BACK PAIN AND ITS ASSOCIATION WITH THE PRACTICE OF

BODY MECHANICS AMONG HEALTHCARE PROVIDERS IN

HOSPITAL UNIVERSITI SAINS MALAYSIA

NURUL AFIQAH BINTI HARUN

SCHOOL OF HEALTH SCIENCES

UNIVERSITI SAINS MALAYSIA

JUNE 2023

BACK PAIN AND ITS ASSOCIATION WITH THE PRACTICE OF

BODY MECHANICS AMONG HEALTHCARE PROVIDERS IN

HOSPITAL UNIVERSITI SAINS MALAYSIA

NURUL AFIQAH BINTI HARUN

DISSERTATION SUBMITTED IN PARTIAL FULFILMENT

OF THE REQUIREMENTS FOR

DEGREE OF BACHELOR OF NURSING (HONOURS)

JUNE 2023

DECLARATION

I hereby declare that this dissertation entitled "Back Pain and its Association in the Practice of Body Mechanics among Healthcare Providers in Hospital Universiti Sains Malaysia" is the result of my own investigations, except where otherwise stated and duly acknowledged. I also declare that it has not been previously or concurrently submitted as a whole for any other degrees at Universiti Sains Malaysia or other institutions. I grant Universiti Sains Malaysia the right to use the dissertation for teaching, research and promotional purposes.

_____

Nurul Afiqah Binti Harun
Student of Degree of Bachelor of Nursing (Honours)
School of Health Sciences,
Universiti Sains Malaysia
16150, Kubang Kerian,
Kelantan, Malaysia.
Date: _____

ACKNOWLEDGEMENT

I would like to convey my grateful gratitude to my supervisor Dr. Norhasmah Mohd Zain who has convincingly guided and encouraged me to be professional and do the right thing even the road got though. I truly appreciate having her valuable guidance, encouragement, and patiently directing me in this research process. It was difficult at first, but with her guidance and persistent help, I was able to attained my objective in this study.

I also wanted to thank my beloved parents Mr. Harun Din and Mrs. Kamilah Yahaya for their everlasting moral support, endless love, and prayers. They kept me going for me throughout the year by continually assisting and supporting me even from 372km far away.

Apart from that, I want to thank me. I want to thank myself for believing in me. I want to thank myself for doing all of this work. I want to thank myself for having no days off, and I want to thank myself for never quitting. I want to thank myself for always being a giver and trying to give me more than I receive. I want to thank myself for trying to do more right than wrong and I want to thank me for being me at all times.

Lastly, I want to thank all of the respondents who took part in this study. I deeply appreciate the contributions of all those who have directly or indirectly encouraged me in successfully finishing my thesis. I would not have any worthwhile words to express my gratitude, but my heart is still overflowing with gratitude for the kindness shown to me by everyone.

TABLE OF CONTENTS

LIST OF TABLES

TABLE OF FIGURES

SAKIT BELAKANG DAN PERKAITAN DENGAN AMALAN MEKANIK BADAN DALAM KALANGAN AHLI KESIHATAN DI HOSPITAL UNIVERSITI SAINS MALAYSIA

ABSTRAK

Sakit belakang berleluasa dalam populasi umum terutamanya di kalangan profesional ahli kesihatan disebabkan peningkatan pendedahan kepada tuntutan fizikal rutin kerja mereka. Kajian ini bertujuan untuk menentukan kejadian simptom sakit belakang, tahap amalan mekanik badan, perkaitan antara amalan mekanik badan dan simptom sakit belakang, dan faktor berkaitan yang menyumbang kepada gejala sakit belakang dalam kalangan ahli kesihatan di Hospital USM. Tinjauan keratan rentas telah dijalankan ke atas 218 responden yang diambil menggunakan pensampelan mudah di 10 jabatan yang dipilih secara rawak. Tempoh pengumpulan data adalah dari Oktober 2022 hingga Jun 2023. Satu set soal selidik yang ditadbir sendiri melalui borang google telah digunakan untuk mengumpul data. Data dianalisis menggunakan perisian SPSS (26.0). Keputusan menunjukkan bahawa 177 ahli kesihatan daripada 218 mengalami gejala sakit belakang dalam tempoh 12 bulan sebelumnya. Ahli kesihatan yang bekerja di Hospital USM mempunyai tahap amalan mekanik badan yang baik. Perkaitan yang signifikan ($p=0.002$) ditunjukkan antara simptom sakit belakang dan tahap amalan mekanik badan dalam kalangan ahli kesihatan di Hospital USM.

