

**THE PREVALENCE OF LOW BACK PAIN AND
DISABILITY AMONG UNIVERSITY STUDENTS: A
CROSS-SECTIONAL STUDY**

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A Research Project submitted to the Department of Physiotherapy,

Faculty of Medicine and Health Sciences,

Universiti Tunku Abdul Rahman,

in partial fulfillment of the requirements for the degree of Bachelor of

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ABSTRACT

THE PREVALENCE OF LOW BACK PAIN AND DISABILITY AMONG UNIVERSITY STUDENTS: A CROSS-SECTIONAL STUDY

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Background and Purpose: Students often sit for prolonged periods of time and thus they are more prompt to have low back problems. Therefore, a large number of university students may experience low back pain (LBP) by the end of their academic careers as they are spending too much time in sitting, reading, or working on computers. This research study aimed to investigate the prevalence of low back pain and disability level among university students in Universiti Tunku Abdul Rahman (UTAR), Sungai Long Campus.

Objective: To investigate the prevalence of low back pain and disability level among university students.

Methods: This cross-sectional study was conducted among a total of 310 university students in UTAR Sg. Long Campus in three weeks. The information

regarding low back pain was collected with the use of Undergraduate Student Health and Safety Questionnaire and Modified Oswestry Low Back Disability Questionnaire in paper form. The questionnaire incorporated the questions on socio-demographic data, history of LBP, activity level and educational exposure. Statistical Package for the Social Sciences (SPSS) software version 19.0 was used to analyze the data collected.

Results: Three hundred and ten students participated in this study. The overall prevalence of low back pain among university students was 21.0%. The prevalence of low back pain was 22.3% in females and 17.7% in males respectively. Among the university students that had LBP, 87.3% of them had minimal disability and 12.7% of them had moderate disability.

Conclusions: The overall prevalence of low back pain among university students in UTAR Sg. Long campus was high, with females were more prevalent to low back pain compared to males. The overall disability level among university students due to LBP was minimal.

Keywords: Low back pain (LBP), university students, Modified Oswestry Low Back Disability Questionnaire

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We are making this project done not only for academic marks but to also gain knowledge in this field area. Thanks again to all who helped us laterally in this project.

APPROVAL SHEET

This Research Project entitled “The Prevalence of Low Back Pain and Disability among University Students: A Cross-Sectional Study.” was prepared by Lim Chia Voon, Sharanjit Kaur, and Tan Chieu Ling. It will be submitted as partial fulfillment of the requirements for the Degree of Bachelor of Physiotherapy (Hons.) in Universiti Tunku Abdul Rahman.

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SUBMISSION OF RESEARCH PROJECT

It is hereby certified that Lim Chia Voon (ID No: 10UMB04713), Sharanjit Kaur (ID No: 11UMB07256) and Tan Chieu Ling (ID No: 11UMB07512) have completed this Research Project entitled “The Prevalence of Low Back Pain and Disability among University Students: A Cross-Sectional Study” under the supervision of Mr. Deivendran Kalirathinam from the Department of Physiotherapy, Faculty of Medicine and Health Sciences, and Mr. Smithesh Odathil Kooven from the Department of Physiotherapy, Faculty of Medicine and Health Sciences.

We understand that the University will upload softcopy of our Research Project in PDF format into UTAR Institutional Repository, which may be made accessible to UTAR community and public.

Yours truly,

(Lim Chia Voon)

(Sharanjit Kaur)

(Tan Chieu Ling)

DECLARATION

We, Lim Chia Voon, Sharanjit Kaur and Tan Chieu Ling, hereby declare that the Research Project is based on our original work except for quotations and citations which have been duly acknowledged. We also declare that it has not been previously or concurrently submitted for any other degree at UTAR or other institutions.

(Lim Chia Voon)

(Sharanjit Kaur)

(Tan Chieu Ling)

Date _____

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LIST OF ABBREVIATIONS

LBP	Low Back Pain
NP	Neck Pain
SP	Shoulder Pain
MSP	Musculoskeletal Pain
UTAR	Universiti Tunku Abdul Rahman
Sg. Long Campus	Sungai Long Campus

1 DEFINITION OF TERMS

- (a) **Prevalence** is the total number of cases of a disease in a given population at a specific time. (The American Heritage® Dictionary of the English Language, 4th Edition, 2009)
- (b) **Point Prevalence** is measured at a single point in time. (Gordis L. Epidemiology. Toronto, Ontario, Canada: WB Saunders Co; 1996:32–34.)
- (c) **Low Back Pain** is a mechanical disturbance of the musculoskeletal structures or function of the back. (Low Back Pain: Introduction, 2013)
- (d) **Disability** is a physical or mental condition that limits a person's movements, senses, or activities. (Oxford Dictionary of English, 3rd Edition, 2010)
- (e) **University Student** is a person who is studying at a university or other place of higher education. (Oxford Dictionary of English, 3rd Edition, 2010)

(f) **Cross-sectional Study** is a study in which groups of individuals of different types are composed into one large sample and studied at only a single time point (for example, a survey in which all members of a given population, regardless of age, religion, gender, or geographic location, are sampled for a given characteristic or finding in one day). (Farlex Partner Medical Dictionary, 2012)

2 BACKGROUND AND SIGNIFICANCE OF STUDY

Students often sit for prolonged periods of time and thus they are more prompt to have low back problems. (“Back pain: Overview”, 2010) Therefore, a large number of university students may experience low back pain (LBP) by the end of their academic careers as they are spending too much time in sitting, reading, or working on computers.(“Back pain: Overview”, 2010)

Apart from that, other causative factors that are known to develop LBP among the students include poor posture, physical inactivity, sedentary lifestyle and psychological stress. (Mercola, n.d.) Therefore, university students are at a higher risk to develop LBP.

This study is conducted to measure the prevalence of LBP among the university students in Universiti Tunku Abdul Rahman (UTAR) Sg. Long Campus, and considered the association of LBP prevalence with the level of disability.

The significance of this research study is to investigate low back problems and to what extent the activities of daily living of the students are affected. In order to increase the awareness of LBP among the population, a pamphlet comprising low back care exercises, the body mechanics of proper lifting techniques as well as proper sitting and standing postures will be given to all the participants at the end of their participation.

3 INTRODUCTION

Back pain, being one of the major musculoskeletal pain problems, has plagued humans since we evolved the upright bipedal position from that of a quadruped. (Low Back Pain: Introduction, 2013) Waddell in his seminal book titled “the back pain revolution” describes back pain as “the 20th century medical disaster”. (Cardiff University's MSc in Pain Management team, n.d.)He also describes back pain as “simply a mechanical disturbance of the musculoskeletal structures or function of the back”. (Cardiff University’s MSc in Pain Management team, n. d.)

Low back pain (LBP) is a common problem that affects most people ranging from adolescence to adulthood at certain time in their life. (Ehrlich, 2003). It is the major reason for medical consultations. There are many causative factors that lead to this pain. It can be triggered by poor postures while sitting or standing, bending awkwardly, or lifting incorrectly. It is also a leading cause of disability and occurs in similar proportions in all cultures, interferes with quality of life and work performance (Ehrlich, 2003) According to Speed (2004), LBP affects more than 70% of the population in developed countries and poses a major socioeconomic burden, accounting for 13% of sickness absences in the United Kingdom. The annual incidence in adults is up to 45%, with those aged 35-55 years affected most often. Although 90% of episodes of acute LBP settle within six weeks, up to 7% of patients develop chronic pain. (Speed, 2004)

The lumbar spine is the area of the spinal column that comprises the low back. (Asher, A., 2009) The lumbar vertebrae consist of five vertebrae that make up the spine in the lower back. L1, the most upper vertebrae meets the bottom of the thoracic vertebrae, T12 while the base of the lumbar vertebrae, L5, meets the sacral spine. (“Lumbar vertebrae”, n. d.) The lumbar vertebrae are the largest of the major weight-bearing and highly mobile vertebrae in the body. The below is table 1 showing the characteristics of lumbar vertebrae.

Characteristics	Lumbar Vertebrae
Size	Largest
Foramina	One vertebral
Spinous process	Short, blunt (projects posteriorly rather than inferiorly)
Transverse processes	Large and blunt
Articular facet for ribs	Absent
Direction of articular facets a) Superior b) Inferior	Superior facet directed posteromedially Inferior facets directed anterolaterally
Size of intervertebral discs	Thickest

Table 3.1: The characteristics of lumbar vertebrae.

