its severity, but the highest symptoms indicated was redness, followed by burning, (Mekonnen, 2019).

In research from Rubins et al. (2020), approximately 80% of all contact dermatitis is primary irritant contact dermatitis (ICD), whereas allergic contact dermatitis (ACD) makes up only 20% of contact dermatitis cases. This type of skin reaction is caused by several factors which trigger the inflammation of the skin. The main triggers were skin disinfectants, latex, nitrile gloves, and prolonged contact with water while skin disinfectants were the most frequent triggers. (França, 2019).

Besides, the hours of wearing gloves, skin symptoms with gloves, skin symptoms with hand washing liquid or soap, eczema history and allergy history to any substances were also found associated with OHCD. (Huzaifah, 2019). Thus, this condition will cause an adverse impact toward nurses' quality of life.

1.1 Problem Statement

Occupational hand contact dermatitis (OHCD) affects the hands and may have an extensive impact on a nurse's ability to perform a job. Besides, it also reduces the quality of life of a nurse and increase the risk of cross infection. (Huzaifah,2019). There are about 90.3% of nurses who suffered with severe OSD hand eczema and it more severe for those who have a MRSA carrier than non- carrier. (Brans, 2016). However, many cases are not reported because of a lack of identification of the workplaces the problem, the lack of established reporting, and the fact that many physicians diagnose and treat these patients.

The associated factor of disease which cannot be avoided by the nurse during performing a task expose the nurses to high risk to get the OHCD. These several factors include long hour of wearing a glove and wet exposure, skin condition due to gloves wearing, skin condition due to frequent and repeated use of hand hygiene products, history of eczema and allergy to any causative allergen that associated with OHCD. (Huzaifah,2019).

There are some factors can be overcome, such as changing the type of gloves and hand soap, or disinfectant used to a type of material that does not adversely affect the skin. However, yet the effectiveness of the method cannot be ascertained and guaranteed as

the prevalence of the OHCD remain shown an increasing value between countries, which this also cause an economic burden to a country. (Huzaifah,2019).

The side effect of this disease could be more severe if the symptoms are not treated. Commonly the symptom we could see in a person who has OHCD is radish, swollen, scally and itching. However, it showed a higher prevalence of the symptom such as vesicle, erosions, or fissure in person with has hand eczema. (Brans, 2016). The effect of disease can be prevented if the nurse does not expose to the associated factor of disease. Unfortunately, due to standard operational practice (SOP) compliance, this restrains the nurse to avoid it.

Therefore, early prevention of occupational skin diseases is very important to prevent and overcome this problem. A systematic collection of data is needed to evaluate the nurses' practices. Conducting close observations to the nurses is required to analyse the status health of the nurses. Thus, the preventive measures to overcome this OHCD can be plan and implemented.

Significant of Study

This study will provide the prevalence of OHCD among the nurses who work at the certain department at Hospital Serdang, Selangor which where there is a risk of getting this occupational skin disease. This data can be used to find the strategies and preventive measures in order either to reduce the risk factor or the disease to be prevented. As further studies are needed to address the burden of occupational hand contact dermatitis and develop guidelines for its management at a national level. (Gupta, 2018).

The data are useful for determining improvements in knowledge and awareness among nurses and other health-care workers with developments of health policies and essential interventions for prevention and control of occupational skin diseases. The quality of the analysed data depends on the quality of the analysed medical records. (França, 2019). To find out the health problems among the nurses, data such as medical records are needed to evaluate the main causes and the factors which put the nurse at risk. Unfortunately, this type of data is difficult to obtain.

However, in this research, the questionnaires adapted from H.A Smith were used to acquire the information from the nurses itself. These methods are still valid to be used to measure and evaluate data regarding the disease and its factor among the nurses at Hospital Serdang, Selangor. Hence, the results might be useful to future researchers in evaluating the prevalence of occupational skin disease and its factor in hospitals.

The pandemic COVID-19 has a significant impact on the health sector. One of its impacts is in terms of changes in management and standard operating procedure (SOP) of safety and precaution during provide care and treatment to patients. Since OHCD can affect compliance to hand hygiene protocols, educational interventions and early treatment of the disease enable all the nurses to adhere to this protocol during a COVID-19 pandemic.

1.2 Research Questions

- What is the prevalence of OHCD among nurses in Serdang Hospital?
- What are the factors that causes OHCD?
- What is the relation between associated factor and OHCD?

- What are the sign and symptoms of hand presented by nurses who suspected with OHCD?

1.3 Research Objectives

General:

To study the prevalence of occupational hand contact dermatitis and its associated factors among nurses in Serdang Hospital.

Specific:

- To identify the prevalence of occupational hand contact dermatitis among nurses in Serdang Hospital.
- To identify the socio-demographic characteristic among the nurses in Serdang hospital.
- To identify the association between socio-demographic factor and occupational hand contact dermatitis.
- To identify the association between employment factor and occupational hand contact dermatitis.
- To identify the association between glove wearing factor and occupational hand contact dermatitis.
- To identify the association between hand washing factor and occupational hand contact dermatitis.
- To identify the association between atopy and allergy history and occupational hand contact dermatitis

1.4 Hypothesis

H01: There is no significant association between socio-demographic factor and occupational hand contact dermatitis.

H02: There is no significant association between employment factor and occupational hand contact dermatitis.

H03: There is no significant association between glove wearing factor and occupational hand contact dermatitis.

H04: There is no significant association between hand washing factor and occupational hand contact dermatitis.

H05: There is no significant association between atopy and allergy history and occupational hand contact dermatitis

Definition term

Terms	Conceptual Definition	Operational Definition
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Occupational Contact Dermatitis (OCD)	OCD is a multifactorial disease and is often a result of combined allergic, irritant, and endogenous factors. (Houle et al., 2021)	OCD is a skin diagnosis of nurses occupational related to skin condition due to daily exposures to substances such as hand disinfectant, frequent hand washing, prolonged gloved wearing, latex allergy, and various chemicals during work at the variety department of Hospital Serdang, Selangor, Malaysia.
Nurse	A healthcare profession and has an important role to play in the way health actions are organized and implemented, both at the forefront and at the management level. (Nursing and Midwifery, 2020)	A registered nurse of Lembaga Kejururawatan Malaysia (LJM) who practices patient care and nursing activities at the variety department of Hospital Serdang.
Socio-demographic	The term "sociodemographic" refers to a group defined by its sociological and demographic characteristics. It refers to: of, relating to, or involving a combination of social and demographic factors. (Rose, 2016)	The socio-demographic includes date of birth, gender, race, marital status, Income, educational level.
Associated factor	“Of or relating to the medical consideration of the whole person in	Factor that associated with the OHCD include: the duration of wearing

	<p>the treatment of a disease, not only physically but also taking into account mental and social factors rather than just the symptoms” (“Associated Factor,” 2006–2021)</p>	<p>gloves, skin symptoms with gloves, skin symptoms with hand washing liquid or soap, eczema history and allergy history</p>
Prevalence	<p>“The ongoing, systematic collection, analysis, and interpretation of health-related data essential to planning, implementation, and evaluation of public health practice.” (CDC, 2014)</p>	<p>It involves collection of data through the survey questionnaires, analysis of the data based on the inclusion and exclusion criteria from the data collected and prevalence of disease and its factor interpretation.</p>

1.5 Conceptual Framework

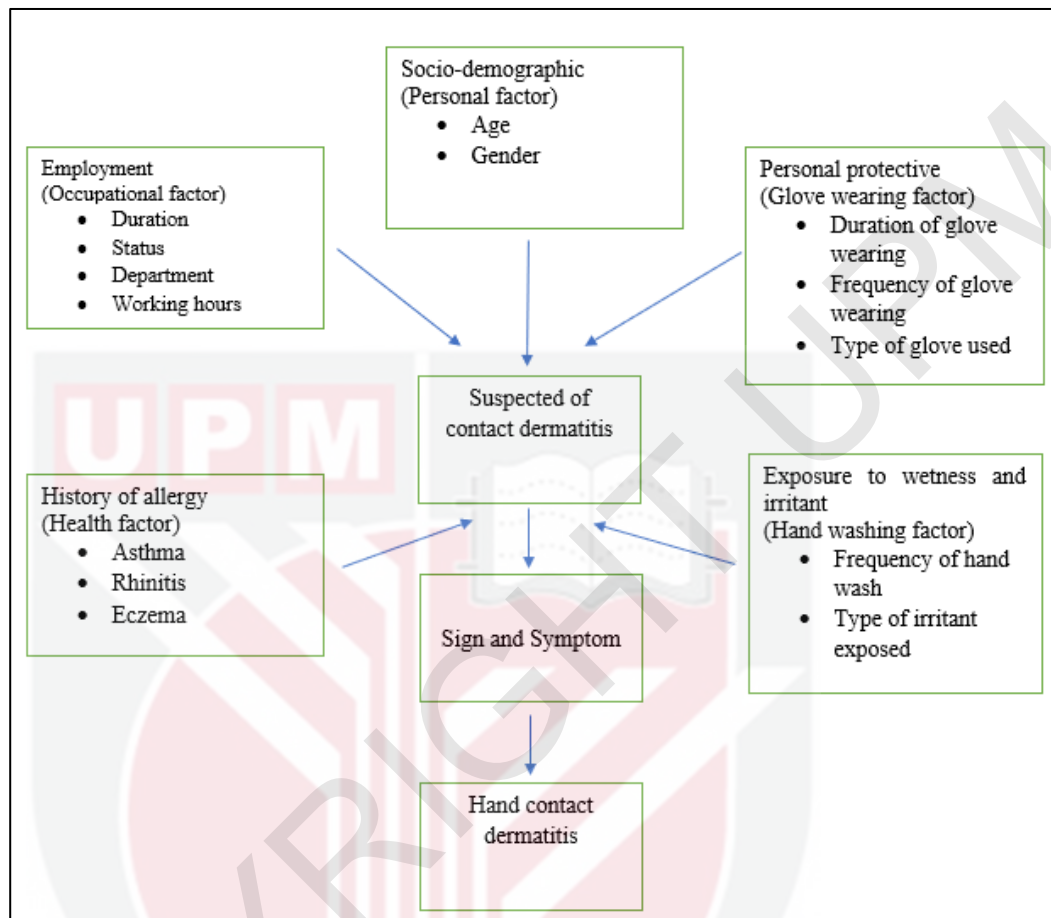


Figure 1.0: Conceptual framework of the study

Based on figure 1.0 above, it shows the relationships of OHCD and how it relates between variables in this research study. The variables are categorised into five which are socio-demographic (age, gender, race, marital status, education level), employment factor (duration, status, department, working hours), glove wearing factor (duration, frequency, types), hand washing factor (frequency and type) and history of allergy (asthma, rhinitis, other substance). Those variables are the associated factor, that contribute to the OHCD prove by the sign and symptom shown by the nurses. This conceptual framework also generally develops based on the concepts and empirical findings from the literature. In this study, there are two types of variables that will be

used as keys which are independent variables and dependent variables. These two keys will be used to identify the expected cause and effect of the OHCD. The expected cause is the independent variables which include the sociodemographic data, employment history, personal protective used (glove wearing), exposure to wetness and irritant (hand washing practice) and history of allergy, while the expected effect is the dependent variable is the contact dermatitis which depend on signs and symptoms of OHCD shown by the nurses. This conceptual framework illustrates the expectation finding in this study as it defines the relevant variables used to mapping the relation between each other in visual format.