BACK PAIN AND ITS ASSOCIATION IN THE PRACTICE OF BODY MECHANICS AMONG HEALTHCARE PROVIDERS IN HOSPITAL UNIVERSITI SAINS MALAYSIA

ABSTRACT

Back pain is widely prevalent in the general population especially among healthcare professionals due to the increased exposure to physical demands of their work routine. This study aims to determine the incidence of back pain symptoms, the level of practice of body mechanics, the association between the practice of body mechanics and backpain symptoms, and the related factors that contributed to back pain symptoms among healthcare providers in Hospital USM. A cross-sectional survey was carried out on 218 respondents that were recruited using convenience sampling in a 10 random selected departments. The data collection period was from October 2022 until June 2023. A set of self- administered questionnaire via google form was used to collect the data. The data was analyzed using software SPSS (26.0). The result shows that 177 healthcare providers out of 218 experienced back pain symptoms in the preceding 12 months. The healthcare providers that worked at Hospital USM had good level of body mechanic practice. A significant association (p=0.002) was indicated between back pain symptoms and the level of body mechanic practices among healthcare providers in Hospital USM.

CHAPTER 1 INTRODUCTION

1.1 Introduction

This research proposal study to assess healthcare providers in Hospital Universiti Sains Malaysia on their practice of body mechanics in hospital settings and its association with back pain. The first chapter of the dissertation starts with background of the study, problem statement, research questions, research objectives, and research hypothesis of the study. Finally, the significance of the study and the operational definition of key terms used in this study are described.

1.2 Background of The Study

During the past decades, back pain has been one of the most leading causes of disease burden across the developed and developing countries. Back pain can be defined as a pain that is felt in any region ranging from the thoracic spine to the pelvis. In Malaysia, the prevalence of back pain was 12%, rated as the ninth and fifth most common complaint in public and private primary healthcare clinics, respectively (Kumar Muniandy et al., n.d.). Back pain can be divided into three categories which are acute back pain, subacute back pain and chronic back pain (Ehrlich, n.d.). Back pain can happen when mechanical or structural problems develop in the spine, discs, muscles, ligaments, or tendons in the back. It also can be caused by any inflammatory conditions and other medical conditions.

The human back is composed of a complex structure of muscles, ligaments, tendons, disc, and bones, which work together to support the body and enable us to move around. The segments of the spine are cushioned with cartilage-like pads called disc. Problems with any of these components can lead to back pain (James, 2017). The symptoms that may be experienced by each one of an individual is vary. Usually, most of

the people will have had muscle spasms and tightness in the low back, pelvis, and hips (Peloza,2017). Back pain is widely prevalent in the general population especially among healthcare professionals due to the increased exposure to physical demands of their work routine, such as the mobilization and positioning of the dependent patients and the several psychosocial hazards that they experienced which put them more prone to the risk of developing back pain (Yasobant & Rajkumar, 2014). At some time in their life, it is predicted that more than half of the general population will seek medical attention to treat their back pain (Homaid et al., 2016). This is because healthcare providers usually stand or sit for hours and work in an awkward posture. Plus, their work also involves transferring and relocating patients or objects respectively, repositioning patients in beds, pushing or pulling trolleys and things, and using computers for administrative work (Negash et al., 2022).

After a long period of repetitive movements in performing those movements, they are at high risk to get lower back and upper extremity disorders. Apart from work, some socio-demographic characteristics identified to be significantly contributed to the risk of back pain. Age was found as a significant risk factor of back pain in which elder people were more susceptible to the risk (Wong et al., 2017). Apart from that, women were seen more often for the development of back pain than men because of the pelvic structural differences between men and women (Bento et al., 2020). Other factors that can be associated with increased prevalence of lower back pain in healthcare workers include body mass index, gender, stress level, lack of physical activity, and other psychological conditions.

Healthcare providers need to work in a supportive environment to help them properly apply body mechanics, a technique to perform their duty safely. Body mechanics

is a term that indicates an efficient, safe, and coordinated effort of the musculoskeletal and nervous systems to maintain balance, posture, and body alignment in daily life, which is directly related to effective bodily functioning (Kang, 2017). Improper working posture increases the risk of injury to the body. Body mechanics refers to the method of efficiently using the body when making movements, such as bending the body, lifting a heavy object or positioning or transferring a person, sitting, standing, or lying while performing tasks (Priyanka et al., 2021). Such activities require muscle exertion to any of the healthcare providers. All the healthcare providers must know and practice proper body mechanics to prevent back injury. The use of proper body mechanics is important to reduce the risk of injury to the musculoskeletal system and to facilitate body movement allowing physical mobility without muscle strain and excessive use of muscles energy resulting in natural strengthening of the back (Moustafa et al., 2022).

1.3 Problem Statement

Research on healthcare provider's activities daily work and body mechanics in clinical situations has been mostly related to back pain. It has been reported that most of the healthcare providers who experienced back pain rarely used the body mechanics principle when they are on duty (Wanless, 2017). According to a study from Sarza et al., (2021), the study revealed that there is a significant relationship of knowledge and practice toward low back pain prevalence. Chi-square statistics revealed (p=ooo) which indicated that the more the knowledge of the respondents knew about the body mechanic technique, the more they will likely practice it. However, a study from Jaafar N, (2013) that was conducted at Hospital Kluang, Johor, Malaysia found that majority of the nurses have the knowledge about body mechanics techniques, but less practicing on it. The reason why is because of them still lack of knowledge about body mechanics caused them did not practice correct body mechanics techniques while in

clinical area.