There are many classifications of LBP. LBP is usually classified into three different groups – acute, subacute and chronic according to the length of time the pain persist on a subject. Acute back pain is the most common presentation and is usually self-limiting; lasting less than 6 weeks regardless of treatment. Subacute LBP lasts between 6 and 12 weeks while chronic back pain is a more difficult problem and often persists for more than 12 weeks. (Zanni& Wick, 2003)

LBP is also categorized into mechanical LBP and secondary LBP by different etiologies. For mechanical or nonspecific LBP, it has no serious underlying pathology or nerve root compromise. (Zanni& Wick, 2003) It is the tension, soreness or stiffness in the lower back region for which the specific cause of the pain is still unknown. The secondary LBP, occurring in less than 2% of patients, is associated with underlying pathology. (Zanni& Wick, 2003) They include metastatic cancer, spinal osteomyelitis, epidural abscess, fractures, infection, ankylosing spondylitis and other inflammatory disorders. According to Zanni and Wick (2005), the most common neurologic impairment associated with back pain is the herniated disc and 95% of disc herniation occurs at the lowest two lumbar intervertebral levels.

There are many factors that can lead to back pain. Such risk factors that directly cause LBP comprise prolonged sitting, poor posture, bending or twisting awkwardly, incorrect lifting technique and so forth. Other underlying factors including the physical inactivity, sedentary lifestyle and psychological stress are also causing the pain.

“Sitting, especially prolonged sitting is generally accepted as a risk factor in developing low back pain.” (Mangrum, 2006) In general, most of the students often do the activities that require long periods of sitting as majority of their jobs is performed while sitting. For example, they may sit in the chair for hours in class or in front of computer and this prolonged sitting was a major cause of low back problem among the university students. (Ergonomics for Prolonged Sitting ,n.d.) This is because the long periods of sitting and lack of spinal motion may increased the stress of the back, neck, and legs and puts an extra pressure to the back muscles and the supporting tissues leading to muscle tension and fatigue, joint strain and spinal disc compression. (Danoff R., n.d.)

Studies have shown that lack of spinal motion creates stretch in spinal ligaments and hampers fluid flow into the disc which consequently leads to insufficient nutrition of the vertebral discs. (Mangrum, 2006) Other studies have demonstrated adverse effects on muscles with prolonged low-level static loading on the back with prolonged sitting. Prolonged activity leads to impaired oxygenation of muscle tissues and has been implicated as a cause of back pain. (Mangrum, 2006) Therefore, prolonged sitting will end up with pain and limiting the spinal movements.

Secondly, poor or improper postures can also lead to LBP or worsen the existing back pain. According to Dr. Finkel, “most people sit wrong.” (Common causes of back pain: Weight, posture, lifestyle factors, n.d.) In most of the time, students will unintentionally slump or slouch on the chair after a long period of sitting as they are not aware on these poor postures may lead to low back pain.

These improper ways of sitting such as leaning forward can overstretch the ligaments and strain the supporting tissues of the back. (Common causes of back pain: Weight, posture, lifestyle factors, n.d.) Other than that, awkward body postures, such as twisting the trunk to reach for an object, wrong lifting technique like bending or twisting the trunk while lifting a heavy object add an extra workload to the back and cause undesirable stress to the spine. (Ergonomics and the workplace, n.d.)

In addition, the unsuitable workplace design may also cause the low back pain among university students. The poor ergonomics design puts the low back at a higher risk to develop LBP. The ideal basic ergonomics workplace design is the chair, keyboard, and monitor in a straight line, lower back get supported on the back rest, knees flexed at 90 degrees and the feet flat on the floor. (Morse et al., n. d.) However, due to the low level of awareness on the workplace design, the height of the chair was commonly never been adjusted and it is always too high or too low to give a proper lower back support. (Morse et al., n. d.) Over time, the incorrect daily posture and poor workplace ergonomics can contribute to or cause recurrent episodes of back pain. (Common causes of back pain: Weight, posture, lifestyle factors, n.d.)

The next factor that contributes to the low back pain among university students is being physical inactive. Most of the university student does not get a regular exercise as they have insufficient leisure time. This is because students usually spend most of their time for the academic purposes such as attending the class, assignment, and revision. Furthermore, some students are more likely to

have a sedentary lifestyle as they are less motivated. Students that have sedentary lifestyle always miss out on the benefits of regular physical activity as they are lack of time. Lack of exercise can cause or worsen back pain because of increased stiffness and weakened muscles of the back. (Common causes of back pain: Weight, posture, lifestyle factors, n.d.)

Moreover, being tension or under stress is the most common psychological factor that leads to LBP. Stress and other emotional factors are believed to play a major role in low back pain, particularly chronic low back pain. (Jordan, 2013) Most of the students are under stress. They are unable to manage it effectively and this is always associated with anxiety or depression. In turn, this psychological stressful mind indirectly leads to low back pain.

John Sarno, M.D., a physician and professor of physical medicine and rehabilitation at New York University, published a theory of stress-related back pain in the terms of “Tension Myositis Syndrome” (TMS). (Deardorff, 2001) According to his idea, the emotional tension causes vasoconstriction, reduce the blood flow to various soft tissues, including muscles, tendons, ligaments, and nerves in the back. This will further decreased the oxygen supply to all the tissues and buildup of waste products in the muscles. As a result, muscle tension, spasm and back pain will be experienced by the subject. (Deardorff, 2001)

"Students carrying heavier backpacks relative to their body weight were more likely to report back pain," write the researchers in the March/April 2004 issue of the *Journal of Pediatric Orthopedics*. (Heavy backpacks can hurt students' backs, 2004) Students always carry heavy backpacks that increase the

workload and stress on the lower back. For instance, a heavy backpack that filled with books can bend the spine to an abnormal curvature, causing the compression on the spinal disc and finally causing back pain. (Backpack safety, n.d.)

In conclusion, the daily activities and unhealthy lifestyle may put the university students at a high risk of getting LBP. This may have an implication that affects their future life. Therefore, LBP among university students remain a major concern as most of the parents, students and communities are concerned with this issue.

4 LITERATURE REVIEW

A literature review of 24 relevant articles published between years 1985 to year 2013 is done and identified the problems of low back pain among adolescents and students and investigated the associated risk factors and factors affecting low back pain among them. Their findings and suggestions are reviewed here.

1. **Alshagga et al (2013)** assessed the prevalence, body distributions and factors associated with musculoskeletal pain (MSP) among medical students in a private Malaysian medical college. They found that LBP among medical students was relatively high, thus, further clinical assessment is needed in depth study of ergonomics.
2. **Burger S. M. (2012)** investigated the prevalence and factors associated with low back pain (LBP) among the undergraduate physiotherapy students at the University of the Witwatersrand. She concluded that the prevalence of LBP might be reduced if students are more aware of LBP and consequential muscle imbalances that might perpetuate the problem.
3. **Hoy (2012)** conducted a systematic review of the global prevalence of low back pain that included general population studies published between 1980 and 2009. A total of 165 studies from 54 countries were identified. He found that the global number of individuals with low back pain is likely to increase substantially over the coming decades. He also

suggested that further research is needed to identify risk factors and culturally appropriate interventions to prevent and treat low back pain.

4. **Moroder et al (2011)** evaluated the extent of sedentary lifestyle and the 12-month prevalence of LBP in a sample group of medical students in comparison to a random sample of physical education students. The results showed that medical students were approximately 2.5 times less physically active than the 107 physical education students and spent 3 more hours per day sitting. The 12-month prevalence of subacute and chronic LBP in the sample group of medical students was 53.4% as compared to 60.7% in the sample group of physical education students. These data reveal a high prevalence of low back pain among students, which is rather alarming considering their young age.
5. **Auvinen (2010)** evaluated the prevalence of neck pain (NP), shoulder pain (SP) and LBP and peripheral pains (upper or lower extremities) and the prevalence of multiple pains. Second, the study determined the role of a set of potentially modifiable risk factors for adolescents' NP, SP, and LBP. In their results, they showed that NP, SP, and LBP were common at the ages 16 and 18, while medical consultations for these pains were less frequent. The prevalence of pain increased with age. Peripheral pains were rare. Surprisingly many adolescents reported multiple musculoskeletal pains. Girls were more likely to report pain than boys. Both low and high level of physical activity, some risk sport activities, high amount of

sedentary activities, and insufficient quantity and quality of sleep increased the risk of NP, SP, and LBP in adolescence.

6. **Falavigna et al (2010)** evaluated the association between undergraduate physiotherapy students and LBP. The results show that 77.9% of the students had LBP at some point in their lives, 66.8% in the last year and 14.4% of them reported they were suffering from LBP at the moment of answering the questionnaire. Physiotherapy students reported a higher prevalence of LBP when compared with the medical students in all measures.
7. **Gilkey et al (2010)** evaluated potential risk factors among a population of students at a Colorado university. They found out that the psychosocial factors were identified to be associated with back pain. The prevalence of back pain among this younger population is of significant concern. Further investigation is warranted to identify contributing factors that may help in the development of interventions to reduce the epidemic of back pain within college students and lessen the burden upon college health providers.
8. **Heuscher et al (2010)** evaluated the association between the self-reported annual low back pain with the estimated usual backpack weight among college students and the result of study suggest that increasing reported backpack weight is associated with increased prevalence of annual low back pain. However, the results do not provide evidence to support the

recommendation that the backpack weight necessarily be less than 10% of body weight.