1.6 Conclusion

From the chapter one, the researcher can conclude that this research is about the study of work-related hand skin disease among a nurse. Occupational hand contact dermatitis which causes by several factor include. Thus, the researcher found out that this OHCD potentially cause harm to nurses' life and quality of work as this skin condition potential to cause the spread of infection. Occupational hand contact dermatitis is also not chronic illness which direct to mortality. Even it does not disrupt all aspect of the nurse's life, but it possibly impaired the nurse's quality of life. Besides, occupational hand contact dermatitis among a nurse could contribute to the deterioration of the treatment quality which this causes a lot of divest to patient and to the nurses itself. There is a risk of infection transmission either from nurses to patient or patient to nurse due skin condition. It is vital that nurses stick to the protocol and execute the hand hygiene technique correctly. (Martos-Cabrera, 2019). However, these will expose the nurses to the high chance of getting occupational hand contact dermatitis. The duration of gloving and frequent hand washing exposed the hand skin to the wet setting cause a skin irritation. Moreover, include the other factor such as expose to the 1causative

agent with history eczema and allergic will contribute to the skin condition more severe. Therefore, this study must be conducted to determine the prevalence of occupational hand contact dermatitis and its associated factors among staff nurses at Hospital Serdang, Selangor, Malaysia.



CHAPTER 2

LITERATURE REVIEW

2.0 Introduction

In this chapter, the researcher discusses further about occupational hand contact dermatitis, the epidemiology, its cases in Malaysia and global, its associated factors consist of (personal factor, employment factor, hand gloving factor, hand washing factor and history of atopy and allergies) and its symptoms. These topics will be discuss specifically based on overview from previous published research. From the title searching in Scopus and Google scholar, there are 294 articles were found. A screening title process was done by using a Mendeley software. Thus, there are 50 articles that valid to referred and used in this study.

2.1 Overview of Contact Dermatitis

Contact dermatitis also known as contact eczema is a collective term for three dermatitis with various aetiologies, whose common feature is the development of skin inflammation in response to a direct contact with the provoking agent which categories into three types, include irritant contact dermatitis, allergic contact dermatitis and protein contact dermatitis. (Dermatological Society of Malaysia, 2009). Allergic contact dermatitis (ACD) or allergic contact eczema is inflammatory skin disease. This skin condition is initiated by specific immune reaction to a substance that trigger it. When looking at epidemiological data, one must remember that ACD is not the same as contact allergy (CA). However, (ICD) is acquired inflammatory skin disease caused by chemical or physical insults leading to direct cellular injury. Most of ICD cases are associated with detergents, solvents, acids or alkali. Acute ICD (toxic dermatitis)

develops rapidly (minutes to hours) after exposure to potent irritants. Moreover, Protein contact dermatitis (PCD) is acquired inflammatory skin disease initiated by specific immune reactions to allergens - proteins with molecular weight exceeding 10000 Daltons, usually of animal or plant origin.

2.2 Epidemiology of occupational hand contact dermatitis (OHCD)

Occupational skin disease is common. It affects workers more often than reported. Contact dermatitis, both irritant and allergic, accounts for the majority of occupational skin diagnoses. Occupational contact dermatitis (OCD) frequently affects the hands and may have a profound impact on an employee's ability to perform a job. Severe OCD can affect a worker's activities of daily living and can even lead to job loss. (Lampel & Powell, 2018). Exposure of hand to the substance that trigger skin condition during work, contribute the incidence of hand dermatitis. During this pandemic outbreak, hand hygiene practices become the norm for all people. Other than wear face mask, the hand hygiene practice also become one SOP that apply in every workplace especially in hospital or healthcare-setting. Increase exposure to hand disinfectant solutions can increase the incidence of hand dermatitis among workers. This is how the disease contribute into the work- relation. According to Stingni et al., (1995), The majority of work-related contact dermatitis had irritating origins and were mostly associated to disinfectants (particularly chlorhexidine gluconate and glutaraldehyde) and gloves (latex proteins and starch glove powder, rather than accelerators and additives of rubber). Finally, atopy appeared to favour the development of hand dermatitis.

2.3 Occupational Hand Contact Dermatitis Among Nurses

Hand dermatitis is one of the occupational skin diseases among nurses. (Khanegah, 2021). Although wet work-related irritant contact dermatitis is the most common cause, healthcare professionals are also at a significant risk for allergic contact dermatitis and contact urticaria. (Ibler, 2016). Nurses have the highest rate of occupational hand contact dermatitis (OHCD) among healthcare employees. (Huzaifah, 2019). Contact Dermatitis is one of the most devastating, accounting for 70 to 90 percent among occupational skin disease. (OSD) cases. (Mekonnen, 2019). Besides, most workers diagnosed with OHCD are women, with a prevalence of 76.85 percent. (França, 2019). The prevalence of hand dermatitis (HD) among nurses is reported to range from 18% to 57%. (Ngajilo, 2014). While the prevalence of hand eczema among the respondents was 22.1% (160/724). More than 90% had moderate to severe hand eczema. (Luk et al., 2011)

2.3.1 Global

Hand eczema is common in the nursing profession and has been reported widely in various parts of the world. A study by N. M. T. Luk et al. (2011) showed hand eczema is common and severe among Hong Kong nurses who working in a regional hospital. The result of the study found, more than 90% had moderate to severe hand eczema with the most common symptom of itchiness and dryness. The result of the study suggest that hand eczema is an important problem for a nurses and preventive measure should be emphasized. In Korea, a self-administered questionnaire study was performed on hospital nursing staffs at a single general hospital to identify the risk factors for hand eczema in hospital nursing staffs. The overall frequency of symptom-based hand eczema was 75.6%, and self-reported hand eczema was 31.0% which show

that hand eczema is quite common among hospital nursing staffs. Risk factors for hand eczema were young age, history of atopic dermatitis, frequent hand washing which more than 20 times per day and long duration of glove wearing which more than 5 min. Therefore, demands for appropriate prevention and education programs have been proposed (Lee, 2013). In Australia, a retrospective analysis study of occupational skin disease over 21 years period from 1993 to 2014 had show an incidence of 555 cases where 81.0% was occupational skin disease. The most common diagnosis was irritant contact dermatitis (ICD) (79.1%), followed by allergic contact dermatitis (ACD) (49.7%). (Higgins et al., 2016). In Jeddah, Saudi Arabia, a cross-sectional study regarding hand contact dermatitis of 181 nursing staff in the university hospital showed the prevalence rate of 7.73%. Despite the fact that the frequency of hand dermatitis is not as high as the frequency reported in some previous studies, it is still considered an issue that needs to be addressed and resolved. The incidence of hand dermatitis among nurses may need to be clinically confirmed and compared with the general population in our area in future studies. (Kokandi, 2017). In U.K., occupational contact dermatitis (OCD) and occupational contact urticaria (OCU) remain prevalent among workers and affect quality of life and employability. The study was conducted to summarize the British Occupational Health Research Foundation's (BOHRF) 2010 systematic review. It was also to help practitioners translate BOHRF guidelines into clinical practice. These standards of care aim to improve the education and knowledge of medical practitioners in the diagnosis and management of OCD and OCU, offering practical tools to improve the consistency and quality of diagnosis and care. (Adishes, 2013). A few years later, a study was conducted among nurses working in the UK National Health Service (NHS) who are particularly at risk of hand dermatitis. In research from Madan (2016), he has noted that, although various skin care strategies

and policy directives have been developed in recent years to minimize risk, their effectiveness and cost-effectiveness remain unclear. Therefore, the study was conducted to evaluate the clinical effectiveness and cost of interventions to prevent hand dermatitis in nurses in the United Kingdom. Recently, after COVID-19 outbreak in China spread over the world and become pandemic. There were several studies related to skin disease was conducted. In United State, according to research by Trepanowski (2021), nearly all participants consist of physicians, nurses, and other allied health professionals reported developing new skin symptoms since the start of the pandemic and new skin problems after the use of PPE with prevalence rate of 95.4% and 90.5% respectively. During outbreak in Turkey, the frequency and severity of some dermatological complaints increased in health care profession consisting of doctors and nurses. (Metin et al., 2020).

2.3.2 In Malaysia

In Malaysia, occupational skin disease as documented by the Department of Safety and Health Malaysia (DOSH) shows an increasing pattern from 2017 to 2018 which 69 and 158 respectively. However, in 2019, cases are back on the decline to 109. The data on contact dermatitis among nurses in Malaysia are lacking. In 1997, the Ministry of Health Malaysia introduced a surveillance programme for occupational and work-related diseases including poisonings for cases seen in government health facilities. Between June 1997 and November 1998, there were 108 cases of skin disease. The commonest reported skin disease was contact dermatitis with prevalence rate of 87%. (Sirajuddin, 2001). According to a first ever study of prevalence carried out in Malaysia among health care workers. The prevalence among the Malaysian health care workers can be considered to be low in comparison to that of some consumer countries as the USA which reported a prevalence of as high as 16.9%. (Kim, 1999). However,

based on a cross sectional study conducted in public hospital, the prevalence of contact dermatitis among staff nurses was 26.2% with responses rate of 100% and it showed to be a problem among staff nurses at the study location. (Huzaifah, 2019). The researcher believes that from 2019 and to the current year, there must be an increasing of cases especially during a COVID-19 outbreak. Unfortunately, the data was found was very limited and unclear.

2.4 The associated factors of Occupational Hand Contact Dermatitis.

There are six factors were found to be statistically significant associated with occupational hand contact dermatitis which are hours wear glove per week, having skin problem due to glove, frequency of hand washing per shift, having skin symptom due to handwashing, eczema history and allergy history. (Huzaifah, 2019). The main triggers were skin disinfectants, latex, nitrile gloves, and prolonged contact with water (4.84%). (França, 2019). The rate of cutaneous adverse events associated with gloves and hand hygiene products was 49.16%. (Montero-Vilchez, 2021). Most common skin adverse events were contact dermatitis, acne and itching. (Montero-Vilchez, 2021) These nursing duties was strongly associated with cutaneous reactivity after controlling for the confounding of gender, age, and other factors such as simultaneous exposure to multiple substances, use of aggressive detergents and wet work. (Coppeta, 2021).

2.4.1 Personal factor

The personal factor is referred to the social demographic data include age and gender. These two factors may contribute to hand contact dermatitis. According to recent research regarding Occupational dermatoses among front-line health care workers during the COVID-19 pandemic, there are 341 out of 390 health care workers who

participated were a woman with (87.4%) with the mean age was 39.5 years whose experienced worsening of their skin condition. (Trepanowski, 2021). However, about 235 from 341 participant of woman had reported experience skin condition before the start of the pandemic. Meanwhile, from the study by Lee (2013) he found that risk factors for hand eczema were young age. Since, these two elements possible contribute to the skin condition related to work, thus it will be assessed in this study.

2.4.2 Employment factor

The definition of employment according to International Labour Organization (ILO) is when a person who aged of fifteen and above worked at least one hour of duration within a week for profit and pay. (According to the International Labour Organization (ILO) Definition) | INSEE, 2021). The employment factor is referred to characteristics of employment regarding to a nurse's jobs. A nurses' duties depend on the work position, assigned task and environment. The nurse's duties generally include care management, prevention of adverse effect incident, and maximization of health service competences and patient health result (Aiken et al., 2014). There are several factors of employment that potentially contributes to the occupational hand contact dermatitis such as year of working, department assigned, working hour include a per day and per week and working extended hour. According to reports, the incidence of hand dermatitis (HD) among nurses varies from 18 percent to 57 percent, depending on the type of job they do and the department in which they work (Ngajilo ,2014.). Mostly, employees assigned to surgical departments and nursing assistants were the most affected. (França, 2019). Besides, a nurse who work at special care units were also the most get impacted (Ngajilo ,2014.). The employment factor is associate with other factor such hand washing factor and glove wearing factor since it is nature of nurse's work. The nurses are required to wash their hands frequently, perform wet work, wear

occlusive gloves for long periods, and are in regular contact with disinfectants, detergents, and medical substances. When the nurses working for extend hour means they will expose more to this associate factor so the effect to their skin condition will be more severe. Moreover, the nurse's duty and shift work were both linked to a higher incidence of cutaneous sensitization. (Coppeta, 2021). Cutaneous sensitization is an adaptive immunological response in which chemically changed skin proteins trigger a delayed T-cell-mediated allergic reaction. (Basketter et al., 2008). This condition known as irritant hand contact dermatitis (IHCD) which where we can see this often happens among nurses who have a history of allergies. This proves that employment factor is also associate with the history of atopy and allergies. Thus, the employment factor consists of year of working, department assigned, working hour include a per day and per week and working extended hour associated with other three main factors which hand washing, glove wearing, and history of atopy and allergy is related to the nurses occupation skin dermatitis.

