KNOWLEDGE AND ATTITUDE OF LOWER BACK PAIN AMONG NURSING STUDENTS IN UNIVERSITI SAINS MALAYSIA, KELANTAN

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By

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LIST OF ABBREVIATIONS

LBP   Lower Back Pain

LKQ   Low Back Pain Knowledge Questionnaire

Back-PAQ   Back Pain Attitude Questionnaire

USM   Universiti Sains Malaysia

SPSS   Statistical Package Social Sciences

Pengetahuan dan Sikap Terhadap Sakit Pinggang Bahagian Bawah Dalam Kalangan

Pelajar Kejururawatan di Universiti Sains Malaysia, Kelantan

ABSTRAK

Sakit pinggang (LBP) adalah masalah biasa dalam populasi umum. Ia adalah sakit di bahagian bawah belakang anda yang mungkin datang dari tulang belakang, otot, saraf atau struktur lain yang berdekatan. Jururawat adalah salah satu populasi yang selalu mengalami sakit pinggang kerana keperluan kerja mereka untuk mengangkat dan mengendalikan pesakit. Jadi, pengetahuan dan sikap dalam kalangan pelajar kejururawatan adalah penting kerana mereka adalah bakal jururawat dan mungkin mengalami perkara yang sama. Justeru, kajian keratan rentas telah dijalankan untuk mengkaji pengetahuan dan sikap sakit pinggang dalam kalangan pelajar kejururawatan di Universiti Sains Malaysia. Seramai 156 responden, lelaki 16 (10.3%) dan perempuan 140 (89.7%), berumur antara 19 hingga 33 tahun yang telah memenuhi kriteria kemasukan dan pengecualian telah melengkapkan soal selidik. Data yang dikumpul dianalisis secara statistik menggunakan perisian SPSS versi 26.0. Pearson's Chi Square dan Independent T-Test digunakan untuk analisis data. Bagi skor pengetahuan dan sikap pula, keputusan menunjukkan hanya 12 (7.7%) yang mempunyai pengetahuan yang tinggi tentang LBP dan kebanyakan responden kurang percaya terhadap sikap ke atas LBP. Hasil kajian menunjukkan tidak terdapat perkaitan yang signifikan secara statistik antara LBP dengan tahap pengetahuan (p= 0.141) dan tidak terdapat perbezaan yang signifikan antara LBP dan sikap dalam kalangan pelajar kejururawatan di USM (p= 0.101). Terdapat perbezaan yang signifikan antara LBP dan umur dalam kalangan pelajar kejururawatan di USM (p= 0.001) dan terdapat signifikan secara statistik antara LBP dan tahun pengajian di mana hasilnya adalah (X^2=23.02; p-value <0.05). Kesimpulannya, pengetahuan dan sikap

pelajar kejururawatan perlu dipertingkatkan supaya mereka lebih berilmu dan memberi manfaat kepada kehidupan mereka.

Knowledge and Attitude of Lower Back Pain among Nursing Students in Universiti Sains Malaysia, Kelantan

ABSTARCT

Lower back pain (LBP) is a common problem in general population. It is the pain in your lower back which may come from the spine, muscle, nerves or other nearby structure. Nurses is one of the populations who always getting lower back pain because of their job requirement on lifting and handling patients. So, the knowledge and attitude among nursing students is important because they are the future nurses and may experience the same. Hence, a cross-sectional study was carried out to study the knowledge and attitude of lower back pain among nursing students in Universiti Sains Malaysia. A total 156 respondents, male 16 (10.3%) and female 140 (89.7%), aged between 19 to 33 years old who had fulfilled the inclusion and exclusion criteria had completed the questionnaires. Data collected was statistically analyzed using SPSS software version 26.0. Pearson's Chi Square and Independent T-Test were used for data analysis. As for the knowledge and attitude score, the results showed only 12 (7.7%) has high knowledge on LBP and most of the respondents got unhelpful belief towards LBP for attitude. The result shows that there is no statistically significant association between LBP and the level of knowledge (p= 0.141) and there is no significant difference between LBP and attitude among nursing students in USM (p= 0.101). There was significant different between LBP and age among nursing students in USM (p= 0.001) and there was a statistically significant between LBP and year of study where the resulted was ($X^2 = 23.02; p-value < 0.05$). In conclusion, nursing student's knowledge and attitude had to be improved so they could be more knowledgeable and benefits their life.