9. **Freburger et al (2009)** determine the prevalence of chronic low back pain in North Carolina through telephone survey in 1992 and repeated in 2006. They found an alarming increase in the prevalence of chronic LBP in North Carolina, with moderate increases in already high use of health care. This study has limitations. The cross-sectional nature of the analysis prevents them from making firm conclusions regarding causality. It is also possible that there was some underreporting of pain in the surveys, since a household member was asked to identify all household members with a history of back or neck problems. Finally, the study was conducted in only 1 state.
10. **Pellis et. al. (2009)** assessed the prevalence of low back pain (LBP) in adolescents and the clinical features of LBP in 2 European countries and to evaluate the effect of LBP on health-related quality of life (HRQOL) using standardized validated generic and disease-specific instruments. Low back pain was reported by 587 adolescents (39.8%): isolated LBP in 250 (42.6%), LBP plus other pain in 271(46.2%), LBP plus whole-body pain in 50 (8.5%, and unclassifiable LBP in 16 (2.7%). This shows that low back pain in adolescents is a prevalent symptom with overall low associated disability and little effect on health-related quality of life.
11. **Mitchell et al (2008)** identified the relative contributions of age and occupational exposure on the prevalence, duration and severity of low

back pain episodes among undergraduate nursing students and suggested that there is a rise in occupational exposure from student to working nurse is the primary cause of the increase in low back pain. Increased exposure may be to physical as well as psychological stressors. Given that prevalence rates are very high prior to commencing work, nursing student populations should be a target group for low back pain preventative strategies.

12. **Pradeep J. R. (2008)** investigated the prevalence of back pain among dentistry undergraduate students. The overall prevalence rate was very high, especially in fourth-year. He concluded that back pain is a reality for most of the dentistry students at the University of the Western Cape in South Africa.
13. **Brennan (2007)** assessed the level of LBP amongst students engaged in educational programs that were physically demanding, and its influence on lower back problems. This study revealed high prevalence of LBP consistent with that of the literature, and unveiled a recurrence rate and behavioral habits of sufferers, which are warning signs of a more chronic state to come.
14. **Louw et al (2007)** conducted a prevalence study on low back pain in Africa in April 2006. The findings support the global burden of disease of LBP, in addition to suggesting that LBP prevalence among Africans is rising and is of concern.

15. **Diepenmaat et al (2006)** examined among adolescents the prevalence of neck or shoulder, low back, and arm pain within different socio-demographic groups and the association of neck or shoulder, low back, and arm pain with computer use, physical activity, depression, and stress. The prevalence of neck/shoulder pain was higher among girls and adolescents not living with both parents. The prevalence of low back pain also was higher among girls. Depressive symptoms were associated with neck or shoulder pain, low back pain, and arm pain. The stress experienced was associated with neck or shoulder pain and with low back pain. This study strengthens the findings that musculoskeletal pain is common among adolescents and is associated with depression and stress but not with computer use and physical activity.
16. **Randoll et al (2006)** carries out the National Health Survey for the Federal Republic of Germany from October 1997 to March 1999 among 5315 persons between the ages of 20 and 64 to find the fact that women have a higher prevalence of LBP compared to men. The participants took part in a medical examination and answered a self-report form. chi test and logistic regression analyses were used to investigate correlations between self-reported low back pain and gender-specific biopsychobehavioral and sociophysical environmental factors. They concluded that the seven-day back pain prevalence in the Federal Republic of Germany is 32% for men and 40% for women.

17. **Jones et al (2004)** conducted a cross-sectional survey to provide evidence of the prevalence and consequences of recurrent low-back pain in children from Northwest England. He concluded that low-back pain is a common complaint during childhood and some children experienced the recurrent low-back pain that can lead to disabling consequences. He also suggested that future research should focus on these recurrent low-back pain cases, since these cases lead to disabling consequences.
18. **Nyland and Grimmer (2003)** investigated whether LBP was a problem for undergraduate physiotherapy students. Physiotherapy students should be alerted to the likelihood of LBP and its potential causes during their training, so that they enter the workforce with reduced risk of LBP. The potential for other undergraduate students to suffer LBP should also be considered.
19. **Feldman et al. (2001)** investigated the risk factors for the development of LBP in adolescence. The outcome was low back pain occurrence at a frequency of at least once a week in the previous 6 months. Risk factors associated with development of low back pain were high growth, smoking, tight quadriceps femoris, tight hamstrings and working during the school years. Modifying such risk factors as smoking and poor leg flexibility may potentially serve to prevent the development of low back pain in adolescents.
20. **Hartvigsen (2000)** did a critical review to investigate sitting-while-at-work as a risk factor for low back pain. In conclusion, the extensive recent

epidemiological literature does not support the popular opinion that sitting-while-at-work is associated with LBP.

21. **Loney and Stratford (1999)** had conducted a review of current literature and tried to find the prevalence of low back pain in adults. They suggested that future research on the community prevalence of LBP is needed before an accurate assessment of the societal impact of LBP on society with respect to disability and cost can be determined. They also found that roughly 10 million people are experiencing LBP on any given day. Many of these individuals will need medical care. Thus, it appears justified to contend that further research on the models of care and the effectiveness of treatments for LBP is needed and the more accurate prevalence estimates would aid in the research.

22. **Davidson and Keating (2002)** compared the 5 commonly used questionnaires for assessing disability in people with low back pain. The modified Oswestry Disability Questionnaire, Quebec Back Pain Disability Scale, Roland-Morris Disability Questionnaire, Waddell Disability Index, and SF-36 Physical Functioning scale had been examined and they found that the Modified Oswestry Disability Questionnaire and Quebec Back Pain Disability Scale were the most reliable and had sufficient width scale to reliably detect improvement or worsening in most subjects.

23. **Oslen et al (1992)** assessed the prevalence of low back pain (LBP) in a cohort study of 1242 adolescent (aged 11 to 17) currently participating in a 4-year prospective study of medically treated injuries. Overall, 30.4% of

the adolescents reported LBP. The impact of LBP in adolescents was considerable, with one third resulting in restricted activity and 7.3% seeking medical attention. These results suggest that LBP in adolescents is a serious public health problem.

24. **Chapman CR (1985)** shown that the visual analog scale (VAS) system was shown to be valid and comparable to the other methods while offering several advantages. It brought greater sensitivity and greater statistical power of data collection and analysis by allowing a broader range of responses than traditional categorical responses .it removed bias that was introduced by examiner questioning, and it allowed graphic temporal comparisons. Most importantly, patient's affinity was higher for this type of subjective evaluation.

5 MATERIALS AND METHODOLOGY

5.1 Ethical Approval

The ethical approval in this study was granted by the UTAR Scientific and Ethical Review Committee (SERC).

5.2 Study Design

This research was a cross-sectional study aimed to evaluate the prevalence of low back pain and disability level due to the pain among university students. There was no intervention done in this study. The time frame for this research was in total of seven weeks, which is from 14th October 2013 till 29th November 2013 and a period of three weeks time was used to assess the university students on the prevalence and disability level of low back pain. The research was conducted in University Tunku Abdul Rahman (UTAR) Sg. Long campus.

5.3 Recruitment of Subjects

In this study, convenient sampling method was used to draw participants. A total of 310 undergraduate university students of all races were the target population of this study. The subjects were recruited from the Faculty of Accountancy and Management as well as the Faculty of Medicine and Health

Sciences. All the subjects who met the inclusion criteria were selected. They included the university students who were willing to participate in this study with informed consent and with no other chronic disease at the present time of study, age group between 19 - 24 years, full time undergraduate students as well as both female and male gender. Nevertheless, the ineligibility criteria were those who aged less than 19 and above 24 years, provided inadequate response to questions asked on the questionnaire and the presence of respiratory, kidney, pelvic, gastrointestinal disease, malignancy or any other systemic problem at the time of study. Respiratory, kidney, pelvic, gastrointestinal disease, malignancy or any other systemic problem were also excluded from this study because these problems may indicate a referred pain and not a backache.

5.4 Assessment Measures

The method that applied in order to establish the prevalence of low back pain and disability was by using an Undergraduate Student Health and Safety Questionnaire and Modified Oswestry Low Back Disability Questionnaire. The first questionnaire was a self-administered questionnaire entitled “Undergraduate Student Health and Safety Questionnaire” that enquired the general information on subjects’ demographic profile such as gender, age, respective courses and year of study which was then followed by questions on low back pain history, activity level and educational exposure. The second study instrument was a questionnaire adapted from the Modified Oswestry Low Back Disability Index that was used to measure disability level for those students that presence with back pain. A total of

11 sections of questions were presented in the questionnaire but only 10 sections were graded from 0-5 to assess the degree of pain. The 10 sections of questions consisted of pain intensity, personal care, lifting, walking, sitting, standing, sleeping, social life, traveling, and homemaking whereas the 11th section consisted of a question on the history of previous treatment. An instruction on the scoring system was also included under the appendix D. For each section the total possible score was 5 (except Section 11 which was not included in the scoring): if the first statement was marked, the section score = 0; if the last statement was marked, it = 5. The scores were then added and the final score was expressed as % disability. The final score was interpreted as (1.) (0%-20%) minimum disability, when a patient can cope with most living activities; (2.) (21%-40%) moderate disability, when a patient experiences more pain and difficulty with sitting, lifting and standing and they may be disabled from work; (3.) (41%-60%) severe disability, when a pain remains the main problem; (4.) (61%-80%) crippled, when back pain impinges on all aspects of the patient's life; (5.) (81%-100%) which was bed-bounded or exaggerating indicated that the individual was disabled from most of the activities asked on the questionnaire.