2.4.3 Glove wearing factor

The media of skin side events related to PPE was 75.13%. There are two condition which type and duration of glove wearing that expose the nurses to the high risk of get hand contact dermatitis (HCD). Generally, there will four types of gloves that could cause the irritation to the skin, which is latex, nitrile rubber, polyvinyl chloride, polyurethane, and neoprene. (Tabary et al., 2020). The common type of glove that have been used at health care setting for treatment or assessment is latex and nitril glove which also known as medical glove. Both type of this glove essential part of the infection-control strategy as it flexible and safer for high biological risk procedure. (Anedda et al., 2020). Latex glove is a natural rubber latex which with powdered and

free-powdered while vinyl, nitrile and neoprene (polymers and copolymers of chloroprene) are categories as a type of synthetic non-latex materials (WHO, 2009). Natural rubber latex or rubber glove have been the dominant choice of health-care workers for many years as they provide some of the protection noted above. (Hunte, 2019). However, rubber gloves are a major cause of allergic contact dermatitis (ACD) in healthcare workers. (Rubins et al., 2020). Additionally, the healthcare workers are the occupational group most affected by natural rubber latex (NRLA) due to their frequent use of latex gloves. (Nucera, 2020). The use of latex gloves by health care workers (HCWs) can lead to multiple symptoms: eczema, contact urticaria, rhinitis, conjunctivitis, asthma, and anaphylaxis. Factors associated with glove-related cutaneous symptoms are frequency and duration of glove use, history of atopy, and history of allergy to fruit cross-reacting with latex. The quantity of glove use, history of atopy, and allergy to fruits cross-reacting with latex are risk factors for the occurrence of glove-related noncutaneous symptoms. (Boonchai, 2014). The prevalence of natural rubber latex allergy as diagnosed by prick testing was 2.5%, in one hundred twenty of healthcare workers with hand eczema. (Ibler, 2016). As a general policy, selection of non-powdered gloves is recommended since this avoids reactions with the alcohol-based hand rub in use within the health-care facility. (WHO, 2009). Hospital employees may be sensitized to latex even in the absence of perceived latex allergy symptoms. These data support the need to transform the health-care environment into a latex-safe one that minimizes latex exposure to patients and hospital staff.

2.4.4 Hand washing factor

Hand hygiene is of utmost importance as it may be contaminated easily from direct contact with airborne microorganism droplets from coughs and sneezes. Particularly in situations like pandemic outbreak, it is crucial to interrupt the transmission chain of the virus by the practice of proper hand sanitization. It can be achieved with contact isolation and strict infection control tool like maintaining good hand hygiene in hospital settings and in public. The success of the hand sanitization solely depends on the use of effective hand disinfecting agents formulated in various types and forms such as antimicrobial soaps, water-based or alcohol-based hand sanitizer, with the latter being widely used in hospital settings. To date, most of the effective hand sanitizer products are alcohol-based formulations containing 62%–95% of alcohol as it can denature the proteins of microbes and the ability to inactivate viruses. However, the used of frequent and high concentration of hand hygiene product caused adverse effects that related to contact dermatitis. Irritant contact dermatitis is the most common type of hand dermatitis seen in nurses' population. (Ngajilo ,2014.). As hand contact urticaria may influence adherence to hand hygiene protocols, Occupations involving frequent handwashing, between 20 and 40 times per day, have shown an increased incidence in cumulative ICD. The prevalence of occupational hand dermatitis was 69.7% in workers that reported a handwashing frequency exceeding 35 times per shift. The use of alcohol-based sanitizers is much more prevalent among today's healthcare workers than frequent handwashing.

2.4.5 Atopy and allergy factor

Both allergic and irritate contact dermatitis ICD are worldwide problems. (Rubins et al., 2020). Although most factors contribute to the problem of irritate contact condition

but there is a risk factors of severe disorder that contribute to the increase of allergic contact dermatitis such as atopy. Atopy is related to immune system disorder of a human potential to become sensitised and release IgE antibodies in reaction to common allergens exposure. (Peebles, 2012). The most common type of allergen is often the protein will cause allergic reaction that trigger by the immune system when entering a human body through oral, nostril or integumentary system. This will cause the person to experience a stronger than normal reaction to these allergens such as dust, pollen, peanut, or shellfish. Moreover, a person with atopy disorder is more likely to have allergic condition such as asthma, rhinitis, and eczema. (Watson, 2021). However, in health care setting, the nurses and other healthcare worker are most probably expose to type of chemical allergens such as natural latex glove proteins, several antiseptics such as (povidone iodine, and chlorhexidine) instruments, surface disinfectants (especially glutaraldehyde), drugs (like penicillins, cephalosporins, antineoplastic agents), that cause an allergic reaction. is a as well as fragrances contained most often in liquid soaps and hand disinfectants. which can cause type IV contact allergy and allergic contact dermatitis. The affected skin condition is most obviously could be seen in a person who has contact dermatitis with history of allergy. This finding agrees with the findings of relative studies which health care workers with a history of atopy type I allergic reaction, are at an even greater risk for sensitization and allergic reactions following exposure to several occupational allergens.

2.5 Symptoms of hand contact dermatitis

In research from Mekonnen (2019), he found, the highest symptoms indicate to contact dermatitis was redness, 28.5% (n = 38), followed by burning, 17.3% (n = 23) and hand is the most commonly affected body site, 22% (N = 93). This happens due to the high

frequency of both hand washing and hand gloves used per day with lack of health and safety training which contribute about 95 percent. This shows that these associated factors are highly contributing to contact dermatitis. Besides, the individual who is exposed to the allergen substance of latex gloves, mostly will manifest clinical disorder of latex allergy related to type I hypersensitivity mediated by immunoglobulin E (IgE) and type IV hypersensitivity delayed. Mostly, the person with type I hypersensitivity will have a severe skin condition with manifestation of itching, swelling, pruritus and contact urticaria. They also manifest a symptom of frequent sneezing, wheezing and rhinitis caused by the inflammation occurring in their respiratory system. While, in a person with type IV hypersensitivity they are more likely to have a localized and uncomfortable sense at contact site which develop within 24 to 48 hours after exposure. These symptoms are generally seen as eczematous dermatitis. (Nucera, 2020). Thus, it is important for the nurses to be alert with their skin condition and identify what is the factor that can trigger the reaction to improve the symptom. However, although this condition is not life threatening but it exposes the nurse to infection risk such as MRSA infection which will impair their work performance and quality of life as hand eczema was significantly more severe in MRSA carriers than in non-carriers ($p < 0.001$) and showed a higher prevalence of vesicles, erosions or fissures. (Brans, 2016). Methicillin-resistant *Staphylococcus aureus* (MRSA) infection is an invasion of bacteria that is resistant to several antibiotics into the human body which are very common in healthcare settings (CDC, 2019). The MRSA is transmitted by direct contact with an infected person.

2.6 Conclusion

As a conclusion, this chapter discussed the overview of contact dermatitis, epidemiology of OHCD, the OHCD cases and its prevalence among nurses globally and in Malaysia, the five associated factors of OHCD among nurses that will be assess in this study and symptoms of hand contact dermatitis based on 50 articles from past published works on a OHCD topic from 2010 to 2021. Moreover, the methodology of the study will be discussed in the next chapter.



CHAPTER 3

METHODOLOGY

3.0 Introduction

This study generally assesses the incidence and prevalence of OHCD among the nurses and its associated factors among a nurse who working at Serdang Hospital, Selangor. Specifically, it was to determine the socio-demographic, employment history, the duration, frequency, and type of protective equipment (glove), the frequency and type of exposure to wetness and irritant, and allergy history among nurses in Serdang Hospital. Then to identify the relationship between each type of associated factors (personal factor, employment factor, glove wearing factor, hand washing factor and allergy factor) and occupational hand contact dermatitis (OHCD). Finally, the significant symptom of skin condition shown by nurses who suspected have hand contact dermatitis was observed. However, to determine these three criteria (socio-demographic, associated factors, and the significant symptom of skin condition) and its relation, the data collection method and procedure must be chosen and planned well. Thus, the systemic method and principle of study must be established in this chapter. This chapter discuss about the research design of the study, setting of the study, the population of study, Study sampling the sample, inclusion and exclusion criteria of sample, the sample size, data collection method and its instrument, pilot study, data collection process selection process, the survey instrument, data collection.

3.1 Study design

This descriptive, cross-sectional study was conducted to investigate the prevalence and contributing factors based on several factors that cause significant skin condition that

related to occupational hand contact dermatitis among the nurses at Hospital Serdang, Selangor. Through survey method, the data was collected by using the questionnaire in this quantitative research study.

3.2 Study location

This study was conducted at Serdang Hospital, specifically at 5 departments such as Medical, Surgical, Operation theatre (OT), Intensive Care Unit (ICU) and Emergency department (ED).

3.3 Study population

The study population was staff nurses who work at several type of department at Hospital Serdang. The staff nurse defines as registered nurse with a diploma or a degree holder who provides patient care and nursing.

3.4 Duration of the study

The data for this study was collected in two months from Mei 2022 to July 2022. Estimating project length is an important aspect of scheduling. This duration of the study was estimated based on a project schedule that illustrated in Gantt chart (Appendix 1). The Gantt chart show the plan of activities and the current schedule status to manage the project effectively. The objective of effective project management is to finish projects on time.

3.5 Subject criteria

Inclusion criteria of the data	Exclusion criteria of the data
1. All staff nurses and head nurses (sister) working at selected	1. A nurse who works at clinic department.

<p>department for more than 12 months at Serdang Hospital.</p> <p>2. Malaysian citizen.</p>	<p>2. Clinical nurse manager OR matron nurse</p> <p>3. Staff nurses who were on maternity, medical and study leave.</p>
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3.6 Sample size

The sample of respondent which represents the population as a whole will be taken in order to survey a population of targeted samples in this research. In this study, firstly, the size of sample was count based on population size estimation, margin of error, confident level, and standard deviation by using a Modification Equation of Cochran's formular.

$$n = \frac{n_0}{1 + \frac{(n_0 - 1)}{N}}$$

Where,

n_0 = Cochran's sample size recommendation

N = population size

n = final sample size

To determine the final sample size, the Cochran's sample size recommendation will be count by using the Cochran's formular:

$$n_0 = \frac{Z^2 pq}{e^2}$$

Where,

n_0 = Cochran's sample size recommendation

Z = Z selected critical value of desired level of confidence

p = estimated proportion of an attribute that represent the population

q = 1 - p

e = desired level of precision

The appropriate sample size was determined using a value that assumes maximal variability because the degree of variability of this research group is unknown. The estimated proportion was set up in 50% ($p = 0.5$), 95% confidence level with 5% precision ($e = 0.05$) and the Z value will be 1.96. Thus,

Cochran's sample size recommendation, $n_0 = \frac{Z^2 pq}{e^2}$

$$n_0 = \frac{(1.96^2)(0.5)(0.5)}{(0.05^2)}$$

$$n_0 = 384.16$$

$$n_0 \approx 384$$

The total number of nurses working at each department which medical, surgical, operation theatre, intensive care unit and emergency department of Serdang Hospital, Selangor, who recruited for this study is estimated to be 425, which is the population size, N. Thus,

$$\text{Final sample size, } n = \frac{n_0}{1 + \left(\frac{n_0 - 1}{N}\right)}$$

$$n = \frac{384}{1 + \left(\frac{384 - 1}{425}\right)}, n = 201.98832$$

$$n = 202$$

As a result, 202 nurses from selected department of Serdang Hospital in Selangor who match the inclusion requirements for this study. The Cochran method was used to find an optimum sample size. In situations involving large populations, Cochran's formula was very useful. Because a sample of any size offers more information about a smaller population than a larger one, there is a 'correction' that may be used to lower the number indicated by Cochran's formula if the entire population is small. Thus, the Cochran's formula was chosen in this study. Then to get the sample size for each department, first, the population size for each department was divided by the size of entire population then multiply by the size of entire sample. Stratified random sampling formula (Neyman, 1934):

$$\text{Stratified random sampling formula, } n_h = (N_h / N) * n$$

where:

n_h = Sample size for hth stratum

N_h = Population size for hth stratum

N = Size of entire population

n = Size of entire sample

After the stratification of the population, the number for the sample needed for each department has been determined like shown in the following table:

Table 1: Stratification of respondents needed according to the faculty.