CHAPTER 1: INTRODUCTION

1.1 Introduction

This study was carried out to identify the knowledge and attitude of lower back pain among nursing students in Universiti Sains Malaysia (USM). Chapter 1 details the background of the study, problem statement, research question, research hypothesis, the conceptual and operational definition and the significance of study.

1.2 Background of the study

Lower back pain (LBP) is known as one of the most common health problems and can affects people of all ages from children to elderly (Vujcic et al., 2018). According to (Cieza et al., 2020), LBP was frequently reported world widely and acknowledged as a health condition associated with a higher risk disability. While Rachael (2020) argued that, LBP is a pain occurs posteriorly in the region between the proximal thigh and the lower rib margin (*Low Back Pain - Physiopedia*, 2020).

Figure 1.1 shows the most common regions of LBP. Usually, LBP occurs in the area of back that starts below the ribcage which known as lumbar region (*Low Back Pain Pictures: Symptoms, Causes, Treatments*, n.d., 2022). Besides, LBP may be linked to the ligament around the spine and disc, disc between the vertebrata, spinal cord and nerve, lower back muscle and more (MedicalNewsToday, 2020).
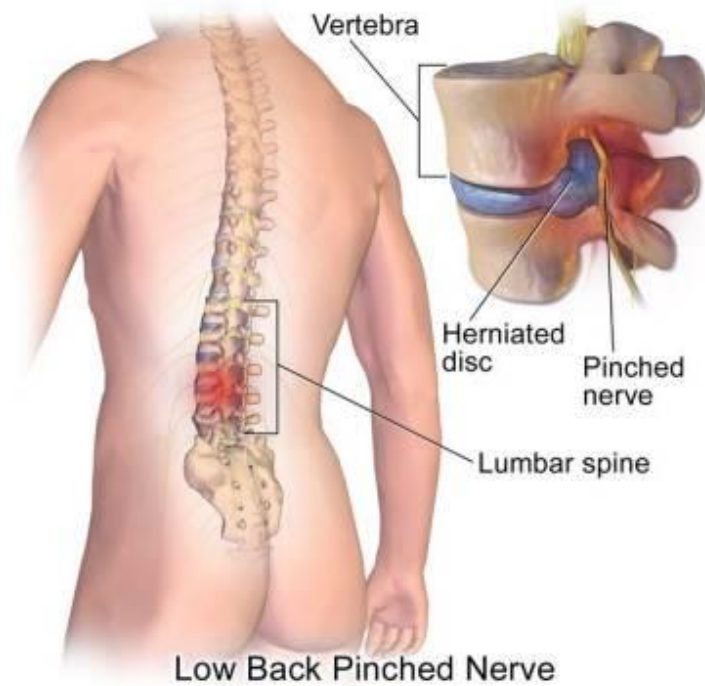
Figure 1.1 Common region of lower back pain

There are three types of LBP, which are acute, sub-acute and chronic LBP (National Institute of Arthritis and Musculoskeletal and Skin Disease, 2019). Acute LBP usually happens suddenly and will last for a few days to a week. While sub-acute occurs suddenly or overtime and last for 4 to 12 weeks. Lastly is chronic LBP, which occurs quickly or slowly but last longer than 12 weeks (*Common Causes of Back Pain - Types & Treatment | NIAMS*, n.d.). In terms of the symptom, the sufferer can feel the range in intensity from a dull, constant ache to a sudden, shooting or sharp pain (National Institute of Neurological Disorders & Stroke, 2020).

As other health problems, there are several complications of LBP if it is left untreated, which can be divided into physical and social complications (Casiano et al., 2022). Physical complications can include deformity, chronic pain and neurologic impact, either with sensory

or motor deficit. Whereas social complications are usually measure by the disability, increased absenteeism and decreased gross domestic product (Casiano et al., 2022).

Globally, LBP is the leading cause of worldwide disability. According to Hartvigsen et al., (2018), the years lived with disability caused by LBP had increased 54% between 1990 and 2015, and it occurs in high-income, middle-income and low-income countries. It is not possible to identify a specific cause for people who suffered with LBP. The pathological cause of LBP includes vertebral fracture; malignancy or infection need to be well understanding by a person with LBP. Unfortunately, only a small proportion of people have adequate understanding of LBP (Lotia & Sheth, 2021). People with greater risk of reporting LBP are among those who hold physically demanding job like nurses and construction workers. Hartvigsen et al., (2018) emphasized that, smoker and obesity are also part of the risks factors that can contribute to LBP.