5.5 Procedure

Figure 5.1 below showed the steps in completing our study. This study was conducted in 2 phases. They were the face validity survey and the actual survey. Firstly, the face validity survey using the self administered questionnaire was done among five lecturers from the Faculty of Medical and Health Sciences (FMHS), UTAR Sg. Long Campus. A detailed explanation regarding the study was given to all the lecturers who participated in the face validating study. All the five lecturers have responded well to the questionnaire and proved it to be valid and reliable, thus, indicating the clarity of the questions that were asked. The study instrument was then subjected to reliability testing. The Cronbach's Alpha score was 0.673(Cronbach's Alpha > 0.6) showing that this study instrument was reliable.

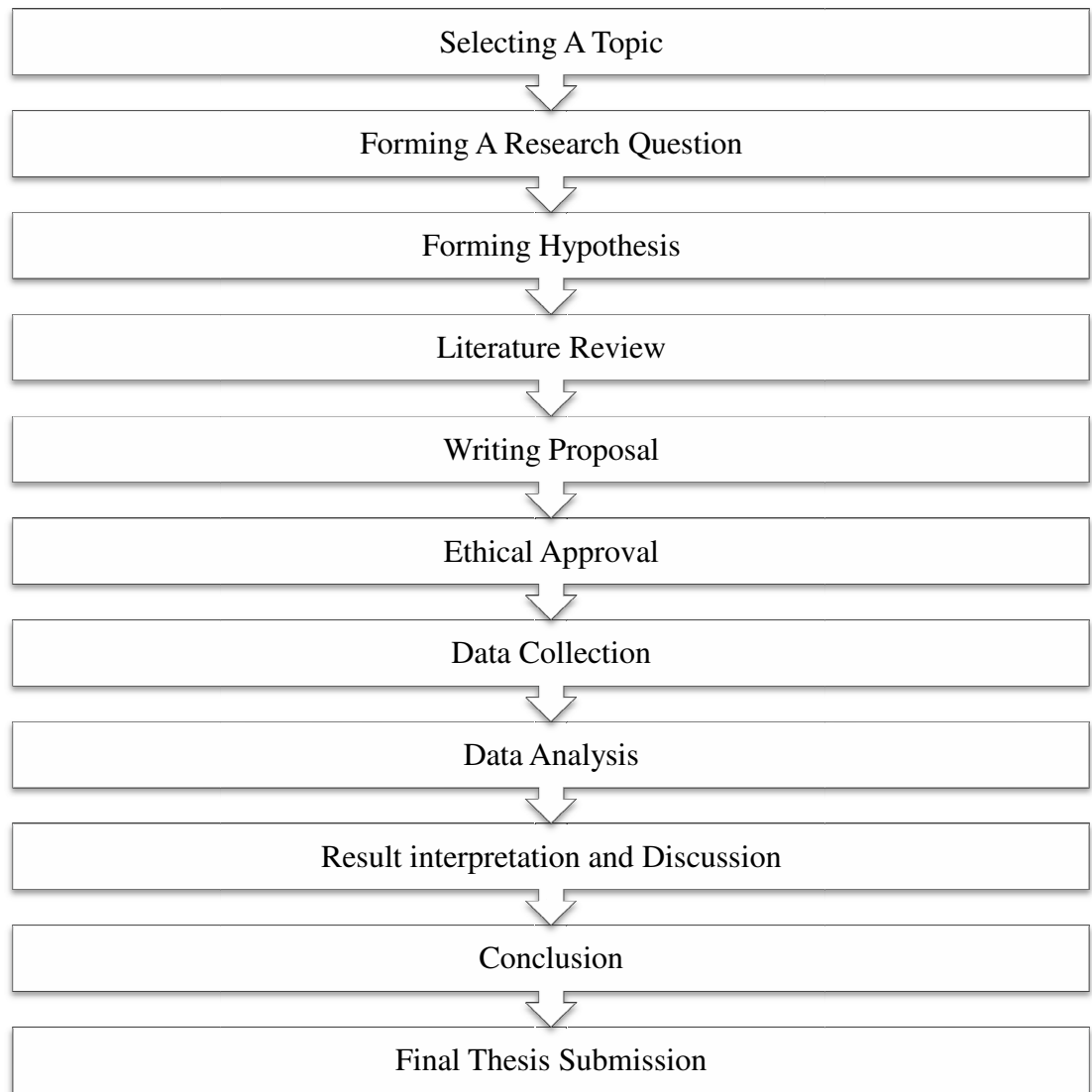


Figure5.1: Flowchart of Research Process.

Secondly, the validated survey was conducted using the validated Undergraduate Student Health and Safety Questionnaire. A detailed explanation regarding the study was given to all the students who participated in this validated study. An informed consent was also obtained from the students prior to participating in this study. Only the subjects who met the inclusion and exclusion criteria were selected to take part in this study. The questionnaire was then distributed to the subjects where they were required to fill the first tool which was the Undergraduate Student Health and Safety Questionnaire. Next, they were given the Modified Oswestry Low Back Disability Questionnaire to complete the study. All the questions were completed by the subjects in the presence of the investigator. The questionnaires were then collected and the subjects received a pamphlet comprising of low back care exercises, the body mechanics of proper lifting techniques as well as proper sitting and standing postures.

5.6 Statistical Methods

Analysis of the data collected was performed using descriptive method and the Statistical Package for the Social Sciences (SPSS) software version 19.0. SPSS software was used to do the descriptive statistics, frequency tables, charts and graphs for each data collected. Mean score was calculated and one sample t-test to analyze the significant of data collected were also done using the SPSS Software.

6 RESULTS

In this study, a total number of 316 questionnaires had given to 316 students. However, 6 students declined to participate in this study. Thus, 310 questionnaires were collected. From a total number of 310 students, 310 of them had given the consent but 1 student provides inadequate response. Thus, 309 students' responses were analysed. The flow of participants was shown in the Figure 6.1 below.

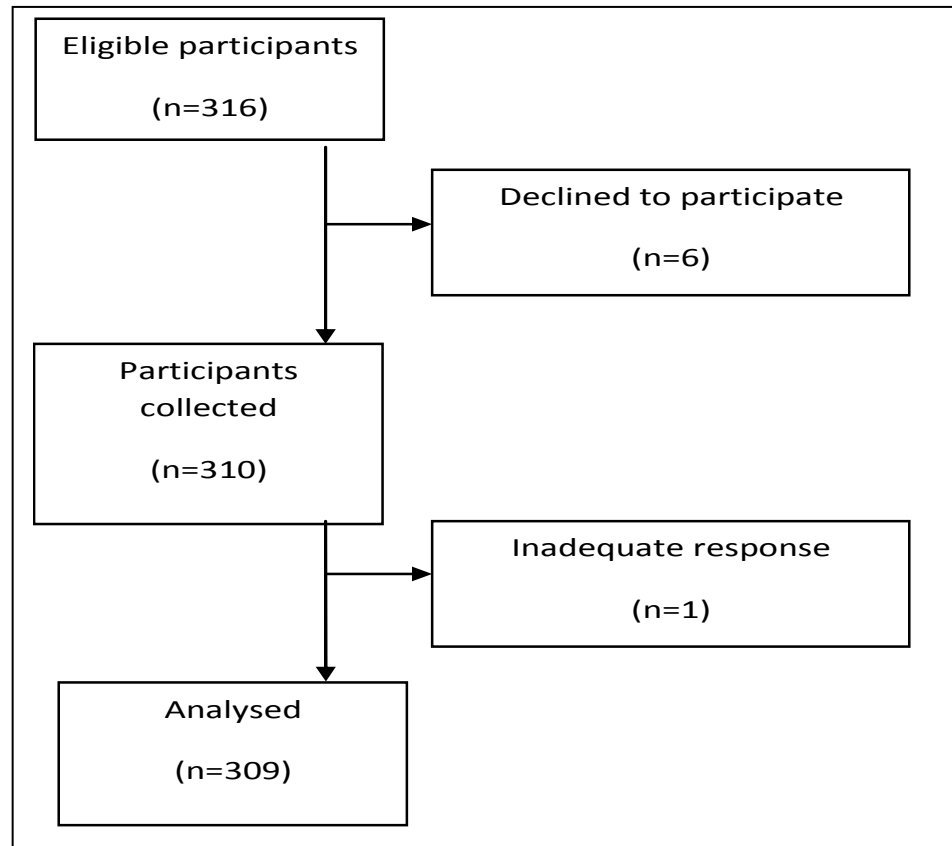


Figure 6.1: The Flow of Participants.