In addition, research on burdens to the body related to nurses' working posture revealed that the degree of burden on the body was highest when changing a patient's position due to improper posture, followed by repetitive work, long hours of sitting and standing, manual handling of loads, overuse, which could be the source of the backache (Kang, 2017). Long-term performance of these motions, as well as the over usage of improper muscles to complete a task, can result in severe musculoskeletal strains and tiredness which cause to develops back pain (Wanless, 2017). Proper body mechanics should be employed consciously when performing physical activities to avoid these issues. Understanding the fundamentals of body mechanics, applying them to all work-related tasks, learning safe handling procedures for transfers and positioning, and knowing how to evaluate a patient's capacity for placement or transfer may all help prevent back pain.

Most healthcare providers are typically required to work in an upright position for extended periods, handle medical devices, and transfer patients based on the patient level of consciousness (Alnaami et al., 2019). All these jobs demand the application of the body mechanics concept to avoid physical injury and actively employ the body while delivering care. Poor posture is the most significant factor that can cause lower back problems and approximately 80% of the population is affected at some point in their lives (Freburger et al., 2009). Over a quarter of reported healthcare worker injuries are connected to the movement and handling of patients and inanimate items. Back and over 80% of all back and shoulder injuries are caused by handling and transporting patients, according to the Bureau of Labor Statistics. Therefore, since the lack of published data from Malaysia to prove the association between the practice of body mechanics and back pain symptoms,

4

this study is conducted to identify the incidence of healthcare providers who had back pain and to identify all of the factors mentioned above had the association with the back pain symptoms experienced by the healthcare providers in Hospital USM.

1.4 Research Question

The research questions for this study are as below:

 i. What is the incidence of back pain experienced by healthcare providers in Hospital USM?

 ii. What is the level of practice of body mechanics among healthcare providers in Hospital USM?

 iii. Is there any association between practice of body mechanics and back pain symptoms among healthcare providers in Hospital USM?

 iv. What are the related factors that contributed to back pain symptoms among healthcare providers in Hospital USM?

1.5 Research Objective

1.5.1 General objective

To determine the incidence of back pain, the practice of body mechanics, the association between body mechanics and back pain, and the related factors that contributed to back pain symptoms among healthcare providers in Hospital USM.

1.5.2 Specific Objective

 I. To identify the incidence of back pain experienced by healthcare providers in Hospital USM.

 II. To determine the level of practice of body mechanics among healthcare providers in Hospital USM.

III. To determine the association between the practice of body mechanics with back pain symptoms among healthcare providers in Hospital USM.

IV. To determine the related factors that contributed to back pain symptoms among healthcare providers in Hospital USM.

1.6 Research Hypothesis

Hypothesis 1

H_0: There is no significant association between the practice of body mechanics and back painsymptoms among healthcare providers in Hospital USM.

H_A: There is a significant association between the practice of body mechanics and back painsymptoms among healthcare providers in Hospital USM.

Hypothesis 2

H_0: There is no significant association between related factors (e.g.: demographic data, body mass index, and nature of working) and back pain symptoms among healthcare providers in Hospital USM.

H_A: There is a significant association between related factors (e.g.: demographic data, body mass index, and nature of working) and back pain symptoms among healthcare providers in Hospital USM.

1.7 Conceptual and Operational Definition

Terms	Conceptual	Operational
Back pain	Back pain refers to a discomfort associated with an injury or some other persistent pain of the back, the posterior portion of the body	In this study, back pain refers to pain, stiffness or any discomfort experienced by healthcare providers at their vertebral region which includes cervical,

	that extends from the shoulders to the hips (Samartzis, 2019).	thoracic, lumbar, sacrum, and coccyx.
Practice	The actual application or use of an idea, method and, belief (Amy, 2017).	In this study, practice refers to the application of body mechanics among healthcare providers in the hospital setting. The level of practice of body mechanics was measured by using an adopted questionnaire by (Al, 2017) that has 8 close-ended questions using a 5-point Likert scale.
Body mechanics	Body mechanics refers to the term used to describe the efficient, coordinated, and safe use of the body to carry out the activities of daily living (D'SOUZA et al., 2020).	In this study, body mechanics refers to the healthcare providers proper use of balance, posture, and body alignment during lifting, bending, moving, while performing activities of daily living.
Healthcare providers	A health care provider is an individual health professional or an organization who had licensed to provide health care diagnosis, prognosis and services such as prescribing medication, performing surgery and the use medical devices to a patient (Wikipedia contributors, 2022).	In this study, healthcare providers refer to doctors, nurses, specialists, pharmacists, medical laboratories, and other allied health professionals who worked at Hospital USM.