Besides physical and mental comorbidities, LBP can occurs in those who are in a prolonged sitting position for more than 3 hours in a day (Fahmi Issa et al., 2016). For example in a study done in Saudi Arabia among undergraduate students. They found that, 30% of the students experiencing LBP. Of this number however, 61.5% were among those with prolonged sitting of more than 3 hours in a day (Fahmi Issa et al., 2016).

A study by Thomas et al., (2022) on 60 nursing students in India found that, 48 (80%) suffered LBP with the prevalence of 12 months and lifetime were 45.8%, 41.7% and 12.5%. The finding also indicated that 50% (n=24) had moderate pain and 41.65% (n=20) had mild pain (Thomas et al., 2022). In Malaysia, a study was conducted by Kjs et al., (2021) in Universiti Kebangsaan Malaysia (UKM) among health field students includes nursing, medicine, physiotherapy and occupational therapy. The reported the prevalence of LBP were

higher for both the lifetime and the last 12 months interval, while being lower for both the last month during the day of data collection interval (Kjs et al., 2021).

Besides the previously mentioned factors, other factor unrelated to pain that may contribute to back disability are attitudes and beliefs (Latimer et al., 2004). For example, a person's negative or positive attitudes and beliefs about his/her LBP that may affect their physical activity and consequently, influence treatment outcome (Alshami & Albahrani, 2015). A person who is experiencing LBP will automatically reduce movement and physical activity because of worry about injury or increased pain. This kind of attitude may be helpful to protect body tissue during the healing process. But not to chronic pain because at this stage, protection and healing are no longer needed. Instead, it may increase the pain and causing disability (*Psychology of Back Pain - International Association for the Study of Pain (IASP)*, n.d.).

There are many studies reporting LBP in university students, especially those in health programs such as medical, physiotherapy and nursing (Lotia & Sheth, (2021); Mukoka et al., (2019); Alburaidi et al., (2020). All of these health program required the students to directly involved in patients' care. Thomas et al., (2022) reported causes of LBP in university students includes anthropometric traits, gender, computer use, classroom furnishings and sitting position. They also indicated that most nursing students did not applying proper body mechanic while performing nursing procedures during clinical posting that put them at higher risk for LBP (Thomas et al., 2022). Thus, this proposed study will explore LBP among nursing students.

1.3 Problem Statement

As mentioned earlier, LBP is common among adult especially among those who involves a lot of physical movement, such as nurses. Mechanical hazard in the hospital mainly from manual lifting (patient especially) makes nurses as one of the most affected groups by LBP. A study by Semachew Kasa et al., (2020), showed that nurses lost 750000 days a year as a result of back pain. According to a study by Shah & Dave, (2012) in America, nurses were ranked the sixth highest to lose their working day from a job due to LBP. While according Brennan et al., (2007), LBP caused disability and inability to work and was ranked first in world population at some point in their lifetime that expected to affect up to 90% of the world population. This study however, was conducted among nursing students to assess their knowledge and awareness of LBP. This is because they are future nurses and their practice to prevent the occurrence of LBP is very dependent on their current knowledge.

LBP can affect the sufferers' well-being. Their activity of daily living will be affected because the bodily function become impaired and they have to adjust their daily activities to accommodate the pain and this can disturbed their quality of life includes sleeping disturbance, difficulty to bend, turning or reaching out something, difficulty to move around and lifting thing and etc. (Casiano et al., 2022). Although LBP is not a life-threatening condition, it can however, becoming a signal of a severe medical problem such as disc injuries or degeneration, alignment problems, fractures, infections and so on (William, 2021).

There were several published studies on LBP. However, most of them were conducted in the Western and Middle-east countries (Semachew Kasa et al., 2020; Tarimo & Diener, 2017; Fahmi Issa et al., 2016). Moreover, the population of the study were mostly among nurses, and also among medical and physiotherapies students, patients and other

physical workers. The researcher managed to find a current study conducted in Malaysia but the population was among medical students (Arshad Ikram et al., 2020). Such study in Malaysia and among nursing students however, is almost none at this stage. Therefore, the researcher will take this opportunity to conduct a study on LBP among nursing students because the researcher believed that nursing students is one of the populations that at risk for LBP, as well as to fill the gap in this area of care.