The overall response rate was 99.7% for the questionnaire given to the students. As stated in methodology, for those with LBP were given another questionnaire entitled “Modified Oswestry Disability Questionnaire” in order to achieve our second objectives in this study. Among the students that responded to the first questionnaire, there are 65 of them who had LBP. However, 2 of the students did not answer the second questionnaire. Thus, the response rate for the Modified Oswestry Disability Questionnaire was 96.9%. In this study, the population sample represented 14.5% of the total number of students enrolled into UTAR, Sungai Long campus in the year of 2013. All the students attended university as full time enrolled students. The table 6.1 below shows the response rate in this study.

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Undergraduate Student Health and Safety Questionnaire	309	99.7%	1	0.3%	310	100.0%
Modified Oswestry Disability Questionnaire	63	96.9%	2	3.1%	65	100.0%

Table 6.1: Response Rates of the 2 Questionnaires.

		Frequency	Percent
Valid	No	244	78.7%
	Yes	65	21.0%
	Total	309	99.7%
Missing	System	1	0.3%
Total		310	100.0%

Table 6.2: Prevalence of LBP.

Table 6.2 above shows that 21.0% of the university students in UTAR are having LBP history. Among the 309 respondents, there were 224 females and 85 males. 50 out of 224 females (22.3%) are having LBP history in the past one year which represented the amount of 16.2% of the university students in UTAR. 15 out of 85 males (17.7%) answered YES to the question. This data show that 4.9% of the students that having LBP history in the past one year are male in gender. The following table 6.3 and Figure 6.2 reveal these data.

		LBP		Total
		No	Yes	
Gender	Female	174	50	224
	Male	70	15	85
Total		244	65	309

Table 6.3: Gender and LBP.

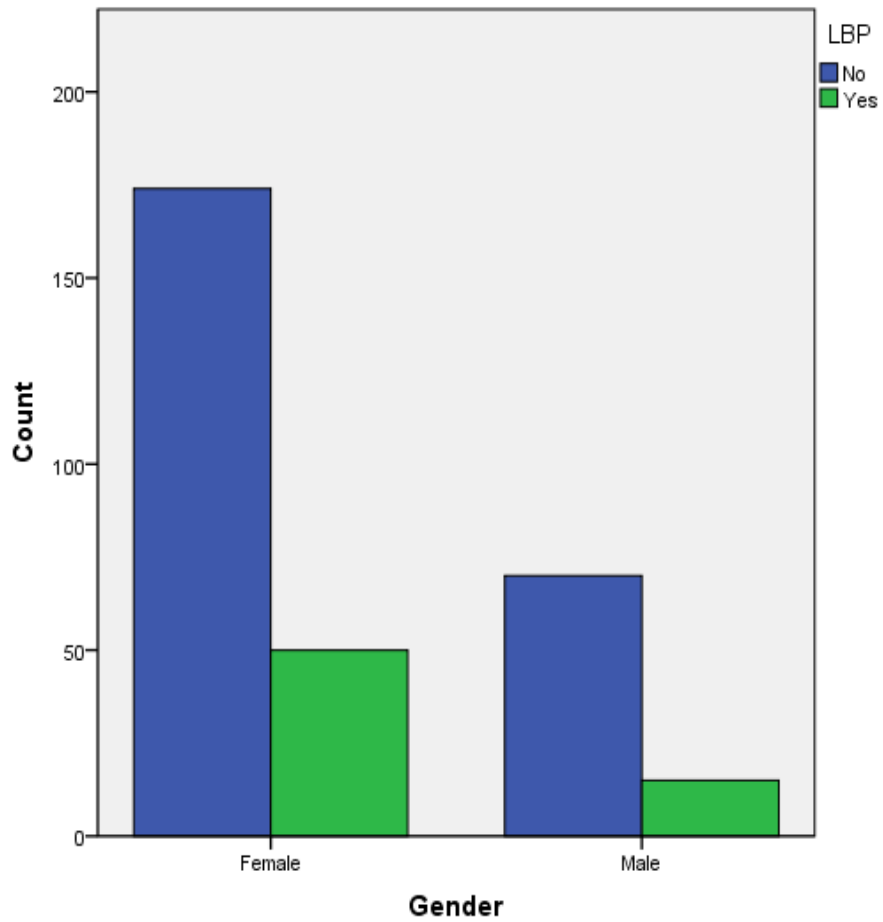


Figure 6.2: Gender and LBP.

The mean age of participants in this research is 20.58 ± 1.14 years old. A total of 77 out of 244 are the highest score for students aged 20 years old reported with absence of low backache while 28 students out of 65 with age 20 years old reported with low backache. The table 6.4 below shows the data on age and LBP.

		LBP		Total
		No	Yes	
Age	19	45	9	54
	20	77	28	105
	21	74	17	91
	22	31	8	39
	23	14	3	17
	24	3	0	3
Total		244	65	309

Table 6.4: Age and LBP.

This study was conducted among the undergraduates from Faculty of Accountancy and Management (FAM) as well as Faculty of Medicine and Health Sciences (FMHS). In FAM, 205 out of 255 students reported with absence of low backache whereas 50 of them claimed to have low back pain. Meanwhile in FMHS, a total of 39 students have no backache but 15 out of 54 of them had reported with low back pain.

		LBP		Total
		No	Yes	
Course	FAM	205	50	255
	FMHS	39	15	54
Total		244	65	309

Table 6.5: Course and LBP.

The table 6.6 and Figure 6.3 below show the year of study and LBP among the university students. Among 127 of Year 1 students, 78.7% (n= 100) of students responded that they had no LBP in the past one year and 21.3% (n=27) of them had LBP. For Year 2 students, 78.1% (n= 75) of them had no LBP while 21.9% (n= 21) of them were suffering from LBP. For Year 3 students, 78.4% (n= 58) had no LBP and 21.6% (n=16) had LBP. 91.7% (n= 11) of year 4 students had no LBP and 8.3% (n= 1) had LBP.

		LBP		Total
		No	Yes	
Year	1	100	27	127
	2	75	21	96
	3	58	16	74
	4	11	1	12
Total		244	65	309

Table 6.6: Year and LBP.

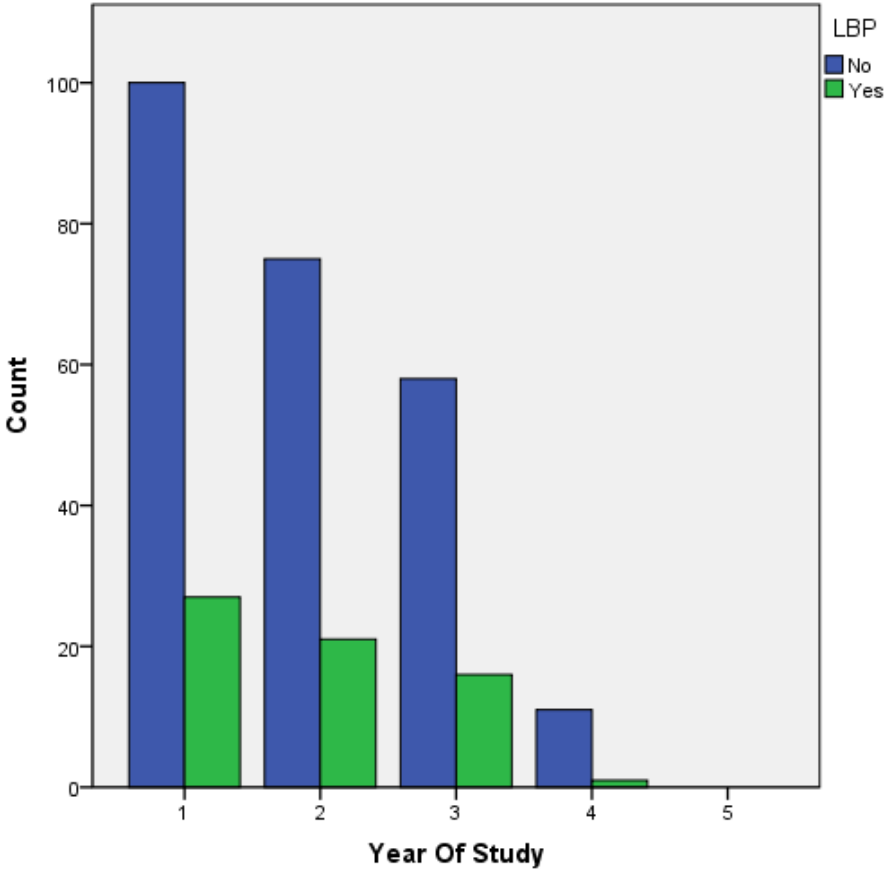


Figure 6.3: Year and LBP.