DEPARTMENT	STRAFICATION OF POPULATION	TOTAL SAMPLE NEEDED
Medical (n:122)	$(202/425) \times 122 = 57.9$	58
Surgical (n:70)	$(202/425) \times 70 = 33.3$	33
Operation Theatre (n:113)	$(202/425) \times 113 = 53.7$	54
Emergency department (n:51)	$(202/425) \times 51 = 24.2$	24
Intensive Care Unit (ICU) (n:69)	$(202/425) \times 69 = 32.8$	33
TOTAL:	201.9	202

By considering of 10% for non-response, missing data, unavailability of subjects or refusal to participate, the sample size of this study is calculated as below:

$$n=202+(202 \times 10/100)$$

$$n = 222.2$$

$$n \approx 222.2$$

In conclusion, after considering 10% of dropouts, the sample size of the participants needed in this study is 222 subjects.

3.7 Sampling method

The sampling technique used in this research was the convenience sampling where a specific type of non-probability sampling method that relies on data collection from population members who are conveniently available to participate in study. The nurses in Serdang Hospital as respondents who agree to follow this research, was filled the questionnaire given by the researcher. To draw reliable conclusions from the research's findings, the researcher the appropriate sampling technique was used. Therefore, the characteristics of the target population have been identified according to the purpose, criteria, and practicality of the research study before the appropriate sampling method in this research is established.

3.8 Research tool

3.8.1 Questionnaire

The Questionnaire used for this study was adapted from Smit 1992 and Nordic Occupational Skin Questionnaire 2002. (Smit, Coenraads, Lavrijsen & Nater, 1992). Written permission was obtained from the corresponding author before conducting this study and it is attached at Appendix A. The questionnaires comprises of 44 questions divided into four sections. The socio-demographic aspects are discussed in Section A. Section B focuses on aspects that are relevant to nurses's job. In Section C, questions on atopy and allergy history were asked. Section D used Smit's 1992 criteria to establish the condition of occupational hand contact dermatitis. Respondents will be asked if they experienced signs and symptoms of hand dermatitis in the previous 12 months, and if there is any of the signs and symptoms of hand dermatitis lasted more than three weeks. Finally, respondents will be asked if they had experienced the sign

and symptom of hand dermatitis more than once in the previous 12 months. If someone has at least two symptoms of hand dermatitis and has answered yes to the length or recurrence of hand symptoms, they have been diagnosed with hand dermatitis (Smit et al, 1992).

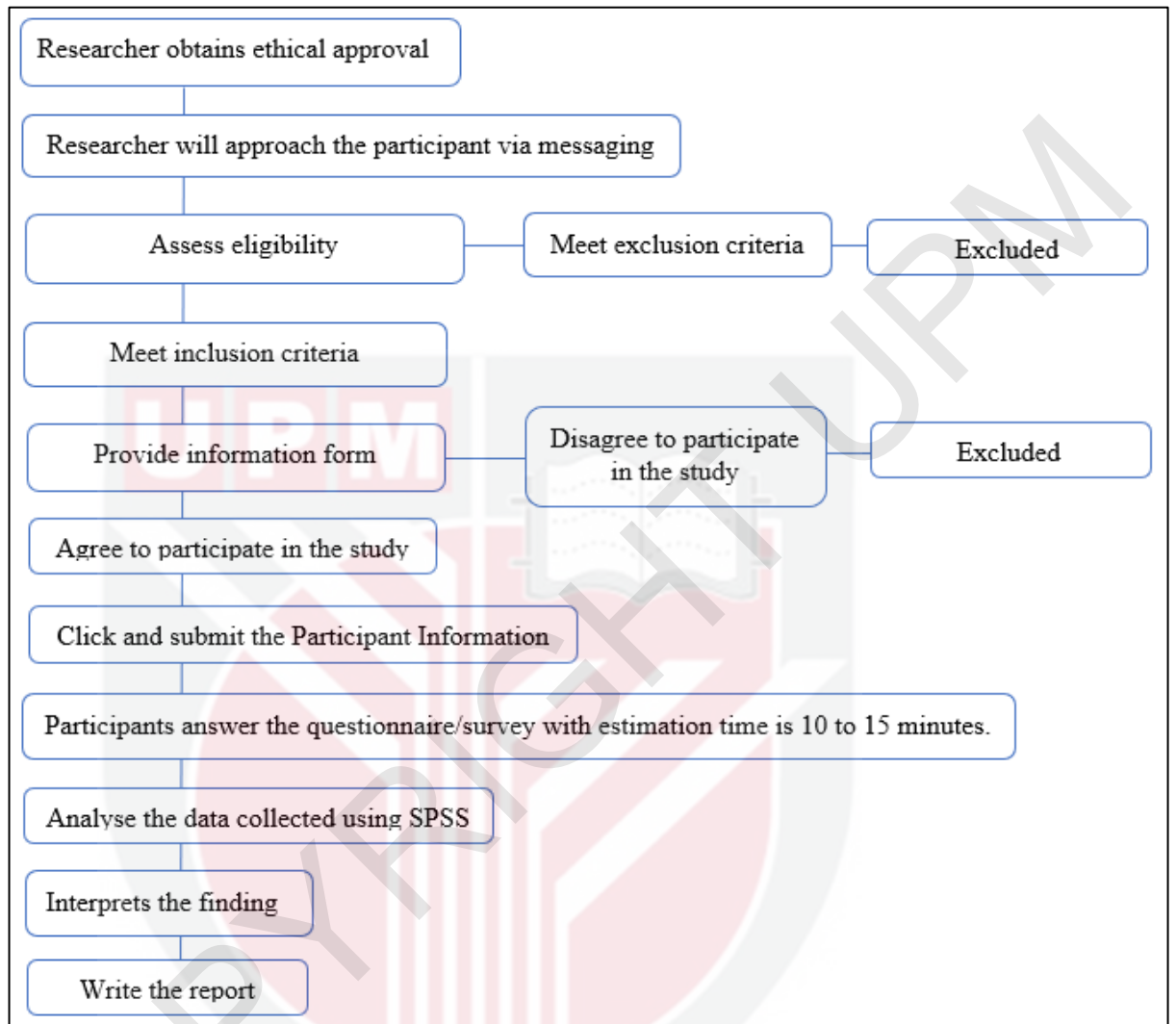
3.8.2 Validity and Reliability

To perform a good research, validity and reliability tests are needed to take very carefully. (Kumar Mohajan, 2017). Therefore, for validity and reliability in the study will be assessed by several methods. Firstly, the validity was tested by using the construct validity method which pilot run will be done on a small scale of the sample. There are 22 respondents about 10% from the sample size estimated of 202 by using stratified random sampling. Then, Statistical Package for the Social Science (SPSS) Version 27 will be used to analyse the result. To assess this type of validity, the researcher must be able to define the expected outcome. A correlation coefficient of a 0.60 or above will indicate a significant, positive relationship (Creswell, 2005). To establish validity, the researcher must determine which concept of validity is important so internal consistency method will be chosen in this study by using the Cronbach Alpha test. This test will be used to assess the reliability of the questionnaire used for this study. The value of Cronbach's alpha will determine which the reliability of 0.70 and above is good, 0.80 and above is better, and 0.90 and above is best. The value will be acceptable. Before that, the question will be reviewed by the supervisor and co-supervisor for consultation. However, the questionnaire will be developed in bilingual which are Malay and English. So, the questionnaire will be translated to Malay language. Thus, it needs to be assessed by the supervisor and lecturer from Fakulti Bahasa Moden dan Komunikasi, UPM.

3.8.3 Data collection

Data was collected as soon as the researcher receives ethical permission for the study. The data was gathered online using a Google form as allowed researched to collect information easily and efficiently as it can integrated with Google spreadsheets, therefore researcher can access to a spreadsheet view of the collected data. The link to the Google form was shared with nurses who are currently employed and working at Serdang Hospital, Selangor, and they subsequently shared the link with additional eligible nurses to complete. The survey was distributed via social media platforms which is WhatsApp. On the first page of the online survey, a comprehensive Participant Information Sheet will be provided to check that the participants fulfil the study's inclusion and exclusion criteria. Aside from that, after reading the information and meeting all the requirements, the volunteers clicked the button which indicate their desire to participate in the study. As a result, consent was granted automatically.

Figure 2.0: Study Flowchart of Occupational Hand Contact Dermatitis Among Nurses in Serdang Hospital: A Cross Sectional Study.



3.9 Data analysis

Data was analysed using Statistical Analysis of Social Sciences System (SPSS) Version 27. A descriptive statistical analysis performed by using frequencies, percentage, median and interquartile range regarding the prevalence of occupational contact dermatitis of hands and its associated factors. Although, Chi square test and will be used to measure the association between two categorical variables with occupational hand contact dermatitis.

Objective	Variable	Type of variable	Statistic measurement
To identify the sign and symptom of hand contact dermatitis among the nurses.	Present of sign and symptom of hand contact more than one.	Categorical	Descriptive statistic: percentage
	The symptoms last for more than 3 weeks.	Categorical	Descriptive statistic: percentage
	Recurrent episode of hand symptom in past 12 months.	Categorical	Descriptive statistic: percentage
Objective	Dependent variable	Independent variable	Statistic measurement
To identify the relationship between socio-demographic data and OHCD	OHCD Diagnose Sign and symptom of hand contact dermatitis. (categorical)	Socio-demographic	
		1.Age (categorical)	Pearson Chi-square test
		2.Gender (categorical)	Pearson Chi-square test
To identify the relationship between employment factor and OHCD		Employment history	
		1.Department (categorical)	Pearson Chi-square test
		2.Working hour (categorical)	Pearson Chi-square test
To identify the relationship between glove wearing factor and OHCD		Glove wearing history	
		1.Duration of wearing glove once (categorical)	Pearson Chi-square test
		2. Frequency of change a glove (categorical)	Pearson Chi-square test
		3.Type of glove wearing (categorical)	Pearson Chi-square test
To identify the relationship between the hand washing factor and OHCD		Hand washing history	
		1.Frequency (categorical)	Pearson Chi-square test

To identify the relationship between the atopy and allergy and OHCD.		
	2.Type of hand washing (categorical)	Pearson Chi-square
	Atopy and allergy history	
	1.Asthma (categorical)	Pearson Chi-square test
	2.Rhinitis (categorical)	Pearson Chi-square test
	3.Eczema (categorical)	Pearson Chi-square test

3.10 Ethical Consideration

3.10.1 Ethical approval

The ethical approval will be obtained from two committee for this study. First, the Ministry of Health's (MOH) Medical Research and Ethics Committee (MREC) and second from Ethics Committee for Research Involving Human Subjects Universiti Putra Malaysia or Jawatankuasa Etika Universiti untuk Penyelidikan Melibatkan Manusia (JKEUPM). As this study will be conducted in a government hospital (Hospital Serdang), the approval from MREC is needed. The MREC approval will be obtain via online registration and application through the National Malaysia Research Register (NMRR). Next, send the written ethical approval letter to the Jawatankuasa Etika Untuk Penyelidikan Melibatkan Manusia (JKEUPM). The written ethical approval letter received from MREC, and the proposal will be attached together in the written ethical approval letter to JKEUPM. Then a written permission letter will be submitted to the Clinical Research Centre (CRC) and the director of Serdang Hospital to obtain permission to conduct this study in the respective hospital.