1.4 Research Questions

In order to guide this study and to inform the research outcome, the following research questions were formulated:

i. What is the prevalence of LBP among nursing students in Universiti Sains Malaysia (USM)?
ii. What is the level of knowledge and attitude on LBP among nursing students in USM?
iii. Is there any association between LBP and the knowledge and attitude on LBP among nursing students in USM?
iv. Is there any association between LBP and sociodemographic factors (gender, age, duration of sitting and year of study) among nursing students in USM?

1.5 Research Objective

1.5.1 General objective

This research study aims to assess the prevalence of LBP, knowledge and attitude of LBP and the association factors of LBP among nursing students in USM.

1.5.2 Specific objective

i.   To determine the prevalence of LBP among nursing students in USM.

ii. To determine the level of knowledge and attitude on LBP among nursing students in USM.

iii. To assess association between LBP and the knowledge and attitude on LBP among nursing students in USM.

iv. To identify association between LBP and sociodemographic factors (gender, age, duration of sitting and year of study) among nursing students in USM.

1.6 Research Hypothesis

Hypothesis 1:

There is no significant association between LBP and knowledge and attitude on LBP among nursing students **(Ho)**

There is a significant association between the LBP and knowledge and attitude on LBP among nursing students **(H$_A$)**

Hypothesis 2:

There is no significant association between LBP and socio-demographic factors among nursing students **(Ho)**

There is a significant association between LBP and socio-demographic factors among nursing students **(H$_A$)**

1.7 Conceptual and operational definition

Table 1.1 Definition for the operational terns used in this study

Term	Conceptual	Operational
Knowledge	Information and understanding about a subject which a person has, or others have (*KNOWLEDGE | Meaning, Definition in Cambridge English Dictionary*, 2022).	In this study, knowledge refers to the cognition of nursing students of School Health Sciences regarding LBP that will be measure using the Low Back Pain Knowledge Questionnaire (LKQ).
Attitudes	Generally, attitude can be classified into a negative attitude, group attitudes, a threatening attitude and a relaxed attitude. It involved manner, disposition, feeling with regard to a person or thing. It also involved person position or posture of the body appropriate to or expressive of an action and emotion (Attitude Definition & Meaning | Dictionary.Com, n.d.).	In this study, the nursing students' attitudes toward LBP will be measured using Back Pain Attitude Questionnaire (Back-PAQ)
Lower back pain	Back pain or LBP is very common among society and usually will improves within a few weeks but sometimes the pain can last longer or may keep coming back (Back Pain - NHS, n.d.).	In this study, the portion of LBP among nursing students will be measured by using the LKQ and Back-PAQ questionnaires.
Nursing students	Nursing student is defined as an individual who is enrolled and take part in a professional nursing or vocational nursing education programs (*Nursing Student Definition | Law Insider*, n.d.)	In this study, nursing student refers to students who are studying nursing at School Health Science in both Diploma and Bachelor programs.

1.8 Significance of the study

      This study is important as it concern about the level of knowledge and attitude on LBP among nursing students, who are future nurses that will provide care to patients. The findings of this study will enhance the evidence of LBP experienced by the nursing students. Accordingly, it is hope that an appropriate action towards this problem can be carried out by the school and the nurse educators specifically to reduce the risk against LBP and to improve the students' level of knowledge and attitude of LBP. Indirectly, the nursing students' well-being also can be improved to increase their academic performance as well as improve the quality of nursing care.

CHAPTER 2: LITERITURE REVIEW

2.1 Introduction

This chapter provide general information about the knowledge and attitude of LBP. This chapter will also present the instrument that is used in this study as well as the theoretical frameworks chosen for this study.

2.2 Prevalence of LBP

The prevalence of LBP worldwide is estimated to be between 30 to 80% among the general population (D Hoy et al., 2010). According to Damian Hoy et al., (2014), LBP was ranked sixth highest burden on a list of 291 conditions in Global Burden of Disease (GBD). While, LBP ranked the highest in term of years lived with disability (YDLs) (Damian Hoy et al., 2014). According to a global review, the prevalence of LBP in adult general population approximately 12 %, one month prevalence of 23%, a one year prevalence of 38% and a lifetime prevalence of 40% (Manchikanti et al., 2014).