1.8 Significance of The Study

Back pain has a high prevalence among hospital staff members and causes significant medical and socio-professional consequences. Despite the importance of body mechanics techniques, some of the healthcare providers are still improper practice body mechanics techniques (Wanless, 2017). According to a previous study, among all, 90.6% of healthcare providers showed moderate to crippled disability using Oswestry Disability Index classifications indicating the poor practice of body mechanics while working (Mohd Yusoff et al., 2019).

Therefore, this study is conducted to determine the incidence of healthcare providers who experienced back pain symptoms during their working period at Hospital USM. Apart from that, this study is also conducted to observe the level of practice of body mechanics among healthcare providers to increase their awareness about the implementation of body mechanics in daily living which will help them to reduce the risk of getting back pain. This study could also help them to identify and evaluate their level of practice of body mechanics and the needs to take further action to avoid doing repetitive causes that can contribute to back pain. Plus, the data obtained from this study can be used as a guideline for the hospital authorities to emphasize the awareness campaign or provide health education for the healthcare providers to prevent back pain by practicing the correct body mechanics when they are working at the hospital. In the end, the finding from this study could also benefit the healthcare providers which makes them have less sick leave, fewer chances of losing jobs and the most important is the quality of patient care has beenimproved in the future.

CHAPTER 2 LITERATURE REVIEW

2.1 Introduction

This chapter is going to review the literature related to back pain, body mechanics, back pain and its association with body mechanics, and the factors contributed to back pain symptoms among healthcare providers in Hospital USM. Lastly, it describes the theoretical framework chosen for this study.

2.2 Back Pain

"Acute Low Back Pain Problems in Adults". It served as a basis for the provisional document issued by the WHO (Ehrlich, n.d.). Back pain was found to be prevalent in Malaysia in 12% of the population. Before the nineteenth century, back pain had often been   considered an incurable rheumatologic disease with an unclear pathophysiological and etiology. Back pain is currently the most common musculoskeletal complaint whichaffecting millions of individuals every year. Back pain significantly contributes to patient morbidity and healthcare costs and is the leading cause of activity limitations and work absenteeism and it also causes an enormous economic burden on individuals, families, communities, industry, and governments (Gibbs et al., 2022). Back pain can be defined as located pain and discomfort below the costal margin and above the superior gluteal line, with or without related pain in the lower limb. There are two types of back pain which are acute back pain and chronic back pain (Almeida & Kraychete, 2017).

According to the Institute of Neurological Disorders, (n.d.), acute back pain, or short-term back pain lasts a few days to a few weeks. Most low back pain that is experienced by an individual is acute. Acute back pain usually resolves on its own within a few days with self-care and usually not involving loss of body function to mobile. In some cases, a few months are required for the symptoms to disappear. Apart from that,

chronic back pain is defined as pain that continues for 12 weeks or longer, even after an initial injury or underlying cause of acute low back pain has been treated. About 20% of people are affected by acute low back pain develop chronic low back pain with persistent symptoms at one year. Even if pain persists, this does not always indicate that there is a medically serious underlying cause. Anyhow, in some cases, chronic low back pain can be treated successfully with medical treatments, but in severe cases, pain that continues persistently or worsen may needs surgical treatment.

According to National Institute of Arthritis and Musculoskeletal and Skin Diseases (n.d.), back pain can range from local pain in a specific spot to radiating pain spreading all over the back. Sometimes the pain radiates away from the back to other areas of the body, such as the buttocks, legs, or abdomen. The intensity of back pain varies for each person. Depending on the type, cause, and location of the back pain, an individual may had increasing pain with lifting and bending, worsening pain when resting, sitting, or standing, or stiffness in the morning when awakening and lessened back pain with activity. The etiology of back pain commonly caused by strains and sprains which could occur for many reasons including poor posture, improper lifting, and lack of physical activity. Apart from that, medical conditions and infection such as herniated disc, spinal fracture, kidney stones, osteomyelitis, and ankylosing spondylitis also being the cause of back pain (Peloza, 2017).

2.3 Body Mechanics

Body mechanics is a combination of posture, balance and motion, all of which affects coordinated movement and the amount of stress placed on the body (Kaur et al., 2018). "Body Mechanics" is the way a body moves and keeps its balance through the use of all its parts. "Posture" is another word for "body alignment" (Wanless, 2017). It is to allow the body to move and function with strength and efficiency. Good posture is needed

which means keeping major body parts, including head, trunk, arms, and legs in a straight alignment. Maintaining good posture while standing or sitting is an acquired skill that requires practice and training. Keeping shoulder blades together, head straight and preserving the three natural spinal curves are all basics principles of good body alignment. Every individual should keep their knees slightly bent and engage their leg and abdominal muscles whenever they lift heavy loads (Karahan et al., 2009). Having proper body mechanics and moving the body in the optimal positions that it was designed for helps to reduce the adverse effects of gravity or friction, enhance the positive effects of these two forces to reduce the expenditure of energy, avoid undue stress or strain to body systems, and maintain control of the body thus reducing the risk of developing back pain symptoms.