3.10.2 Informed consent

Informed consent is an ethical and legal requirement for research involving human participants. It primarily protects human participants of research to ensure the quality of high ethical standards. Each participant in this study will be given a participation information sheet and an informed consent form attached to the questionnaire before participating in the study. The participation information sheet and informed consent form along with the questionnaire will be shared in the form of Google forms and distributed via WhatsApp. In the participation information sheet, the details of this study will be explained one by one, and participants are asked to read and understand it before participating in this study. In addition, each participation from the respondents was voluntary and they had the right to withdraw from the study at any time without assigning any reason. However, any submitted data is unable to be withdrawn as it cannot be traceable to the specific individual and will be analysed in the final analysis. Next, participants required to click and submit an informed consent form if they agreed to participate in the study.

3.10.3 Confidential of the data

The information gathered will be kept completely private. No identifiable information, such as name, identification card number, staff number, or entire address of the participant's workplace, will be recorded to guarantee that the participant's identity remains secret and anonymous. Even the researchers are unable to link the data to specific persons. Moreover, because the data will be collected via a Google Form, the researcher's Google Account will only be accessible to the researcher. The acquired data will then be transferred to a computer for statistical analysis; as a result, the

downloaded data will be maintained on a password-protected computer, thumb-drive, and cloud account (i.e., dropbox). Furthermore, the data that the researcher is required to upload to Google Drive will be password-protected. Only those involved in the study, such as researchers, qualified monitors and auditors, sponsors and their affiliates, and governmental or regulatory bodies, have access to the data. Because the information is classified as sensitive, the researcher will keep it for at least seven years before completely deleting it. If any hardcopy material is accessible, the researcher's supervisor will keep it in a secured drawer in the supervisor's office.

3.10.4 Publication Permission

The personal information of the participant will not be revealed, regardless of how the study is published or presented. When the research is presented, no personal information about the participant will be published. If the study is recommended for publishing, authorization from the Director of Serdang Hospital and the Director of the Malaysian Ministry of Health must be acquired prior to publication. The article URL will be provided to the participating location, Serdang Hospital, if it is published in journal form. If the study is published as a written thesis, the abstract of the study will be shared with Serdang Hospital to inform the participants of the findings. If necessary, a sharing session via presentation or conference at the participating site will be scheduled.

3.11 Conclusion

This study provides information regarding the prevalence of Occupational Hand Contact Dermatitis and its associated factor among nurses in Serdang Hospital, Selangor. Throughout this study, we can determine the prevalence of the disease among a nurse and what the main factor that trigger the symptom of the disease. Thus, it helps us to identify the factors highly contributing to the skin condition of the nurses.

Therefore, further interventions could be carried out to improve the quality of health status and life among a nurse. Thus, the best and safe care can be provided to the patient in public healthcare setting.



CHAPTER 4

RESULT

4.0 Introduction

This chapter presents the result of this study that aimed to determine the association between the prevalence of occupational hand contact dermatitis and its association between 5 factors which include sociodemographic factor, employment factor, glove wearing factor, hand washing factor and allergy history factor. All the data had been analysed using IBM SPSS statistic 27 with a statistical level set at $p < 0.05$.

4.1 Response rate

A total of 120 individuals responded to the online survey and all responses are valid to be used and analysed in this study. 222 respondents were the required sample size, hence the response rate for this study is 54%

4.2 Prevalence of Occupational Hand Contact Dermatitis (OHCD) among nurses.

Based on the result, there are 45 respondents reported to have minimum one symptom of occupational hand contact dermatitis. However, only 37 respondents fulfilled Smit 1992's Criteria, which have more than 1 sign and symptom, the symptoms last for more than 3 weeks and/or recurrent episode of hand symptom in past 12 months.

Therefore, the two-months prevalence of occupational hand contact dermatitis in this study is 30.8%.

4.3 Sociodemographic characteristics

The total number of respondents of this study is 120, aged from 23 to 44 years old with the median age of 27 years old with interquartile rate (IQR) of 9 years. Majority of the respondent were female (92.5%, n=111), Malay (80%, n=96) and married (75, n=90). The highest education level among respondents is diploma (90%, n=108). The respondent's minimum working duration was a year, and the longest duration was 19 years with a median of 9 years. The distribution of the respondent almost equal to medical (20%, n=24), emergency department (19.2%, n=23), and operation theatre (20%, n=24). However, the highest and lowest respondents are from intensive care (ICU) (25.8%, n=31) and surgical (15%, n=18) respectively. All the respondents worked in a shift, and majority worked for 40 to 42 hour per week. Majority of the respondents (100) worked in an extended hour ranged between 1 to 7 hours per week. The details regarding the distribution of the respondents' socio-demographic characteristics and employment history are reported in Table 4.3.

Table 4.3: Distribution of socio-demographic characteristic and employment history among nurses in Serdang Hospital, Selangor.

Variables	Frequency (Percentage) n (%)	Median (IQR)	Min-Max
Sociodemographic			
Age (year)		27(9)	23-44
23-29	55 (45.8)		
30-39	59 (49.2)		
More than 40	6 (5.0)		
Gender			
Male	9 (7.5)		
Female	111 (92.5)		
Ethnicity			
Malay	96 (80.0)		
Chinese	7 (5.8)		
Indian	5 (4.2)		
Others	12 (10.0)		

Marital status			
Single		30 (25.0)	
Married		90 (75.0)	
Education level			
Diploma		108 (90.0)	
Degree		12 (10.0)	
Employment history			
Year of working			
		5 (9)	1-19
1-5		49 (40.8)	
6-10		47 (39.2)	
11 and more		24 (20.0)	
Department			
Medical		24 (20.0)	
Surgical		18 (15.0)	
Operation Theater (OT)		24 (20.0)	
Intensive Care Unit (ICU)		31 (25.8)	
Emergency department (ED)		23 (19.2)	
		42 (6)	40-48
Working hours per week			
40-42H		72 (60.0)	
More than 42H		48 (40.0)	
Working extended hour			
Yes		100 (83.3)	
No		20 (16.7)	
		7 (4)	7-21
Extended hours per week			
1-7H		66 (55.0)	
More than 7H		34 (28.3)	

4.4 Sociodemographic factor

None of the factors in the sociodemographic significantly associated with occupational hand contact dermatitis.

Table 4.4: Association between sociodemographic factors and occupational hand contact dermatitis among nurses in Serdang Hospital (n=120).

Variables	Hand dermatitis	No hand dermatitis	Test statistic		
	n (%) (n=37)	n (%) (n=83)	X ²	df	P-value
Sociodemographic factor					
Age			4.449 ^a	2	0.108
23-29	21 (38.2)	34 (61.8)			
30-39	16 (27.1)	43 (72.9)			
More than 40	0 (0)	6 (100)			
Gender			3.314 ^a	1	0.069
Female	37 (32.7)	76 (67.3)			
Male	0 (0)	7 (100)			

4.5 Employment factor

Table 4.5 shows one of the factors in the employment history have significantly associated with occupational hand contact dermatitis (OHCD). Working department had significantly associated with OHCD with p-value of 0.001. Working hour per week were not significant in this study as p-value are more than 0.05.

Table 4.5: Association between employment factor and occupational hand contact dermatitis among nurses in Serdang Hospital (n=120).

Variables	Hand dermatitis	No hand dermatitis	Test statistic		
	n (%) (n=37)	n (%) (n=83)	X ²	df	P-value
Employment factor					
Working Department			24.445 ^a	4	0.001*
<i>Current working department</i>					
Medical	1 (4.2)	23 (95.8)			
Surgical	11 (61.1)	7 (38.9)			
Operation Theatre (OT)	9 (37.5)	15 (62.5)			
Intensive Care Unit (ICU)	13 (41.9)	18 (58.1)			
Emergency Department (ED)	3 (13.0)	20 (87.0)			
Working hour			0.234 ^a	1	0.628
<i>How many hours do you work on average per week?</i>					
40-42 hours	21 (29.2)	51 (70.8)			
More than 42 hours	16 (33.3)	32 (66.7)			

4.6 Glove wearing factor

None of the factors in the glove wearing factors has significantly associated with occupational hand contact dermatitis among nurses in this study.

Table 4.6: Association between wearing glove factors and occupational hand contact dermatitis among nurses in Serdang Hospital (n=120).

Variables	Hand dermatitis	No hand dermatitis	Test statistic		
	n (%) (n=37)	n (%) (n=83)	X ²	df	P-value
Glove wearing factor					
Duration of wearing glove <i>How many hours do you wear glove when performing procedure in a week on average?</i>			0.346 ^a	1	0.557
1-10 hours	22 (28.9)	54 (71.1)			
More than 10 hours	15 (34.1)	29 (65.9)			
Frequency of change a glove <i>How many times do you wear a glove to performing procedure in a week on average?</i>			0.000 ^a	1	0.983
1-30 times	24 (30.8)	54 (69.2)			
More than 30 times	13 (31.0)	29 (69.0)			
Type of glove wearing <i>What type of glove do you use when performing a procedure?</i>			0.259 ^a	2	0.879
Nitrile powder free	10 (33.3)	20 (66.7)			
Latex powder free	11 (32.4)	23 (67.6)			
Latex powder	16 (28.6)	40 (71.4)			

4.7 Hand washing factor

Table 4.6 shows both factors in the hand washing factors had significantly associated with occupational hand contact dermatitis in this study. Frequency of hand washing had significantly associated with OHCD with p-value of 0.022. Another factor which types of hand wash used also show had significant with OHCD with p-value of 0.047.

Table 4.7: Association between hand washing factors and occupational hand contact dermatitis among nurses in Serdang Hospital (n=120).

Variables	Hand dermatitis	No hand dermatitis	Test statistic		
	n (%) (n=37)	n (%) (n=83)	X ²	df	P-value
Hand washing factor					
Frequency of hand washing			7.596 ^a	2	0.022*
<i>How many times do you wash your hands in one working day/ shift as following 'hand hygiene' requirement?</i>					
3-10	19 (23.5)	62 (76.5)			
11-20	10 (40.0)	15 (60.0)			
More than 20	8 (57.1)	6 (42.9)			
Type of hand wash.			6.119 ^a	2	0.047*
<i>What type of hand wash or soap do you use frequently at your workplace?</i>					
Hand Disinfectant (Al-soft A)	7 (16.7)	35 (83.3)			
Anti-microbial hand soap (Surgi Scrub 4%)	29 (38.7)	46 (61.3)			
Normal soap	1 (33.3)	2 (66.7)			
Water only	0 (0)	0 (0)			

4.8 History of allergy factor

Table 4.8 shows one the factors in the allergy factors significantly associated with occupational hand contact dermatitis in this study. History of allergy factor shows had significant associated with OHCD with p-value of 0.042. However, another factor of allergy history is not showing association in this study.

Table 4.8: Association between history of atopy and allergy factors and occupational hand contact dermatitis among nurses in Serdang Hospital (n=120).

Variables	Hand dermatitis	No hand dermatitis	Test statistic		
	n (%) (n=37)	n (%) (n=83)	X ²	df	P-value
History of allergy factor					
History of eczema			4.134 ^a	1	0.042*
<i>Do you have history eczema?</i>					
Yes	10 (50.0)	10 (50.0)			
No	27 (27.0)	73 (73.0)			
History of rhinitis			2.297 ^a	1	0.130
<i>Do you have history of allergy rhinitis?</i>					
Yes	6 (50.0)	6 (50.0)			
No	31 (28.7)	77 (71.3)			
History of asthma			0.206 ^a	1	0.650
<i>Do you have history of asthma?</i>					
Yes	2 (40.0)	3 (60.0)			
No	35 (30.4)	80 (69.6)			
History of substances allergy			0.966 ^a	1	0.326
<i>Do you have history of allergy to other substances?</i>					
Yes	15 (36.6)	26 (63.4)			
No	22 (27.8)	57 (72.2)			

CHAPTER 5

DISCUSSION

5.0 Introduction

The findings of this study are discussed further in this chapter based on the objective set. The discussion includes all the results of the descriptive findings of the prevalence of occupational hand contact dermatitis (OHCD). The descriptive results of five associated factors of occupational hand contact dermatitis among nurses also will also be discussed. On the other hand, the association between each associated factors with prevalence of OHCD will be explored in this study.