In Western setting, LBP affect 40 to 60% of working adult and adversely impact quality of life (Dunn et al., 2013). In Spain, a cross-sectional study done by Miñana-Signes et al., (2021), revealed that the lifetime prevalence of LBP among students 131 (49.6%), a period prevalence 122 (46.2) and a point prevalence was 68 (51.4%). Furthermore, a cross-sectional study done in South Africa showed that the overall prevalence of LBP was 18.1% (95% CI: 15.3-21.3) (Kahere & Ginindza, 2021).

According to a study by Yiengprugsawan et al., (2017) in Thailand, 37% of the respondents had never experienced LBP and 30% suffer with chronic LBP. The same study reported the prevalence of severe LBP with 0.7% with chronic LBP. According to a study in Japan, the prevalence of self-reported LBP during the past few days was 13% (Tomioka et al., 2021). In Malaysia, a study conducted by Shariat et al., (2018), found that more than 50% of the respondents reported pain in their neck, shoulder and lower back. Same study showed that the prevalence of respondent who had severe pain due to LBP was 8.2% and 17% experienced no pain (Shariat et al., 2018). The prevalence of ever having LBP since studying among medical students in Selangor was 64.5%, while the prevalence of having LBP in the past 12 months was 54.0% (Asyraaf Amir Husin et al., 2021).

2.3 Knowledge on LBP

Knowledge is defined as the understanding of or information about a subject that you get by study or experience, either known by individual or by people generally (*KNOWLEDGE | Meaning, Definition in Cambridge English Dictionary*, 2022). Knowledge also is referring as a product of doubt by a British philosopher. He claimed that that we are naturally led into an examination of knowing when we start to asking ourselves seriously whether we really know about something. Besides that, knowledge is also defined knowledge as a focus of how we learn to consider conceptual ideas and to apply critical reflection to real-life scenarios. It's concerned with understanding what it means to "know (Nord Anglia International School, 2020).

A study conducted in Saudi Arabia, found that majority of the respondents (98%) had good knowledge of LBP (Alburaidi et al., 2020). Moreover, a study in India reported that knowledge of pain due to LBP among students was average as the overall instrument mean

score was less than 50%, indicated by a score of 5.86 out of 13 (Lotia & Sheth, n.d., 2021). Similar finding was also indicated in Mukoka et al., (2019), with the mean percentage score for knowledge on LBP among students in University of Witwatersrand, South Africa was average (50%).

2.4 Attitude on LBP

Attitude and belief according to Christe et al., (2020) are related. Unhelpful attitude and belief also can be present in general population and not certainly present in the person with LBP (Christe, Crombez, et al., 2021). They highlighted that a person's beliefs may influence his or her attitudes toward something of concern. In view of LBP, it will lead to ineffective behavior such as passive coping strategies, movement avoidance and staying away from works. While Owlcation (2022) stated that, attitude are a construct of internal beliefs and value system. This attitude may also prevent people who suffers LBP to engage in exercise, which is to be one of the best available treatments to be applied in persistent LBP and help in preventing recurrence (Foster et al., 2018). According to Tarimo (2017), attitude is associated with LBP. The author indicated that the majority (93%, n=190) of the participants reported fear of movement and activity avoidance because of their LBP. While 72% (n=147) believed that their LBP would remain for the rest of their life and would prevent them from working.

2.5 Sociodemographic factors and LBP

There are several associated factors of LBP as reported in the literature. In this study however, the researcher will focus on socio-demographic factors includes gender, age, duration of sitting positing in a day and year of study.

2.5.1 Gender and LBP

According to a study by Bento et al., (2020), the prevalence of LBP in female was 60.9% which higher than male 39.0% . While a study by Wu et al., (2020), the prevalence of LBP on female was 8.01% (95% uncertainty interval (UI): 7.22–8.84%), whereas for males, 6.94% (95% UI: 6.24–7.67%) (Wu et al., 2020). Similar finding was reported in a study by Hanna et al., (2019) in Qatar when they found that 263 (61.2%) female reported to experienced LBP (Hanna et al., 2019). The other studies also reporting the same findings (Palacios-Ceña et al., 2021; Bento et al., 2020). A study in Saudi Arabia found that female of different department in College of Medical Sciences of King Khalid University had slightly higher ratio of knowledge than male. The knowledge of LBP symptom among females (54%) was higher than male (46%) (Alburaidi et al., 2020). In a study conducted at Ireland, stated that female are more to negative beliefs and attitudes about the inevitable consequences than male (Kennedy et al., 2014).