2.4 Back Pain and Its Association with Body Mechanics Among Healthcare Providers

Back pain may have serious consequences for healthcare workers and can reduce their ability to manage their social and work activities for the rest of their lives. Back pain and other musculoskeletal disorders are one of the main reasons for the current and increasing shortage of healthcare workers (Wanless, 2017). It would seem that there needs to major inputs in to postures adopted during the patient process. Hospital workers experience more occupational health problems than other professional groups where back pain has been   the commonest reason for hospitalization amongst this group of workers (Karahan et al., 2009). However, the prevalence of reported low back pain among hospital workers varies between different countries. Besides individual factors, work activities involving joint loading, extreme flexion of the trunk, frequent heavy lifting, maintaining

an awkward or static posture, bending, twisting, hard physical work and psychological stress are reported as causal factors for back injuries (Karahan et al., 2009).

Despite high reported prevalence of low back pain among hospital staff in these studies, very little information is available on the comparative prevalence of low back pain among different hospital workers in Malaysia. Specific information on risk factors and low back pain in different professional groups is needed for preventive interventions to aim at reducing musculoskeletal complaints to be better targeted. Throughout the typical work day, patient care staff may find themselves ascending or descending stairs, bending, twisting, lifting heavy objects or transferring patients; all of which can contribute to the onset of low back pain, especially if optimal body mechanics are not used implemented. Physical work that requires poor posture and frequent lifting, bending or twisting is a risk factor for low back pain.

Rehabilitation professionals, including physical therapists, occupational therapists, physical therapy assistants and certified operation theatre assistants all may encounter some type of patient care that involves manual lifting or maneuvering at some point throughout the typical work day. In addition, operation theatre assistants and physical therapy assistants both receive training in their respected professional courses in proper body mechanics and self-protection while handling and transferring patients However, despite this training, these professionals are still at risk for musculoskeletal injuries associated with patient handling. Higher levels of work-related low back pain could be due to extreme loads in the work setting or faulty musculoskeletal techniques used in treating patients (Moustafa et al., 2022). These injuries with poor body mechanics are due to patient transferring, ambulation, repositioning, and related repetitive tasks that are often done in an irregular body position, unconsciously, and can lead to low back pain.

2.5 Factors Contributed to Back Pain Symptoms

2.5.1 Demographic Data

2.5.1.1 Age

Globally, according to National Center for Health Statistics on 2019, data show the percentage of adults with back pain increased with age, ranging from 28.4% in 18 - 29 years, 35.2% in patients aged 30 - 44 years, 44.3% in patients aged 45 - 64 years, and 45.6 for patients aged ≥65 years (Lapoce, 2021). Apart from that, older population in Malaysia is expected to increase from 4% in 1998 to 9.8% in 2020 (Zahari et al., 2015). This is because when increasing in age, the cartilage fades away. The cartilage is a flexible, elastic tissue that connects the joints and the vertebrae which acts as a shock absorber throughout the body. Plus, since the disc at the spine act as a shock absorber, the discs that starts out with a high percentage of fluid in it will slowly lose water and become narrow, adding more pressure to the joints. This pressure causes inflammation and can lead to back pain (Tingan, 2017).

2.5.1.2 Gender

Women are also affected by many chronic pain conditions and painful conditions of the musculoskeletal system in greater numbers than men are such as low back pain has been   reported consistently in a higher proportion of females than males. According to The Burden of Musculoskeletal Diseases in the United States, females were seen more often for the development of lower back pain than men with approximately 30.5% of the adult female population compared to 26.4% of the male adult population suffered from back pain (Singh, 2021). This is due to the typical changes in a woman's lifecycle, including pregnancy, childbirth, hormonal imbalances, and weight gain, especially in the abdomen can trigger a cascade of events leading to back pain. Plus, female sex hormones play an important role in the etiology and pathophysiology of a variety of musculoskeletal

degenerative diseases. Postmenopausal women show accelerated disc degeneration due to relative estrogen deficiency which over time could lead to back pain problems (Wáng et al., 2016).

2.5.2 Body Mass Index

High body mass index has long been   suspected as a contributing factor in the presentation of musculoskeletal pain in the hips, knees, and feet. According to the American Obesity Association, back pain affects nearly one-third of people that had obesity (Roffey et al., 2013). The reason for this is that when the body carries extra weight, it places a greater mechanical load on weight-bearing joints and structures which can add strain to the back muscles and ligaments, potentially increasing the rate of degeneration through excessive wear-and-tear (Roffey et al., 2013). Furthermore, a high amount of adipose tissue around the muscles and joints can limit a person's mobility, thereby stressing musculoskeletal tissues potentially resulting in back pain (van den Berg et al., 2009). According to a study by Shiri et al., (2010), the meta-analysis from the study shows that being overweight and obese are associated with an increased risk of developing low back pain. In addition, a systematic review in 2000 also identified 65 studies on obesity and low back pain and found that 32% reported a statistically significant association between obesity and low back pain (Darren M. Roffey PhD; et al., 2014).