5.1 Prevalence of Occupational Hand Contact Dermatitis

The prevalence of occupational hand contact dermatitis in this study was 30.8% which was higher compared to a study conducted in another public hospital in Malaysia (26.2%) among 206 staff nurses, even though both of these studies used the same diagnostic criteria. This can be explained as, half of the staff nurses participated in latter study was selected from all clinical department (Huzaifah,2019), meanwhile, the respondents in this study were only selected only from five departments which have high potential to get affected as prevalence of OHCD depending on the nature of the work the nurses perform and the department of employment such as surgical departments and special care units affected. (Ngagilo, 2014)

Another study which was conducted in Ethiopia among 133 staff nurses found 31.5% of the respondents had occupational hand contact dermatitis. In this study, the higher prevalence of occupational hand contact dermatitis was attributed due to interviewer-administered for data collection. (Mekonen, 2019). The commonest reason was due to recall bias as these studies were using questionnaire that required them to recall all the

symptoms that they might experience throughout the past 12 months which lead to inaccuracy and lower the prevalence of occupational hand contact dermatitis (Kokandi, 2017).

The prevalence of occupational hand dermatitis also varied even though the same studies method was applied in Saudi Arabia which was first study conducted during Covid Pandemic in 2020 among 408 staff nurses and found prevalence of 58.6% (Alluhayyan et al., 2020). However, a higher prevalence in German of 33% was documented in later study of 66 staff nurses. These differences can be attributed due to hand hygiene measures in the general population and in health care workers have increased considerably since the outbreak of the COVID-19 pandemic. (Reinholz et. al ,2021).

There were many other factors that may contribute to the variety result yield previously. In this study, there are 45 (37.5%) respondents reported to have minimum one symptom of occupational hand contact dermatitis but respond rate only 54% which only 120 of 222 actual sample size. The larger sample size in the later study which give higher prevalence of occupational hand contact dermatitis. symptom of hand dermatitis. Therefore, there was a possibility that the actual prevalence of occupational hand contact dermatitis among respondent in this study would be higher than 30.8%. However, as there was no physical examination done on the respondents, therefore, there was no concrete evidence to confirm it.

5.2 Socio-demographic characteristic

In this study, the total number of 120 respondents aged from 23 to 44 years old with the median 28 age with interquartile rate (IQR) of 9 years. Majority of the respondent were female (92.5%, n=111), Malay (80%, n=96) and married (75, n=90). The highest education level among respondents is diploma (90%, n=108). This result is almost like

past study in other public hospital in Selangor which the respondents was aged from 23 to 50 years old with median age was 29 years old with interquartile rate (IQR) of 9 years. Only one of the respondents was male. Majorities of the respondent are Malay and hold a diploma in nursing and majority of respondents (70.4%, 145) are married. (Huzaifah,2019). These studies indicated that were elderly nurses in the Malaysian government hospitals and females were the dominant gender in the nursing industry in the Malaysia government hospitals. Other than that, in this study the respondent's minimum working duration was a year, and the longest duration was 19 years with a median of 6 years. Compared to study from Huzaifah, in 2019 the respondent's minimum working duration was a year and the longest duration was 35 years with a median of 5 years. Moreover, in this study, the distribution of the respondent almost equal to medical (20%, n=24), emergency department (19.2%, n=23), and operation theatre (20%, n=24). However, the highest and lowest respondents are from intensive care (ICU) (25.8%, n=31) and surgical (15%, n=18) respectively. All the respondents worked in a shift, and majority worked for 40 to 42 hour per week. Majority of the respondents (100) worked in an extended hour ranged between 1 to 7 hours per week. Meanwhile, the distribution of the respondent in another public hospital in Malaysia was almost equal to medical/ paediatric, surgical, intensive care, operation theatre. Majority of the respondents worked in a shift, for 40 to 68 hour per week. Majority of the respondents (168) worked in an extended hour ranged between one to 25 hours per week. (Huzaifah, 2019)

5.3 Association between socio-demographic factor and OHCD

In this study, none of the factors in the sociodemographic has significantly associated with occupational hand contact dermatitis. Both age and gender, shows the p-value of 0.108 and 0.069 respectively which this indicates no significant between both age and

gender with OHCD in study. A study conducted among Dutch apprentice nurses reported a 1-year period prevalence of HD of 23% compared to a 1-year period prevalence of 9% to 14% in the general population between 18 and 69 years of age. (Ngagilo, 2014). However, in agreement with the findings of Smith's study of nurses in Shijiazhuang, China, they found no association between age with hand eczema. (Huang et al, 2020). In gender perspective, females allergic contact dermatitis (ACD) percentage was higher in all job categories in healthcare sector with prevalence of 65%. (Mauro, 2016). In Saudi Arabia, result shows females are more prone to develop contact dermatitis with p-value of 0.003. (Alluhayyan,2020). It is possible that a different gender prevalence of dermatitis exists due to a possible difference in skin structure between sexes, and segregation of gender that is still present in some occupations, which may vary the types of irritant and sensitising agents that come into contact with female and male skin. (Mauro, 2016). However, this cannot be proven in this study due to low respondent of the study. Response rates approximating 60% for most research should be the goal of researchers to maintain the quality and that standards for survey research (Fincham, 2008). Thus, the response rate of study must be improved to see the significant of the sociodemographic factor with OHCD in this study.

5.4 Association between employment factor and OHCD

In this study, shows one of the factors in the employment history have significantly associated with occupational hand contact dermatitis (OHCD). Working department had significantly associated with OHCD with p-value of 0.001. In German, a high prevalence of symptoms associated with acute hand dermatitis of 90.4% was found amongst 114 HCWs at a single surgical centre and at a COVID-19 intensive care unit. (Guertler, 2020). In Turkey, hand eczema was detected in 54 of 107 (50.5%)

participants who working in the COVID-19 patient care units of hospital. (Erdem,2020). Among Japanese hospital nurses reported the highest prevalence of HD (48%) in the surgical department and lowest prevalence of HD (6%) in psychiatry. (Ngagilo, 2014). In this study the OHCD was highly contribute from surgical department (61.1%) and intensive care unit (41.9%) which this can be relate to the latter study as this study was also conducted in a covid-19 hospital. Other than that, working hour are independent risk factors for hand eczema (HE). (Erdem, 2020) It is a variable that stands alone and isn't changed by the other variables that to measure in study. The more working hour the longer the length and frequency of the exposure. In Saudi Arabia, Respondents who work 40-50 hours per week represent 61.5% of the sample. and it show has significant with hand eczema with p-value of 0.001.(Alluhayyan,2020). However, in this study, working hour per week were not significant as p-value are more than 0.05 (0.628). This similar to result from another public hospital in Selangor (Huzaifah,2019). The result is different because the latter study was involving all the staff nurses who working in the hospital, which include the nurses who are working at clinic department. Thus, in his study gets a wide range of result of work hour per day, thus the result produce has a significant.

5.5 Association between glove wearing factor and OHCD

In this study, all the glove wearing factors includes duration of wearing glove ($p=0.557$), type of glove wearing ($p=0.879$), and frequency of change a glove ($p=0.983$) shows p-value more than 0.05. Thus, none of the factors in the glove wearing has significantly associated with occupational hand contact dermatitis among nurses. This was consistent to the study from hospital in Saudi Arabia shows there was no significant between hand glove wearing and hand eczema with p-value of 0.847. (Alluhayyan,2020). Lan et al reported a high level of hand skin (70.4%) damage due

to frequent hand hygiene and longer times of using gloves in healthcare workers managing COVID-19 patients. (Erdem,2020). However, in this study, only 15 respondents who had hand contact dermatitis are those who wore glove more than 10 hours per week with prevalence of 34.1%, compare to 29 respondents who do not has hand contact dermatitis with prevalence of 65.9%. Thus, there is no significant between the longer times of using gloves factor with OHCD proven.

Wearing occlusive gloves is an integral part of occupations associated with a high prevalence of hand skin disease, such as the healthcare sector. (Brok,2021). Occlusive glove such as latex and nitrile glove had been used in this respective hospital by the healthcare workers when performing procedures. (Huzaifah,2019). In this study there no significant had been proven between types of gloves wearing used with OHCD. This finding was similar with a study conducted in other public hospital in Malaysia. In that study, nurses (n=206) were not found to have contact dermatitis upon used of each type of glove include latex glove, latex free powder, and nitrile free powder. (Huzaifah, 2019). However, there is experimental evidence that, the effect of occlusion, previously occluded skin challenged with sodium lauryl sulfate leads to an increased susceptibility to the irritant with an aggravation of the irritant reaction. (Fartasch, 2016). Another study that had significant study was conducted in India, which about 74 (10.6%) of study participants had latex allergy symptoms, with 69 (9.9%) also having contact dermatitis. (Tomy,2021). This finding could be explained by the nature of occlusive glove that trapped heat and sweat of the wearer which are causing an impairment on the skin's barrier function. The longer duration of wearing glove will further worsen the skin's condition. (Brok,2021).

Other than that, the frequency change of glove. In this study, there is no association between frequency of change of glove with OHCD. According to the findings of

Huzaifah's (2019) study, there is no significant relationship between the frequency of glove wear per week and hand contact dermatitis among nurses. Besides, there was limited literature on the relationship between glove wearing related and hand skin condition. Thus, this result cannot be discussed in more detail.

5.6 Association between hand washing factor and OHCD

A cohort study to assess the influence of wet work on the risk of developing hand eczema in apprentice nurses, reported an incidence rate of 36.7/100 person years. (Ngagilo, 2014). In this study, both factors of hand washing had significantly associated with occupational hand contact dermatitis. Frequency of hand washing had significantly associated with OHCD with p-value of 0.022. Based on the result about 57.1 % respondent with hand dermatitis had wash hand more than 20 times per shift. This finding was similar with study conducted in Saudi Arabia, in this study, handwashing frequency more than 20 times per day ($P = .04$) were significantly over-represented among nurses. (Erdem, 2020). This is because health care workers have more frequent use of soap or, surfactant cleanser and water compared to non-healthcare workers. (Huzaifah, 2019). Frequent and repeated use of hand hygiene products, particularly soaps and other detergents, is an important cause of chronic irritant contact dermatitis among health care workers. (WHO, 2009). Another factor is the types of hand wash used which also show significant to OHCD with p-value of 0.047. In general, two options for hand hygiene are available in clinical practise: hand washing with soap and water or hand disinfection with alcohol-based hand rubs. (Kamph, 2007). In this study, majority the respondents who had OHCD and shown minimum of one sign and symptom of hand dermatitis was used anti-microbial hand soap. This show that the type of Anti-microbial hand soap (Surgi Scrub 4%) has high prevalence

contribute to OHCD with percentage of 38.7% follow by hand disinfectant (Al-Soft A) type with 16.7%. Contrary to older findings,22 alcoholic hand sanitisers have been shown to cause less irritation than regular hand washing. (Ngagilo, 2014). Compared to the latter study, skin symptoms that occurred due to hand washing liquid or soap was found to be significantly associated with occupational hand contact dermatitis. (Huzaifah,2019). However, the study not stated which type of hand wash that contribute the highest prevalence to the skin condition. Another study at Saudi Arabia, also shows that there significant between frequency of handwashing with hand eczema with p-value of 0. 001.(Alluhayyan,2020). Strict adherence to hand hygiene reduces the risk of cross-transmission of infection. (Mathur, 2011). The overall compliance rate in hand hygiene among healthcare worker is around 50%. (Kamph, 2007). As a result, it is not surprising that there is a high prevalence of skin diseases among nurses because of excessive use of antibacterial soap and hand rub.