2.5.2 Age

Age is one of the factors that may affect LBP. According to PennMedicine, (2017), people most commonly will start experiencing back pain between the ages of 40 and 60 years old. However, the pain is not necessarily occurs with increasing age because some people will experience LBP at young age (*Back and Neck Pain with Age - Penn Medicine*, n.d., 2017). A study in Iran by Asadi et al., (2016), was conducted among 350 nurses with 90.3% were female. The result showed that 246 (70.3%) had a history of LBP. They also found that 27.4% of the respondents aged between 27 to 31 had the highest rate of LBP. While only 3.1% (n=11) of the respondents aged 52 to 56 were the least frequent group to have LBP

(Asadi et al., 2016). A significant difference between age and the history of LBP (p = 0.001) was also indicated in the same study.

2.5.3 Duration of sitting

A study in Turkey among health sciences students by Yucel et al., (2016), indicates that prolonged sitting hours was the most important factor that led to LBP apart from student physical features, gender, desk, and smoking habits with females being more sensitive to pain. Beside LBP, a study by Algarni et al., (2017), found that 190 (40.5%) of the respondent complaint of neck pain after prolonged sitting. While, 201(42.9%) respondents claimed back pain occurred after prolonged sitting. According to Bennie et al., (2013), adult will spend as much as six to eight hours per day in a sitting position. This is supported by Gupta et al., (2015), when they found a significant positive association between total sitting time and high LBP intensity (OR = 1.43).

2.5.4 Year of study and LBP

According to Issa1 et al., (2016), it showed that the students in fourth year were the most higher incidence of LBP with prevalence 37.2%, despite there were also reported in first year, second year, and third years student have LBP experience with prevalence 13.2%, 27.8% and 31.1% respectively. Similar study from Australia, reported that fourth year and second year have incidence of LBP with prevalence 81.7% and 72.4% (Nyland & Grimmer, 2003). However, the first year and third year's student also showed higher incidence with prevalence more than 50% of the population. According to Arsh and Jan (2016), revealed that the fourth years and third year students showed higher incidence of LBP with more than 50% of the prevalence in each year of study population.

2.6 Instrument used in this study

In this study, data was collected using a set of questionnaires that combining two specific scales which are Low back Pain Knowledge Questionnaire (LKQ) and Back Pain Attitude Questionnaire (Back-PAQ).

The LKQ was used to evaluate respondents' knowledge of LBP. It was developed by Maciel et al. (2009), and proven as reproducible and valid (Maciel et al., 2009). The scale composed of 16 questions, which is divided into three categories under general aspect, concept and treatment.

While the Back-PAQ was used in this study to evaluate attitudes of the respondent towards LBP. It was developed by Krägeloh et al., (2022). This instrument was initially developed to test whether LBP is related to attitude and beliefs (Krägeloh et al., 2022).

2.7 Theoretical and conceptual framework of the study

The theoretical framework that was utilized in this study is the Knowledge, Attitude and Practice model or known as KAP model (Figure 2.1). KAP model theory divides the process of human behavior change into three steps which are knowledge, generating attitudes/ belief and forming practice/behaviors (Mukoka et al., 2019). The KAP model originating from the fields of family planning and population studies in the 1950s and was developed from learning theory by (Bandura, 1976) and diffusion of innovation theory by Roger, (1995). According to Liao et al., (2022), Roger (1995) state that members of a social system accept innovation through four stages over time. The stages include knowledge acquisition., persuasion, decision and confirmation. In addition, in a year 1976, Bandura suggested that individual behavior are learned through social context (Mukoka et al., 2019).
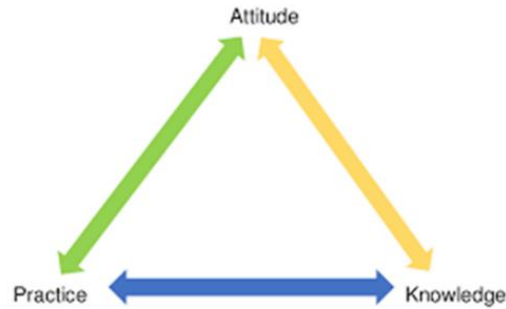
Figure 2.1 The Knowledge-Attitude-Practice Model (Bano et al., n.d., 2013)