2.5.3 Nature of Working

Studies also reveal that factors like workplace conditions, long working hours, working posture, working departments and length of employment are the factors cause of back pain (Mekonnen, n.d.). According to research conducted at a hospital in Sarawak, Malaysia, staff nurses were found to have the highest prevalence of low back pain (38.8%), followed by community nurses (19.0%) and doctors (13.7%), and assistant

medical officers had the lowest prevalence of back pain (5.6%) (Ibrahim et al., 2019).

Related to this study, frequent bending and standing for a long period of time were work-related factors with low back pain. The odds of developing low back pain among healthcare professionals who had frequent bending and twisting were 1.89 times higher as compared to those who had not frequent bending and twisting. This action may cause strain on the area may also cause inflammation that can lead to muscle spasms. Plus, this action also greatly increases the intra disc pressure and may damage the discs. Plus, repetitive bending forward flexion and rotation are shear and compressive forces on the disc that leads to torn, herniated discs and tears which result in back pain (Negash et al., 2022).

According to a study by Negash et al., (2022), the odds of developing low back pain among healthcare professionals who had prolonged standing were 2.6 times higher as compared to those who had not undergone prolonged standing. This might be due to prolonged standing for the length of time being the main cause for spinal hypo-mobility that may directly lead to degenerative changes within the lumbar spine, pushing the pelvis backward, and increasing the curve of the lumbar region that can make low back muscles tighten and spasm which then resulting in pain on the spinal nerve. Prolonged standing effectively reduces the blood supply to the muscle resulting in the acceleration of the onset of fatigue and causing pain in the muscles of the back. Certain subspecialties among physicians and dentists were also noticed at risk to develop low back pain.

Maintaining an awkward static posture for extended periods is the most commonly reported explanation for such a high risk of low back pain among different dental specialties. Similarly, among physicians, orthopedic and general surgeons, gynecologists, pediatricians, ophthalmologists, emergency and intensive care physicians,

and anesthesiologists were at a greater risk of low back pain development than other specialties, which can be caused by extended procedure times and high physical and mental demands in those specialties (Al Amer, 2020).

2.6 Theoretical and Conceptual Framework of the Study

The theoretical framework for this study is based on the Health Belief Model (HBM). The Health Belief Model (HBM) could be applied to a range of health behaviors and so provided a framework for shaping behavior pattern (Abraham, 2015). This model was originally developed by four psychologists who are Hochbaum, Kegels, Rosenstock and Leventhal in the year 1950 as a way to assess the reasons that prevented people from the disease (Abraham, 2015).

The HBM was the construct that representing the perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action and self-efficacy (Abraham, 2015). The combination of six constructed HBM will provide a useful framework for designing both short also long-term behavior changes strategies. It is on healthcare provider's choice to make a healthy behavior change and that is motivated by their practices on the body mechanics and about the risk of susceptibility towards back pain.
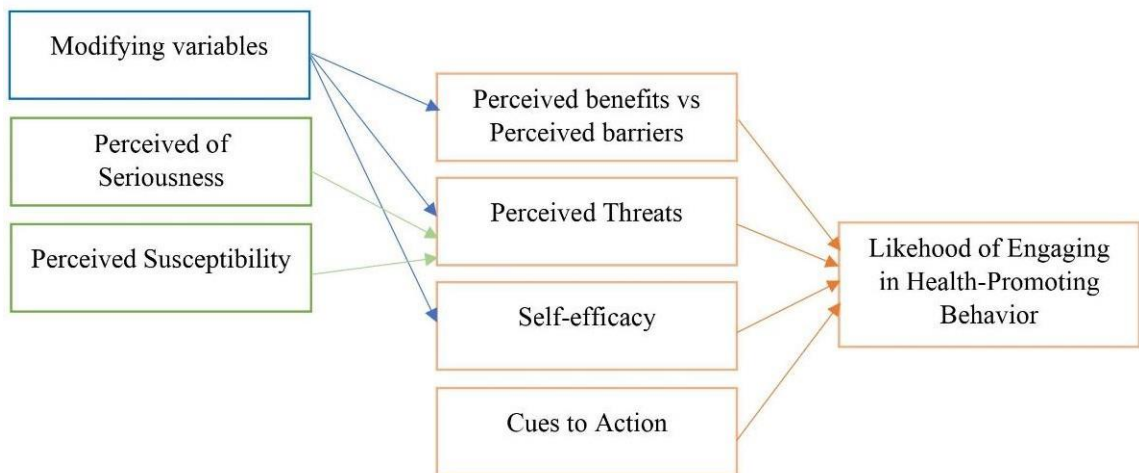
Figure 2.1 The Health Belief Model (Adopted from (Mikhail, 1981))

Perceived susceptibility refers to an individual's subjective perception of the risk of acquiring an illness or disease. In this study, healthcare providers always at risk to develop back pain due to the physical demands that they had. When they know the risk, they will more likely to do something to prevent it from happening. For an example, preventing back pain by implementing the application of body mechanics when on duty. Unfortunately, when the healthcare providers believe that they are not at risk of getting a disease, unhealthy behavior tends to result in the opposite.