5.7 Association between “atopy and allergy history” with OHCD

In this study 20 (16.7%) of the respondents was reported to have history of hand eczema. About ten of them were found to have occupational hand contact dermatitis and it is statistically significant (p-value =0.004). This finding was consistent with a study that found a significant association between history of eczema and occupational hand contact dermatitis in the study (p= 0.005). (Huzaifah,2019). Other than that, this is supported only by one previous study which showed a woman had a background of mucosal atopy and suffered from both hay fever and asthma was diagnosed with allergic contact dermatitis. (Ngagilo, 2014). Nurses who have a personal or family history of atopy are more likely to develop hand dermatitis. (Szepietowski,2005). However, history of allergic reaction to any substances had been recorded as the most important factor associated with occupational hand contact

dermatitis. This was because, the skin became more prone to irritation by lowering the irritation threshold in a person with allergy history (Huzaifah,2019). In an American online study among 90,488 nurses, eczema was found to be strongly associated with food allergy, asthma, and hay fever. (Drucker et. Al., 2016). In Saudi Arabia, researchers discovered a significant ($p=0.001$) difference in the occurrence of contact dermatitis between those who reported a personal history of allergic eye symptoms (itching, watery, red, or swollen eyes, e.g., from pollen or animals) and those who did not (58%; $n=188$). (Alluhayyan,2020). This finding was similar with research in China that showed an increased prevalence of hand eczema was observed in those with food allergy history. (Huang et.al.,2020). However, possibly due to the limited sample size, no correlation between hand eczema and allergy, asthma or hay fever was found in this study.

5.8 Conclusion

A prevalence (30.8%) of OHCD showed to be a problem among staff nurses in Serdang Hospital with response rate of 54% in this study. There are 5 variables was listed in this study to compared which factor contribute higher to the prevalence. Working department ($p=0.001$), frequency of hand washing ($p=0.022$), skin symptom with type of hand washing of Anti-microbial hand soap (Surgi Scrub 4%) ($p=0.047$) and eczema history ($p= 0.004$) were found associated with OHCD. However other factors, age, duration of work, glove factor wearing, and allergy history was not shown any association with OHCD among the nurses in this study. The variability in these results may be due to different sample sizes, representativeness of the samples, and different prevalence rates in different regions due to many factors such as cold and dry climate. (Huang et. Al., 2020)

CHAPTER 6

LIMITATION AND RECOMMENDATION

6.0 Introduction

This is a cross-sectional study that was completed in a short period of time using the convenience sampling method to collect data. As a result, several limitations discovered during the research period will be discussed in this chapter.

6.1 Limitation

The limitation of this study was its small sample size, with nurses drawn from only one hospital in the same state of Selangor. As a result, the findings may not apply to other states of Malaysia. Secondly, there is a bias because this study used a questionnaire that required participants to recall all symptoms they may have experienced in the previous 12 months, resulting in inaccuracy and a lower prevalence of occupational hand contact dermatitis. Next, the researcher did not put the assessment on nurses' knowledge of skin protection in this study. This can be a variable to significant impact of previous/current hand skin condition by finding previous information on skin protection with respect to level of knowledge. Furthermore, due to nurse's heavy workload, they were unable to focus when answering the questionnaire. This could result in response bias, where nurses' responses are false and misleading. Instead, more time was needed for data collection, which caused a delay in the study's progress. Finally, is time limit. Researchers face deadlines when it comes to completing studies. This research was impacted by time constraints. As a result, the study's limitation included a lack of references and recommendations.

6.2 Implication and recommendation

Finding from this study showed that occupational hand contact dermatitis is a problem among clinical staff nurses. As demonstrated in this study, skin symptom following hand washing has contribute to high prevalence of occupational hand contact dermatitis. This problem should be tackled based on case-by-case basis. Nurses who developed skin symptom following hand wash type used should be identified earlier so that a suitable type of soap or hand disinfection with alcohol-based hand rubs could be given to them. Adhering to evidence-based hand hygiene protocols and following international guidelines on hand hygiene practices, therefore, can help prevent irritant contact dermatitis among healthcare workers. Other intervention such as skin care programme which emphasizes on education and advice regarding occupational hand contact dermatitis can be introduced to the staff nurses who presented with skin symptom following hand washing or glove wearing. Advice on the use of the glove, proper hand washing, and correct drying techniques afterward should be given to this group of staff nurses as a priority. History of skin allergy to substances is also another aspect to be concerned. Pre-employment and pre-placement assessment of staff nurses is very important to explore past allergy history.

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APPENDICES

Appendix 1 : Gantt Chart

DESCRIPTION	2021			2022								
	OCT	NOV	DIS	JAN	FEB	MARCH	APRIL	MAY	JUN	JULY	OGOS	SEPT
Discussion with supervisor regarding topic selection												
Topic confirmation and approval												
Identify a problem statement												
Review Literature Review												
Proposal progression												
Formatting questionnaire												
Conduct pre-test questionnaire												
Ethical approval												
Data collection												
Typing research report												
Submit research report												

Appendix 2: Title Screening of Literature Review Table

Brought to you by Universiti Putra Malaysia

Scopus Search Sources Lists SciVal

294 document results

(TITLE-ABS-KEY (dermatitis) AND TITLE-ABS-KEY (hand)) AND TITLE-ABS-KEY (nurse)

Edit Save Set alert

Appendix 3: Instrument Written Permission

Gmail Search all conversations Active

questionnaire of OHCD External Inbox

huzaiyah hussin <huzaiyahmph@gmail.com> to me, TITI Nov 8, 2021, 12:03 PM

Assalamualaikum W.B.T,

Mrs Noor Shafiqah here the questionnaire from our previous study of 'OCHD among nurses'. You are most welcome to use the questionnaire as I attached below.

However, for the Smit Criteria, it would be great if you ask permission from Professor H.A.Smit who can previously be contacted via email (H.A.Smit@umcutrecht.nl).

Thank you,

Huzaiyah Binti Hussin

Questionnaire OCHD...

Appendix 4: Participant Information Sheet

PARTICIPATION INFORMATION SHEET

1. Title of study:

Occupational Hand Contact Dermatitis and Its Associated Factors Among Nurses in Serdang Hospital, Selangor, Malaysia: A Cross-Sectional Study.

2. Name of Investigator and Institution:

Noor Shafiqah Binti Salizam, Faculty of Medicine and Health Sciences Universiti Putra Malaysia (UPM)

3. Name of sponsor: Self-sponsor

4. Introduction

Occupational Hand Contact Dermatitis (OHCD) is one of the most common skin diseases among nurses. Nurses are at high risk of exposure to hand contact dermatitis. Hand contact dermatitis is an acute or chronic skin condition of the dorsal and palmar site of the hands. It caused by several factors which trigger the inflammation of the skin. Occupational hand contact dermatitis (OHCD) affects the hands and may have an extensive impact on a nurse's ability to perform a job and impact toward nurses' quality of life. Therefore, this study aims to assess the incidence and prevalence of occupational hand contact dermatitis among nurses and its associated factors among nurses at Hospital Serdang.

You are invited to participate in a research study because you have criteria for this study that requires your awareness regarding occupational skin disease and factors that contribute to your current skin condition. The details of the research trial are described in this document. It important that you understand why the research is being done and what it will involve. Please take your time to read through and consider this information carefully before you decide if you are willing to participate. Ask the researcher if anything is unclear or if you like more information. After you are properly satisfied that you understand this study and that you wish to participate, you must sign this informed consent form. To participate in this study, you may be required to provide your researcher with information on your health history; you may harm yourself if you are not truthful with the information provided.

Your participation in this study is voluntary. You do not have to be in this study if you do not want to. You may also refuse to answer any questions you do not want to answer. If you volunteer to be in this study, you may withdraw from it at any time. If you withdraw, any data collected from you up to your withdrawal will still be used for the study. Your refusal to participate or withdrawal will not affect any medical or health benefits to which you are otherwise entitled.

This study has been approved by the Medical Research and Ethics Committee, Ministry of Health Malaysia.

5. What is the purpose of the study?

This study is conducted to study the prevalence Occupational Hand Contact Dermatitis (OHCD) and its associated factor among a nurse in Serdang Hospital, Selangor, Malaysia.

A total of 269 respondents like you will be participating in this study. The whole study will last about 3 months which is from May 2022 until July 2022 and your participation will be about 10-15 minutes only.

6. What are my responsibilities when taking part in this study?

You must answer all of the questions asked by the researcher honestly and completely. If your condition or circumstances change during the study, you must tell the researcher. As for your safety, you need to follow the instruction given to make sure the process is going well.

7. What are the potential risks and side effects of being in this study?

There are no risks and side effects when you participate in this study.

8. What are the benefits of being in this study?

a. To you as the subject?

The information that you provided regarding your current hand condition and type of factor that contribute to the symptom shown are valuable and much appreciated in this study. It has no direct benefits to the respondent, but it will create awareness about the risk factor of hand dermatitis among a nurses. There will be no payment given to the respondent as this participation is voluntary. Besides, this study is also conducted by an undergraduate student, and it is a self-sponsor.

b. To the investigator?

The information and data obtained from this study will allow the researcher to determine the prevalence of the occupational hand contact dermatitis (OHCD) among a nurse. The researcher able to identify the significant factor which is associated with prevalence of occupational hand contact dermatitis (OHCD) among nurses in Serdang Hospital. The sign and symptom shown by the nurses who have contact dermatitis. Besides, the findings from the study can suggest for any improvement to be done so this data can be used to find the strategies and preventive measures in order either to reduce the risk factor or the disease to be prevented.

9. Who is funding this research?

This study has no funding as it is a self-sponsor.

10. Can the research or my participation be terminated early?

The researcher can terminate this study and your participation anytime if not fulfil the inclusion criteria of participants. If this study to be ended early, you will be informed immediately.

11. Will my information be kept private?

Yes. All information obtained from this study will be kept and handled confidentially per applicable laws and/or regulations. Your identity will not be revealed without your permission throughout the activities in this study include presentation and publication. However, anyone who is related to this study includes research staff, qualified monitors and auditors, the sponsors and its affiliates and governmental or regulatory authorities has the right to inspect and photocopy your related record when necessary.

12. Who should I call if I have questions?

If you have any problems, please do not hesitate to contact one of the people listed below.

I. Researcher

Noor Shafiqah binti Salizam
Contact no.: +601161487708
Email: shafiqahsalizam98@gmail.com

II. Supervisor

DR. Ruthpackiavathy A/P Rajen Durai
Contact no.: +60122688275
Email: ruthpackiavaty@upm.edu.my

III. Co-supervisor

DR. Muhammad Hibatullah Bin Romli
Contact no.: +601112255977
Email: mhibatullah@upm.edu.my

If you have any questions about your rights as a participant in this study, please contact the Secretary of Medical Research & Ethics Committee, Ministry of Health Malaysia at +60322874032.

Appendix 5: Informed Consent Form

INFORMED CONSENT FORM

Title of Study:

Occupational Hand Contact Dermatitis and Its Associated Factors Among Nurses in Serdang Hospital, Selangor, Malaysia: A Cross-Sectional Study.

By signing below, I confirm the following:

- I have been given oral and written information for the above study and have read and understood the information given.
- I have had sufficient time to consider participation in the study and have had the opportunity to ask questions and all my questions have been answered satisfactorily.
- I understand that my participation is voluntary, and I can at any time free withdraw from the study without giving a reason and this will in no way affect my future treatment. I am not taking part in any other research study currently. I understand the risks and benefits, and I free to give my informed consent to participate in the conditions stated. I understand that I must follow the study doctor's (investigator's) instructions related to my participation in the study.
- I understand that research staff, qualified monitors and auditors, the sponsor, or its affiliates, and governmental or regulatory authorities, have direct access to my medical record to make sure that the study is conducted correctly, and the data are recorded correctly. All personal details will be treated as STRICTLY CONFIDENTIAL.
- I will receive a copy of this subject information/informed consent form signed and dated to bring home.
- I agree/disagree* for my participation in this study.