The KAP Model was recognized as a popular survey instrument in the field of social research and it can be used to access the relationship among knowledge, attitudes/belief and practice/behavior (Mukoka et al., 2019). The model is most widely used in studies to demonstrate societal context in public health research (Bukachi, et al., 2018). The KAP model is a structured, standardized questionnaire complete by a target population that can quantify and analyze what is known (knowledge), believed (attitude) and done (practice) with regard of interest topic (Nguyen et al., 2019; Andrade et al., 2020). Launiala, (2009) stated that this model is easy to conduct. The result of this method are relatively easy to interpret and have concise presentation (Launiala, 2009).

Attitude

Sociodemographic factors ⟷ **Knowledge**

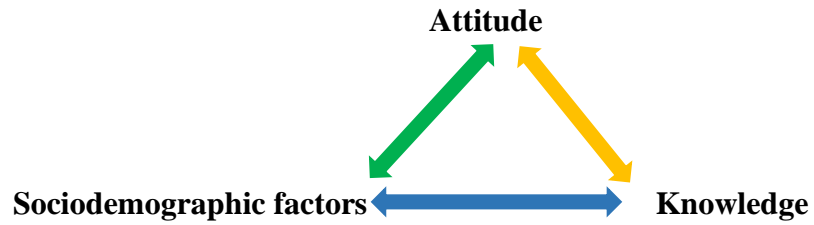**Figure 2.2 Framework of Knowledge-Attitude Model adapted from (Bano et al., 2013)**

By adapting this model, the knowledge and attitude on LBP will be assessed among nursing students. However, some of the component might be adjusted to suit the background of the study population. The practice component in the KAP model will be replaced with "socio-demographic" component to suit the propose study s' interest (Figure 2.2).

CHAPTER 3: RESEARCH METHODOLOGY

3.1 Introduction

This chapter discusses and justify the approach and method used in this study.

3.2 Research Design

This study was conducted through a cross-sectional study. Cross-sectional study is a type of observational study. Whereby the outcome and the exposures in the study participants will be measured by the researcher at the same time (Setia, 2016).

3.3 Research Location

The study was conducted at School of Health Sciences, Health Campus Universiti Sains Malaysia (USM).

3.4 Research Duration

This study was conducted from October 2022 to June 2023.

3.5 Research Population

This study was conducted among Diploma and Bachelor nursing students in School of Health Sciences, USM.

3.6 Subject Criteria

Table 3.1 The inclusion and exclusion criteria

Inclusion Criteria	Exclusion Criteria
Female and Male undergraduate students	Respondent who reported suffering from LBP due to accident
Studying in nursing at School of Health Sciences, USM	

3.7 Sampling plan

Sampling size for this study was determined by initially calculating sample size for each research objective. Then the largest size was chosen as the targeted sample size for this study.

3.7.1 Sample size estimation

Single proportion formula will be used in Objective 1:

$$n = (\frac{z}{\Delta})^2 \, p \, (1-p)$$

n = required sample size

z = value of standard normal distribution curve cutting off probability Alpha (α) is one tail for one-sided alternative or $\frac{\alpha}{2}$ in each tail for a two-sided alternative (z 0.05=1.96)

Δ = desire level of precision = 0.05

p = estimate proportion of an attribute that is present in the population

Objective 1

The parameters for **first objective** were as follows:

$z = 1.96$

$\Delta = 0.05$

$p = 8.8\%$ (knowledge of low back pain) (Tarimo & Diener, 2017).

$$n = (\frac{1.96}{0.05})^2 \, 0.08 \, (1-0.08)$$

n = 113

After consideration 10% of response rate,

113 × 10%

Hence,

n = 124

Two proportion formula will be used in Objective 2:

Objective 2

The parameters for second objective:

Proportion in control (p0) = 68% (association between gender and low back pain) (Shah & Dave, 2012)

Proportion in case (p1) = 80%

Significance level (α) = 0.050

Power (1-β) = 0.840

$$n = (Z_\alpha + Z_\beta)^2 \frac{p_1(1-p_1) + p_2(1-p_2)}{(p_1-p_2)^2}$$

= 209

After consideration 10% of response rate

209 × 10%

Hence,

n =232

Therefore, the exact sample size of this study is based on the sampling size of objective 2, which is n = **232**.