Statistics

	Q 1	Q 7	Q 9	Q 11i	Q 11ii	Q 11iii	Q 11iv	Q 11v	Q 11vi	Q 11vii	Q 11viii
Valid	66	65	309	309	309	309	309	309	309	309	309
Missing	244	245	1	1	1	1	1	1	1	1	1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	I have low back pain at the moment	9	2.9	13.6	13.6
	During the last week	18	5.8	27.3	40.9
	During the last month	15	4.8	22.7	63.6
	During the past 6 months	12	3.9	18.2	81.8
	During the past 12 months	4	1.3	6.1	87.9
	More than 12 months ago	8	2.6	12.1	100.0
	Total	66	21.3	100.0	
Missing	System	244	78.7		
Total		310	100.0		

Table 6.7: Episodes of LBP.

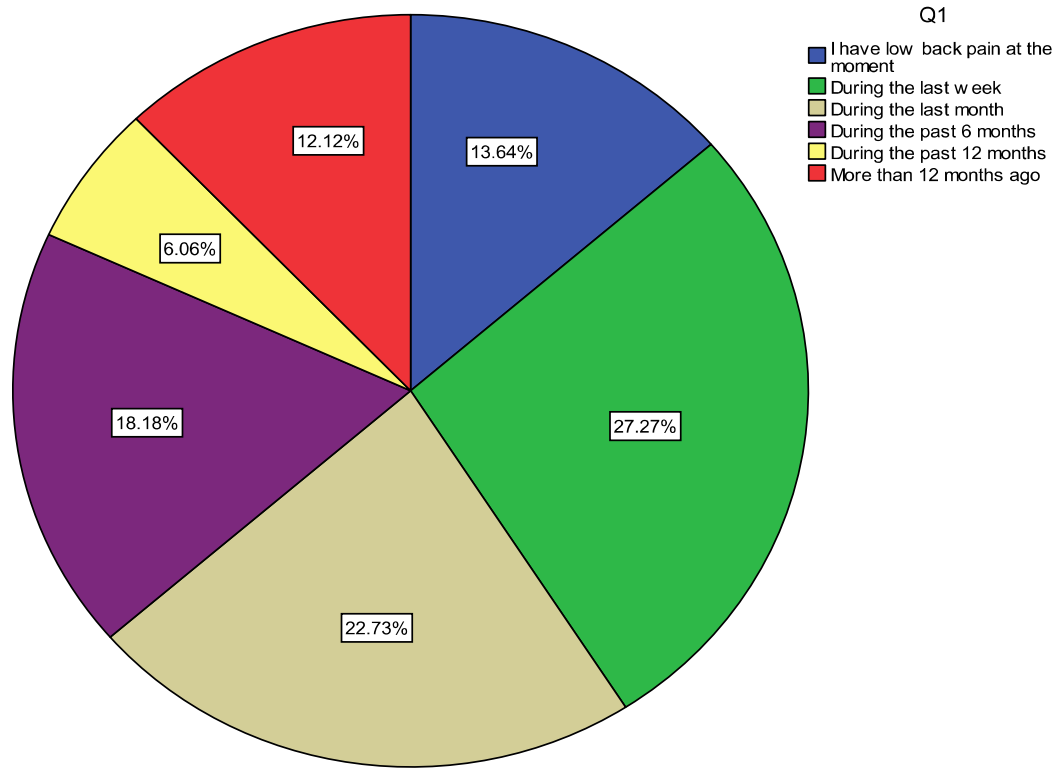


Figure 6.4: Episodes of LBP.

In this question, the respondents were asked about the episodes of LBP. Only those who answered YES to the LBP question was asked to answer this question. However, there was 66 respondents who answering this question. Out of the 66, 1 was rejected due to invalid response. Among the 65 valid responds, 9 (13.6%) of them having LBP at the moment of answering the questionnaire, 18 (27.3%) had LBP in the last week, 15 (22.7%) had LBP in the last month, which is during October 2013, 12 (18.2%) of them had LBP in the past 6 months, which is from April 2013 to September 2013, 4 of the 65 respondents (6.1%) had LBP

history in the past one year and 8 respondents (12.1%) had a LBP history which is more than 12 months ago.

As the table 6.8 below showed, VAS score 1 is reported with 6.6% (n=4), VAS score 2 is reported with 16.4% (n=10), VAS score 3 is reported with 11.5% (n=7), VAS score 4 is reported with 18% (n=11), and VAS scale 5 scored the highest percentage, that is 24.6% (n=15). Meanwhile, VAS score 6 is reported with 9.8% (n=6), VAS score 7 is reported with 6.6% (n=4), VAS score 8 is reported with 3.3% (n=2), whereas for VAS score 9 and 10 each is reported with 1.6% (n=1).

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	4	1.3	6.6	6.6
	2	10	3.2	16.4	23.0
	3	7	2.3	11.5	34.4
	4	11	3.5	18.0	52.5
	5	15	4.8	24.6	77.0
	6	6	1.9	9.8	86.9
	7	4	1.3	6.6	93.4
	8	2	.6	3.3	96.7
	9	1	.3	1.6	98.4
	10	1	.3	1.6	100.0
	Total	61	19.7	100.0	
Missing	System	249	80.3		
Total		310	100.0		

Table 6.8: VAS Score.

Table 6.9 represents the result of types of back pain among students who are having back pain. There are 65 students who had LBP. All the students provided adequate response for this question. Among the 65 students, 10 of the students complained of having continuous LBP while 55 of them complained of having intermittent LBP.

Types of Back Pain	Frequency	Percent	Percent
Continuous	10	3.2%	15.4%
Intermittent			
Total	55	17.7%	84.6%
	65	21.0%	100.0%

Table 6.9: Types of Back Pain.

The result of frequency of LBP episodes among the 65 students is shown in Table 6.10. The overall response rate for this question was 100%. Among them, 6.2% (n=4) of the students reported that they have LBP every day, 10.8% (n= 7) of them reported that LBP occurred one to three times per week and the frequency of LBP episodes of once every 2 weeks was reported by 10.8% (n= 7) of participants. There are 24.6% (n= 16) of students reported having back pain once per month, 27.7% (n= 18) of the students reported LBP occurred in once every three to six months while 20.0% (n= 13) of students reported their LBP as it

happened less than once in 6 months. Thus, from the results, we can see that LBP often occurred once every three to six months among students in UTAR Sg. Long campus.

Frequency of LBP Episodes	Frequency	Percent
Everyday	4	6.2%
One to 3 times per week	7	10.8%
Once every 2 weeks	7	10.8%
Once per month	16	24.6%
Once every 3 to 6 months	18	27.7%
Less than once in 6 months	13	20.0%
Total	65	100.0%

Table 6.10: Frequency of LBP Episodes.

Students had responded on the duration of LBP if it had presented. 66.2% (n=43) of students had responded that LBP lasted for few hours to one day, LBP lasted for 2 to 3 days was reported by 18.5% (n=12) of students, LBP that occurred for 4 to 5 days was reported by 4.6% (n=3) of students, one week was reported by 3.1% (n=2) of students and longer than one week was reported by 7.7% (n=5) of students. The results are shown in table 6.11.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A few hours to 1 day	43	13.9	66.2	66.2
	2 to 3 days	12	3.9	18.5	84.6
	4 to 5 days	3	1.0	4.6	89.2
	one week	2	.6	3.1	92.3
	longer than one week	5	1.6	7.7	100.0
	Total	65	21.0	100.0	
Missing	System	245	79.0		
Total		310	100.0		

Table 6.11: Duration of LBP.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	started spontaneously	10	3.2	15.4	15.4
	MVA	1	.3	1.5	16.9
	Sports injury	15	4.8	23.1	40.0
	Other injury (fall, lifting object)	12	3.9	18.5	58.5
	don't know	25	8.1	38.5	96.9
	can't remember	2	.6	3.1	100.0
	Total	65	21.0	100.0	
Missing	System	245	79.0		
Total		310	100.0		

Table 6.12: Causes of LBP.