Perceived severity is an individual judgement of the seriousness of health condition. For instance, the healthcare providers may perceive that having back pain is not medically serious, but if they perceive that there would be serious consequences that could occur, such as being absent from work for several days, then they will perceive back pain to be a particularly serious condition. In addition, it results in perceived threat when the perception of susceptibility is combined with severity (Boskey, 2022).

Perceived benefit is the belief of positive outcome of health behavior. If the healthcare providers believe that a particular action will reduce susceptibility to a health problem or decrease its seriousness, then they will likely to engage in that behavior. That belief will increase the perceived benefits of those behavior.

Perceived barriers refer to an individual's concerns of the obstacles to behavior change. According to this study, even if the healthcare providers perceives a health condition as threatening and believes that a particular action will effectively reduce the threat, barriers may prevent engagement in the health-promoting behavior.

Cues to action are events, people, or things that trigger people to change behavior. Advice from others, the serious progression of an illness of a family member, awareness campaign on social media can provide cues (Washburn, n.d.). Cues to action are perhaps the most powerful part of the HBM and of getting individual to change their behavior. It refers to a readiness to take an action after perceived susceptibility, benefits, and self-efficacy.

Lastly, self-efficacy is described as a person's belief in their ability to make a health-related change. In other words, even if a person believes adopting healthier behaviors will have significant benefits, they are unlikely to change current behaviors if they doubt that the barriers to change can be overcome. This is because they did not have the confident and ability to belief to take an action. Self-efficacy can be enhanced through encouragement, supports, and training (Washburn, n.d.).
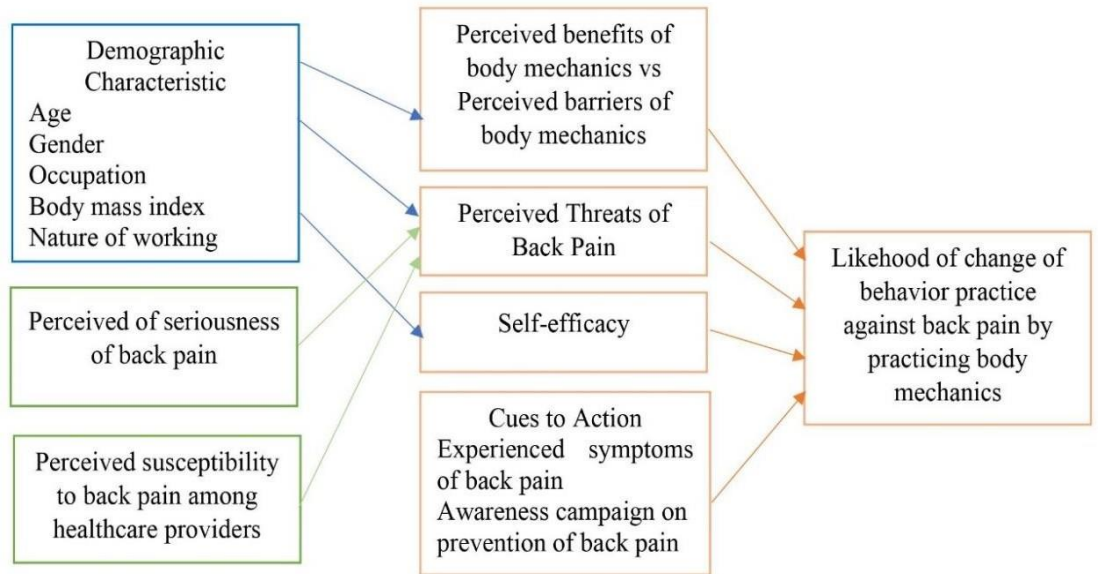
Figure 2.2 The Health Belief Model (Adapted from (Mikhail, 1981))

In other words, the model clearly defined how these factors could guide in changing health behavior. The outcome of this study may show that healthcare providers to be more aware about back pain and its progression if be taken simply. As the healthcare providers knew about the threat, risk and severity of the disease, they may practice the body mechanics to prevent back pain from developing.

CHAPTER 3 METHODOLOGY AND METHODS

3.1 Introduction

This chapter explained and justified the approach and rationale used to support the chosen research methodology. Determining and understanding an appropriate research design is crucial for achieving the objectives of the study. In this section, research methodology such as research design, research population, research duration, research location, subject criteria, sampling plan, instrument, variable, data collection plan, data analysis, expected outcome of the study, and ethical consideration has been discussed in detail.

3.2 Research Design

The cross-sectional study was utilized in this research. The use of this method allows researchers to collect data from the population at a single point in time which helps the researcher to measure the outcome and the exposure of respondents at the same time based on the researcher's objectives. The advantages of choosing a cross-sectional study are inexpensive to conduct, does not require a long period and the findings can be analyzed to create new theories or for further in-depth research.