3.7.2 Sampling method

This study used a probability simple random sampling method. It helps the researcher to randomly selects a subset of respondents from a population (Scribbr, 2020). The selection of respondents is based on inclusion and exclusion criteria of the study using randomizer system.

This method was chosen by the researcher because this method is the purest and most straight forward probability sampling strategy. This method also considered as the most unbiased representation of population. Each respondent will be equally likely to be chosen as a part of the sample (Simple Random Sampling - Research-Methodology, 2011).

In total, there are 285 nursing students from both program (Diploma and Bachelor degree) in School of Health Sciences. The researcher obtained the list of all the nursing student from Academic Office. Then, each student was assigned with a sequential number from one to 285. The researcher then used a software such as Research Randomizer and generate 232 (size estimation) number from one to 285. Once the random number are generated, the researcher approached each of the student listed in the list.

3.8 Research Instrument

3.8.1 Questionnaire

Data for this study was obtained through a set of self-administered questionnaires. This questionnaire is divided into three sections: Part A, Part B and Part C. Questions in Part B and Part C will be adopted from Maciel et al., (2009) and Krägeloh et al., (2022). Permission to use the questionnaire has been obtained from the authors (Refer Appendix B).

Part A: Socio-demographic data

Section A consist of two parts. In first part, the questions regarding socio-demographic background including gender, age, duration of sitting and year of study. While in second part, the questions asked about the respondents' experienced with LBP to determine the prevalence of LBP among nursing students in USM.

Part B: Knowledge of LBP

This section used Low Back Pain Knowledge Questionnaire as instrument to assess the knowledge toward LBP among nursing students in USM. It contains of 16 questions.

Part C: Attitude of LBP

This section is used to determine attitude of LBP among nursing students in USM. The instrument that will be used was Back-Pain Attitude Questionnaire. It contains 20 questions.

3.8.2 Translation of Instrument

The researcher had used the original version of the two scales (LKQ and Back-PAQ), which are in English. This is because the researcher is convinced that all university students are able to read and understand English well. Thus, translation to the scales is not required.

3.8.3 Validity and Reliability

There are two important qualities of surveys for measurement instrument which are consistency and accuracy. It was assessed by considering the survey's reliability and validity. Reliability described as the method to used will depend on the survey designed and purpose and the validity of a survey can be assessed in a number of different ways. While validity is an assessment of its accuracy which extent to which an instrument, a survey, measure to what it supposed to measure (Assessing Questionnaire Validity - Select Statistical Consultants,., 2022).

The reliability of the questionnaires will be tested by conducting a pilot study prior to the real study. According to general rule of thumb, a good value of Cronbach's Alpha is between 0.70 and above (Cronbach's Alpha - Statistics Solutions, , 2022).

The original LKQ questionnaire has been validated and proved as reproducible by the original author and its reliability Cronbach's Alpha coefficient was 0.71 (Maciel et al., 2009). While the Back-PAQ questionnaire reliability Cronbach's Alpha is 0.70 (Krägeloh et al., 2022).

Although the two scales are already validated and reliable, a pilot study was done by the researcher prior to the real study because the scales were used in a different setting and population this time. Through the pilot study, the researcher able to assess whether the

questionnaire is valid or understandable by the respondents. The pilot study was done on 10% of the sampling size (n=23) respondents among nursing students who fulfilled the inclusion criteria. The result shows that those involved in the pilot study will be excluded from the study.

3.9 Variables

There are two types of variables in this study, which is independent variables and dependent variable.

3.9.1 Variable measurement

Table 3.2 Independent and dependent variable

Independent variables	Dependent variable
Socio-demographic data of nursing students • Gender • Age • Duration of sitting • Year of study • Knowledge and attitudes of LBP	• LBP

3.9.2 Variables scoring

Altogether, there are 46 items in the questionnaire.

Part A has ten items which are under socio-demographic data.

The data was measured by using descriptive statistic. Thus, the outcomes were presented in frequency and percentage.