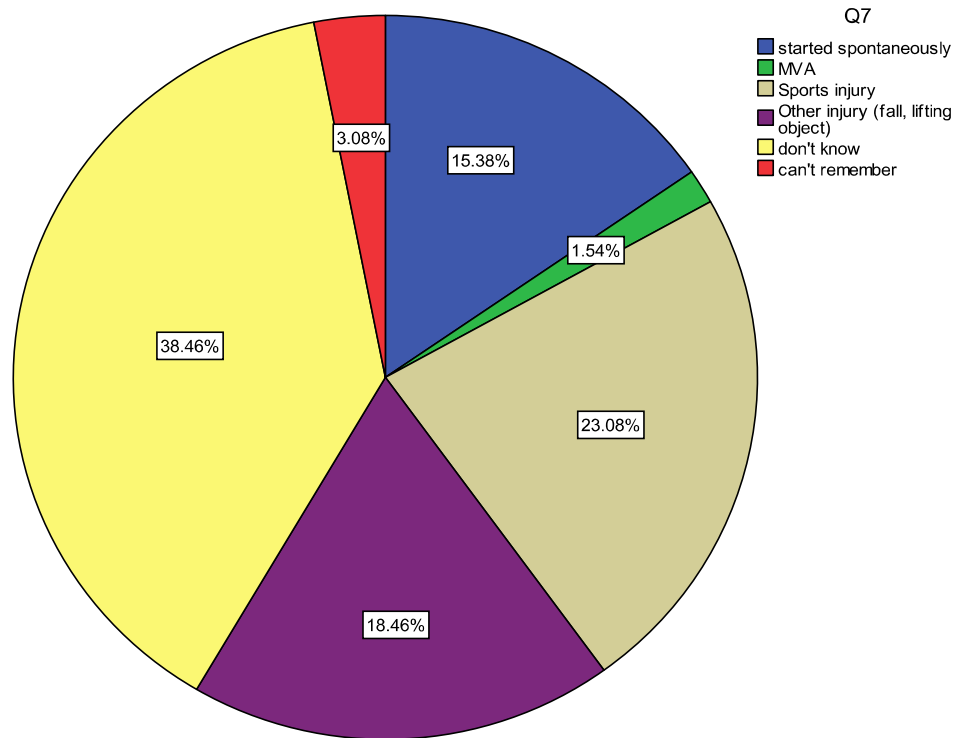


Figure 6.5: Causes of LBP.

From the collected data, we found that most of the students in UTAR were unaware about the cause of the LBP as 38.5% of them answered DON'T KNOW to this question. 15.4% of LBP started spontaneously, 1.5% was due to MVA, 23.1% of the students having LBP because of the sports injuries and 18.5% having LBP history as they hurt their back when falling or lifting objects. 2 respondents (3.1%) were unable to recall the causes of their LBP.

Furthermore, it is found that 8.1% (n=25) of students in UTAR never exercise, 54% (n=167) students exercise less than 1 time per week, 31.4% (n=97)

of students exercise 2-3 times per week, 4.9% (n=15) of students exercise 4 to 5 times per week and 1.6% (n=5) of students exercise more than 5 times per week.

The table 6.13 below shows the results.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	never	25	8.1	8.1	8.1
	<1 time per week	167	53.9	54.0	62.1
	2-3 times per week	97	31.3	31.4	93.5
	4 to 5 times per week	15	4.8	4.9	98.4
	>5 times per week	5	1.6	1.6	100.0
	Total	309	99.7	100.0	
Missing	System	1	.3		
Total		310	100.0		

Table 6.13: Frequency of Activities.

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid never	25	8.1	8.1	8.1
< 30minutes	112	36.1	36.2	44.3
30minutes	79	25.5	25.6	69.9
45minutes	33	10.6	10.7	80.6
60minutes	32	10.3	10.4	90.9
90minutes or more	28	9.0	9.1	100.0
Total	309	99.7	100.0	
Missing System	1	.3		
Total	310	100.0		

Table 6.14: Duration of Activity.

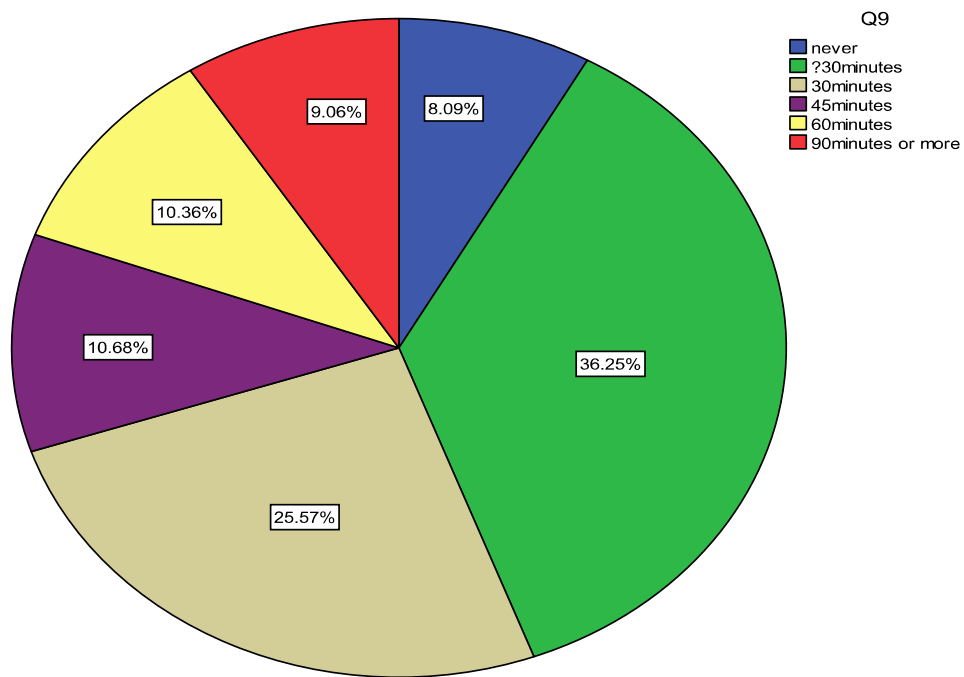


Figure 6.6: Duration of Activity.

The respondents were asked about the intensity of exercise in a session. All the 310 respondents were asked to answer this question. However, 1 of the answer was rejected due to inadequate response. Among the 309 valid data, 8.1% (n=25) does not exercise, most of the students which is 36.2% (n=112) exercise less than 30 minutes per session, 25.6% (n=79) spend 30 minutes to exercise in a session, 10.7% (n=33) and 10.4% (n=32) of them spend 45 and 60 minutes respectively. There are only 28 of the 309 respondents (9.1%) spend at least 90 minutes for the physical exercise in a session.

Activities	Frequency of Activities						Total	%
	None	Once every 2 weeks	1-2 times/ week	3 times/ week	4-5 times/ week	> 6 times/ week		
In class (sitting)	4	6	9	22	128	140	309	99.68
Studying	13	19	55	63	97	60	307	99.03
Work on computers	2	5	20	49	68	165	309	99.68
Watch television/ movies	29	47	68	50	46	69	309	99.68
Lying down	8	11	35	47	44	163	308	99.35
Reading	18	37	61	78	63	52	309	99.68
Sitting	2	4	11	48	54	190	309	99.68
Sleeping during the day	30	43	60	53	39	83	308	99.35

Table 6.15: Frequency of Activities Done.

Meanwhile, the table 6.15 above showed the results of students rating the activities above in respect to the frequency they do these activities. The overall response rates for each activity are stated as above in percentage. The results shown that there are 1.29% (n= 4) of students reported that they did not sit in the class, 1.94% (n= 6) of students reported that they did sit in class for once every 2

weeks time while 2.91% (n= 9) of students reported that they sat in class 1 to 2 times per week. Sitting in class for 3 times per week was reported by 7.11% (n= 22) of students and for 4 to 5 times per week of sitting in class, it was reported by 41.42% (n= 128) of students. 45.3% (n= 140) of students reported that they spent more than 6 times per week sitting in class.

For studying, 4.23% (n= 13) of students reported that they did not study, 6.19% (n= 19) of students reported that they study for once every 2 weeks time and 17.91% (n= 55) of them reported that they study for 1 to 2 times per week. Studying for 3 times per week was reported by 20.52% (n= 63) of the students, 4 to 5 times per week of studying was reported by 31.60% (n= 97) and more than 6 times per week was reported by 19.54% (n= 60) of students.

Besides that, 0.65% (n= 2) of students reported that they did not work on computers, 1.62% (n= 5) of them reported that they works on computer for once every 2 weeks time, 6.47% (n= 20) of them reported they spent 1 to 2 times per week to work on computers. Working on computers for 3 times per week, 4 to 5 times per week and more than 6 times per week were reported respectively by 15.86% (n= 49), 22.00% (n= 68) and 53.40% (n= 165) of students.

9.39% (n= 29) of students reported that they did not watch televisions or movies while 15.21% (n= 47) of them reported that they watched once every 2 weeks time and 22.01% (n= 68) of them reported that they watched 1 to 2 times per week. Those who reported that they spent 3 times per week, 4 to 5 times per

week and more than 6 times per week on watching televisions or movies were 16.18% (n= 50), 14.89% (n= 46) and 22.33% (n= 69) of students respectively.

For lying down, 2.56% (n= 8) of students reported that they did not laid down, 3.57% (n= 11) reported they laid down for once every 2 weeks time and 11.36% (n= 35) reported that they laid down for 1 to 2 times per week. 15.26% (n= 47) of students reported that they lay down for 3 times per week, 14.29% (n= 44) of them laid down for 4 to5 times per week and 52.92% (n= 163) of them laid down for more than 6 times per week.

5.83% (n= 8) of students reported that they did not read, 11.97% (n= 37) of them reported that they read once every 2 weeks and 19.74% (n= 61) reported that they read 1 to 2 times per week. Reading for 3 times per week, 4 to 5 times per week and more than 6 times per week were reported by 25.24% (n= 78), 20.39% (n= 63) and 16.83% (n= 52) of students respectively.