Subject:

Signature:

I/C number:

Name:

Date:

An investigator conducting informed consent:

Signature:

I/C number:

Name:

Date:

Impartial witness: (Required if contents of the participant information sheet are orally communicated to the subject)

Signature:

I/C number:

Name:

Date:

Appendix 6: Questionnaires



Department of Nursing
Faculty of Medicine and Health Sciences,

RESEARCH TITLE:

**OCCUPATIONAL HAND CONTACT DERMATITIS
AND ITS ASSOCIATED FACTOR AMONG NURSES IN
PUBLIC HOSPITAL, SELANGOR, MALAYSIA: A CROSS SECTIONAL STUDY**

RESEARCHER

NOOR SHAFIQAH BINTI SALIZAM

MAIN SUPERVISOR

DR. RUTHPACKIAVATHY A/P RAJEN DURAI

CO-SUPERVISOR

DR. MUHAMMAD HIBATULLAH BIN ROMLI

(This questionnaire is for the sole purpose of research. Your given information will remain strictly confidential.)

This form has 4 sections as below:

A	Sociodemographic data
B	Employment history
C	History of allergy
D	Sign and symptoms of Hand dermatitis

Section A (Socio-demographic)

1. Age: _____

Please tick (/) on the right answer

2. Gender

Male

Female

3. Race

Malay

Indian

Chinese

Other

4. Marital status

Single

Married

Other (please state) _____

5. Highest educational level

Diploma

Degree

Other (Please state) _____

Section B (Employment History)

Tick (/) on correct answer

1. How long have you been work as a staff nurse?
_____ year

2. What is your employment status?

Permanent

Contract

3. Current working department

Medical

Surgical

Operation theatre (OT)

Intensive Care Unit (ICU)

Emergency Department (ED)

Other (Please state) _____

4. How long have you been working in current department?

_____ year

5. Do you work in office hour or shift?

Office hour

Shift (7 hours)

6. On average, how many hours do you work per week?

_____ hour per week

7. Do you work in extended hours / overtime?

Yes

No

If your answer in Question 7 is 'Yes' please proceed with question 8, however if your answer is 'No' please proceed to question 9.

8. If you are working in extended hours/ overtime, on average how many hours per week?

_____ hours per week

9. In a week, on average, how many procedures do you perform?

_____ times per week

10. In a week on average, how many times do you wear glove when performing procedure?

_____ times per week

11. In a week on average, how many hours do you wear glove when performing procedure?

_____ hours per week

12. What type of glove do you use at work when performing a procedure?

You must answer more than one option.

Nitrile powder free

Latex powder free

Latex powder

Other (Please state) _____

13. Have you ever changed the glove type because of skin problems?

Yes

No

Not sure

If you answer in Question 13, 'Yes' please proceed with question 14, however if your answer 'No' please proceed to question 16.

14. What type of glove that make you have to change it due to skin problems?
You may answer more than one option

Nitrile powder free

Latex powder free

Latex powder

Others (Please state) _____

15. What type of glove that you change to after you have skin problems?
You may answer more than one option

Nitrile powder free

Latex powder free

Latex powder

Others (Please state) _____

16. How many times do you wash your hands in one working day/ shift as following 'hand hygiene' requirement?

_____ times per shift

17. At a workplace, how many time on average, do you wash your hand in a week?

_____ times per week

18. What type of hand wash or soap do you use frequently at your workplace?

--

Hand Disinfectant (Al-soft A)

Anti-microbial hand soap (Surgi Scrub 4%)

Normal soap

Water only

Other (please state) _____

19. Have you ever had skin problem due to hand washing?

Yes

No

Not sure

If your answer in Question 19 is 'Yes', please proceed with question 20. However, if your answer is 'No' or

20. What type of hand washing that make you have skin problems?

You may answer more than one option

Hand Disinfectant (Al-soft A)

Anti-microbial hand soap (Surgi Scrub 4%)

Normal soap

Water only

Other (please state) _____

21. What type of hand washing that you change to after have a skin problem?

You may answer more than one option

Hand Disinfectant (Al-soft A)

Anti-microbial hand soap (Surgi Scrub 4%)

Normal soap

Water only

Other (please state) _____

Section C (history of allergy)

Tick (/) on correct answer

1. Do you have history eczema?

Yes

No

Not sure

If 'Yes', please state the year it was being diagnosed

Year: _____

Or

If 'Yes', please state the duration

_____ year

2. Do you have history of allergy rhinitis?

Yes

No

Not sure

3. Do you have history of asthma?

Yes

No

Not sure

If 'Yes', please state the year it was being diagnosed

Year: _____

Or

If 'Yes', please state the duration

_____ year

4. Do you have history of allergy to other substances?

Animal fur

Medicine

Food and beverages

Metals

Other (please state) _____

Section D (symptoms of hand dermatitis)

Tick (/) on correct answer

1. Have you ever had sign and symptom on your hand or fingers in the past 12 months as stated below?

You may tick more than 1 answer

- a) Red hand or finger
- b) Swollen hand or finger
- c) Red hands or fingers and fissures
- d) Vesicles on the hands or between the fingers
- e) Scaly hands or fingers
- f) Fissures on hands or finger
- g) Itching hand or fingers

2. Did one or more of these symptoms last for more than 3 weeks?

Yes

No

3. Did one or more of these sign and symptom occur more than once in the past 12 months?

Yes

No

If your answer is 'Yes' for at least one question from question 1 to 3 please proceed to question 4.

4. Does your symptom improve when you are away from your work (at home/holiday)

Yes

No

5. Have you ever visited a doctor for your hand's symptom (for treatment)

Yes

No

If 'Yes', when was the last time?

6. Have you ever got medical leave due to your skin hand's condition?

Yes

No

7. Do you ever consider / ask change of department due to your skin problem?

Yes

No

8. Do you make an official complaint to your department regarding your skin problem?

Yes



No

9. Do you receive / apply compensation/ ex-gratia for your skin problems?

Yes

No

Appendix 7: Approval Letter from the Medical Research and Ethics Committee (MREC)

	JAWATANKUASA ETIKA & PENYELIDIKAN PERUBATAN (Medical Research & Ethics Committee) KEMENTERIAN KESIHATAN MALAYSIA d/a Kompleks Institut Kesihatan Negara Blok A, No 1, Jalan Setia Murni U13/52, Seksyen U13, Bandar Setia Alam, 40170 Shah Alam, Selangor.	
		Tel: 03-3362 8888/8205
		Ref : 22-00856-4QR (2) Date: 01-June-2022
CIK NOOR SHAFIQAH BINTI SALIZAM UNIVERSITI PUTRA MALAYSIA (UPM)		
Dear Sir / Mdm,		
<u>ETHICS INITIAL APPROVAL: NMRR ID-22-00856-4QR (IIR)</u> OCCUPATIONAL HAND CONTACT DERMATITIS AND ITS ASSOCIATED FACTORS AMONG NURSES IN PUBLIC HOSPITAL, SELANGOR, MALAYSIA: A CROSS-SECTIONAL STUDY		
This letter is made in reference to the above matter.		
2. The Medical Research and Ethics Committee (MREC), Ministry of Health Malaysia (MOH) has provided ethical approval for this study. Please take note that all records and data are to be kept strictly CONFIDENTIAL and can only be used for the purpose of this study. All precautions are to be taken to maintain data confidentiality. Permission from the District Health Officer / Hospital Administrator / Hospital Director and all relevant heads of departments / units where the study will be carried out must be obtained prior to the study. You are required to follow and comply with their decision and all other relevant regulations.		
3. The investigators and study sites involved in this study are:		
<u>HOSPITAL SERDANG</u> Noor Shafiqah Binti Salizam (Principal / Coordinating Investigator) Ruthpackiavathy A/P Rajen Durai Muhammad Hibatullah Bin Romli		
4. The following study documents have been received and reviewed with reference to the above study:		
Documents received and reviewed with reference to the above study:		
1. Study Protocol_Version 4, dated 20-Apr-2022		
2. Patient Information Sheet_English_Version 3, dated 20-Apr-2022		
3. Patient Information Sheet_Malay_Version 3, dated 20-Apr-2022		
4. Informed Consent Form_English_Version 4, dated 17-May-2022		
5. Informed Consent Form_Malay_Version 4, dated 17-May-2022		
6. Questionnaire_Version 3, dated 20-Apr-2022		
7. Investigator's documents : Declaration of Conflict of Interest (COI), IA-HOD-IA, and CV:		
a) Noor Shafiqah Binti Salizam (Principal / Coordinating Investigator)		
b) Ruthpackiavathy A/P Rajen Durai		
c) Muhammad Hibatullah Bin Romli		
5. Please note that ethical approval is valid until 31-May-2023 . The following are to be reported upon receiving ethical approval. Required forms can be obtained from the National Medical Research Register (NMRR) website.		
i. Continuing Review Form has to be submitted to MREC within 2 month (60 days) prior to the expiry of ethical approval.		
ii. Study Final Report upon study completion to the MREC.		

Ref : 22-00856-4QR (2)

- i. Ethical approval is required in the case of **amendments / changes** to the **study documents/ study sites/ study team**. MREC reserves the right to withdraw ethical approval if changes to study documents are not completely declared.

3. This study involves the following methods:

i. Online Questionnaire

4. Please take note that the reference number for this letter must be stated in all correspondence related to this study to facilitate the process.

Comments (if any): NIL

Project Sites:

HOSPITAL SERDANG


Decision by Medical Research & Ethics Committee:

- () Approved
() Disapprove

Date of Approval : **01-June-2022**

DR HJH SALINA ABDUL AZIZ
Chairperson
Medical Research & Ethics Committee
Ministry of Health Malaysia
MMC No: 27117

RR/Approval2021/Mrecshare

	<p>PUSAT PENYELIDIKAN KLINIKAL (CLINICAL RESEARCH CENTRE) ARAS 2 HOSPITAL SERDANG JALAN PUCHONG 43000 KAJANG SELANGOR DARUL EHSAN</p>	<p>CRC MINISTRY OF HEALTH MALAYSIA <i>Research that matters to patients</i> Telefon : 03-89475467 Fax : 03-89475467 MULTI MEDIA SUPER CORRIDOR</p>
		<p>Ruj kami : HSDG/P/CRC/710/11/9(616) Tarikh : 07hb. Jun, 2022</p>
<p>Tuan,</p>		
<p>KELULUSAN MENJALANKAN PENYELIDIKAN DI HOSPITAL SERDANG</p>		
<p>Dengan segala hormatnya merujuk kepada perkara di atas,</p>		
<p>2. Sukacita dimaklumkan bahawa Jawatankuasa Pusat Penyelidikan Klinikal (CRC) Hospital Serdang telah meluluskan permohonan penyelidikan tuan seperti yang berikut :</p>		
Penyelidik:	Noor Shafiqah binti Salizam	
NMRR ID:	NMRR ID-22-00856-4QR (IIR)	
Tajuk:	Occupational hand contact dermatitis and its associated factors among nurses in public hospital, Selangor, Malaysia: a cross-sectional study.	
Tarikh Penyelidikan:	07hb. Jun, 2022	
Penyelia:	Matron Nor Lida binti Mohd Daud (Unit Kejururawatan)	
<p>3. Penyelidikan tuan adalah tertakluk kepada kelulusan <i>Medical Research Ethics Committee</i> (MREC) dan <i>National Medical Research Register</i> (NMRR), Kementerian Kesihatan Malaysia (MOH).</p>		
<p>4. Sila kemukakan Laporan Akhir kepada Pusat Penyelidikan Klinikal (PPK) Hospital Serdang sebaik sahaja penyelidikan tamat .</p>		
<p>Sekian, terima kasih.</p>		
<p>“BERKHIDMAT UNTUK NEGARA”</p>		
<p>“PENYAYANG, BEKERJA BERPASUKAN DAN PROFESIONALISMA ADALAH BUDAYA KERJA KITA”</p>		
<p>Saya yang menurut perintah,</p>		
<p>PROF. DR. GOH BAK LEONG Ketua Pusat Penyelidikan Klinikal Hospital Serdang</p>		

Appendix 9: Turnitin Report

OCCUPATIONAL HAND CONTACT DERMATITIS AND ITS ASSOCIATED FACTORS AMONG NURSES IN PUBLIC HOSPITAL, SELANGOR, MALAYSIA: A CROSS SECTIONAL STUDY

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