3.3 Research Location

This study was conducted at Hospital USM located at Kubang Kerian Kelantan. Hospital USM has been   regarded as one of the best teaching hospitals in Kelantan and the East Coast.

3.4 Research Duration

This study was conducted for one year from October 2022 until June 2023. Data collection was conducted between February 2023 until April 2023 after obtaining ethical approval from The Human Research Ethics Committee (HREC) of USM.

3.5 Research Population

The study was conducted among healthcare providers that fulfilled the inclusion and exclusion criteria. The healthcare providers are nurses, doctors, specialist, pharmacist, dentist, medical laboratorist and other allied health professionals.

3.6 Subject Criteria

Inclusion criteria

Respondents must meet the following criteria to be included in the study:

i.   Have at least one year of working experience

ii. Able to give verbal consent to participate in the study

iii. Able to understand, speak, and write in English

Exclusion criteria

Respondents was excluded from this study if:

i.   Respondents who are unwell except for respondents who experienced back pain symptoms during the data collection

ii. Respondents that was diagnosed with medical illness, chronic illness, and had medical follow-up

3.7 Sampling plan

3.7.1 Sample Size Estimation

For the first objectives is to identify the incidence of back pain symptoms experienced by healthcare providers in Hospital USM. Based on the previous study, the margin error was being set at 5% with the confidence level of 95%. The prevalence rate from the previous study entitled prevalence of back pain among nurses working in government health clinics and hospital in Port Dickson, Malaysia shows that 79.4% of

the respondents had low back pain (M.A Rahmah, J Rozy, I Halim, M Jamsiah, 2008).

$$n = \left(\frac{Z}{\Delta}\right)^2 p(1-p)$$

$$n = \left(\frac{1.96}{0.05}\right)^2 0.05(1-0.05)$$

n = 207 respondents

The minimal sample size is 367, and after considering a 10% drop out, the samplesize calculated is:

n = 251 + 10%

n = 251 + 25

n = 276 respondents

Hence, the sample size needed for the first objective in this study is 276 healthcareproviders who fulfilled the inclusion and exclusion criteria.

For the second objective is to assess the level of practice of body mechanics among healthcare providers in Hospital USM. Based on the previous study, the margin error was being set at 5% with the confidence level of 95%. It is 84.0% of participants do have good practices in the application of body mechanics (Varghese et al., 2017).

$$n = \left(\frac{Z}{\Delta}\right)^2 p(1-p)$$

$$n = \left(\frac{1.96}{0.05}\right)^2 0.84(1-0.84)$$

n = 207 respondents

The minimal sample size is 207, and after considering a 10% drop out, the sample size calculated is:

n = 207 + 10%

n = 207 + 21

n = 228 respondents

Hence, the sample size needed for the second objective in this study is 228 healthcare providers who fulfilled the inclusion and exclusion criteria.

For the third objective is to determine the association between back pain symptoms and the practice of body mechanics among healthcare providers in Hospital USM. The sample size was determined using two proportion formula.

$$n = \frac{[P_1 \ (1 - P_1) + P_2 \ (1 - P_2)](z_a + z_b)^2}{(P_1 - P_2)^2}$$

Whereby,

n = Required sample size

p = Anticipated population proportion

P1: Healthcare providers who had back pain, 0.650 (Al Amer, 2020)

P2: Healthcare providers who does not have back pain, 0.350 (Al Amer, 2020)

Zα = Value of the standard normal distribution curve cutting off probability alpha in one tail for one-sided alternatives (Zα = 1.96)

Zβ = Power of study, 80% (Zβ = 0.84)

Calculation:

$$n = \frac{[0.650(1 - 0.650) + 0.350 \ (1 - 0.350)](1.96 + 0.84)^2}{(0.650 - 0.350)^2}$$

n = 107 respondents

The minimal sample size is 107, and after considering a 10% drop out, the sample size calculated is:

n = 107 + 10%

n = 107 + 11

n = 118 respondents

Hence, the sample size needed for the third objective in this study is 118 healthcare providers who fulfilled the inclusion and exclusion criteria.

For the last objective is to determine the other factors that contributed to back pain symptoms among healthcare providers in Hospital USM. The sample size was determined using two proportion formula.

$$n = \frac{[P_1 \ (1 - P_1) + P_2 \ (1 - P_2)](z_a + z_b)^2}{(P_1 - P_2)^2}$$

Whereby,

n = Required sample size

p = Anticipated population proportion

P1: Female who had back pain, 0.643 (Yee et al., 2020)

P2: Female who had no back pain, 0.357 (Yee et al., 2020)

Zα = Value of the standard normal distribution curve cutting off probability alpha in one tail for one-sided alternatives (Zα = 1.96)

Zβ = Power of study, 80% (Zβ = 0.84)