For normal sitting other than in class, 0.65% (n= 2) of students reported that no sitting was done, 1.29% (n= 4) reported that they sat once every 2 weeks, 3.56% (n= 11) reported they sat for 1 to 2 times per week, 15.53% (n= 48) reported that they sat for 3 times per week, 17.48% (n= 54) reported that they sat for 4 to 5 times per week and 61.49% (n= 190) reported that they sat for more than 6 times per week.

9.74% (n= 30) of students reported that they did not slept during the day, 13.96% (n= 43) reported that they slept once every 2 weeks times during the day, 19.48% (n= 60) of them reported that they slept for 1 to 2 times per week during

the day, 17.21% (n= 53) reported that they slept for 3 times per week during the day, 12.66% (n= 39) of them reported that they slept during the day for 4 to 5 times per week and 26.95% (n= 83) of them reported that they slept for more than 6 times per week during the day.

Activities	Duration						Total	%
	None	<30 mins	30 mins	45 mins	60 mins	90 mins / more		
In class (sitting)	4	2	7	20	76	200	309	99.7
Studying	13	26	53	67	82	68	309	99.7
Work on computers	2	8	20	31	57	191	309	99.7
Watch television/movies	26	34	35	38	81	95	309	99.7
Lying down	10	34	49	39	55	122	309	99.7
Reading	25	29	70	77	63	45	309	99.7
Sitting	4	9	40	43	54	158	309	99.7
Sleeping during the day	21	35	42	36	55	120	309	99.7

Table 6.16: Durations of Activities Done.

According to the analysed data, it is shown that 1.3% (n= 4) of the students reported that they did not sitting in class, 0.6% (n= 2) of students reported that they did sitting in class less than 30 minutes per session while 2.3% (n= 7) of students reported that they sat in class for 30 minutes per session. Sitting in class for 45 minutes per session was reported by 6.5% (n= 20) of students and 60 minutes was reported by 24.6% (n= 76) of students.64.7% (n= 200) of students reported that they spent at least 90 minutes for sitting in class in a session.

For studying, 4.2% (n= 13) of students reported that they did not study, 8.4% (n= 26) of students reported that they study mot more than 30 minutes per session and 17.2% (n= 53) of them reported that they study for 30 minutes per session. Studying for 45 minutes was reported by 21.7% (n= 67) of the students, 60 minutes of studying per session was reported by 26.5% (n= 82) students and 90 minutes or more was reported by 22% (n= 68) of students.

Other than that, 0.6% (n= 2) of students reported that they did not work on computers, 2.6% (n= 8) of them reported that they works on computer not more than 30 minutes each time, 6.5% (n= 20) of them reported they spent 30 minutes to work on computers in a session. Working on computers for 45 minutes, 60 minutes and 90 minutes or more in a session were reported respectively by 10% (n= 31), 18.4% (n= 57) and 61.6% (n= 191) of students.

Furthermore, out of the 309 students, 8.4% (n= 26) of them reported that they did not watch televisions or movies while 11% (n= 34) of them reported that they watched less than 30 minutes in a session and 11.3% (n= 35) of them

reported that they watched 30 minutes in a session. Those who reported that they spent 45 minutes, 60 minutes and more than 90 minutes on watching televisions or movies in a session were 12.3% (n= 38), 26.2% (n= 81) and 30.7% (n= 95) of students respectively.

For lying down, 3.2% (n= 10) of students reported that they did not laid down, 11% (n= 34) reported they laid down for less than 30 minutes each time and 15.9% (n= 49) reported that they laid down for 30 minutes per session. 12.6% (n= 39) of students reported that they laid down for 45 minutes, 17.8% (n= 55) of them laid down for 60 minutes and 39.5% (n= 122) of them laid down for at least 90 minutes in a session.

In addition, 8.1% (n= 25) of students reported that they did not read, 9.4% (n= 29) of them reported that they read less than 30 minutes per session and 22.7% (n= 70) reported that they spent 30 minutes for reading in a session. Reading for 45 minutes, 60 minutes and more than 90 minutes per session were reported by 24.9% (n= 77), 20.4% (n= 63) and 14.6% (n= 45) of the respondents respectively.

For normal sitting other than in class, 1.3% (n= 4) of students reported that they doesn't sit at all, 2.9% (n= 9) reported that they sat less than 30 minutes, 12.9% (n= 40) reported they sat for 30 minutes per session, 13.9% (n= 43) reported that they sat for 45 minutes in each session, 17.8% (n= 55) reported that they sat for 60 minutes and 51% (n= 158) reported that they spent at least 90 minutes for sitting in a session.

Among of the 309 valid response, 6.8% (n= 21) of students reported that they did not slept during the day, 11.3% (n= 35) reported that they slept less than 30 minutes, 13.6% (n= 42) of them reported that they slept for 30 minutes during the day, 11.7% (n= 36) reported that they spending 45 minutes to sleep during the day, 17.8% (n= 55) of them reported that they slept during the day 1 hour in a session and most of them, 38.8% (n= 120) of them reported that they slept for 90 minutes or more during the day.

The figure below shows the LBP disability level among university students. Among the 65 students, 2 students provide inadequate response. Thus, the total number of people included in this disability study is 63 students that suffered from LBP. 87.3% (n= 55) of students had minimal disability (scoring of 0% to 20%) due to LBP while 12.7% (n= 8) of students had moderate disability (scoring of 21% to 30%) due to LBP.

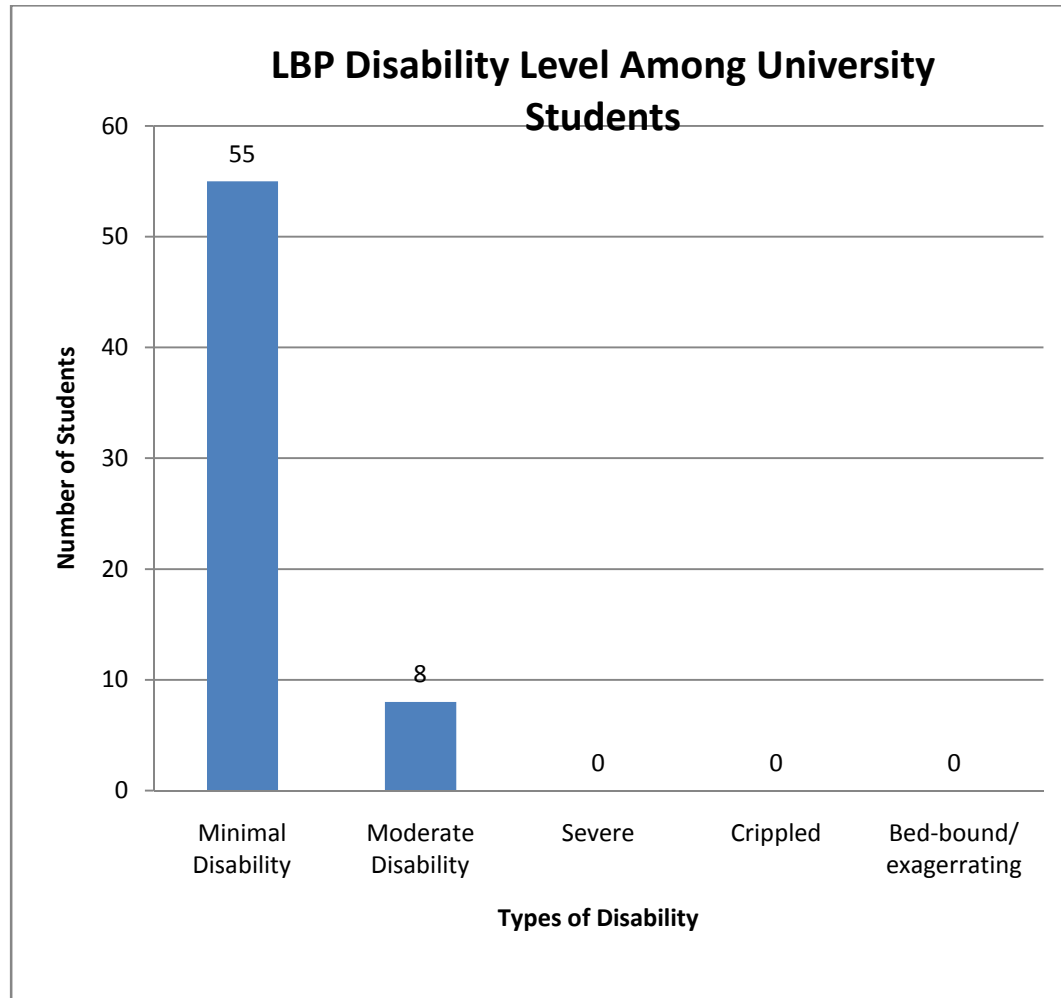


Figure 6.7 : LBP Disability Level among University Students.

	Test Value = 0					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Pain Intensity	4.047	62	.000	.492	.25	.74
Personal Care	2.609	62	.011	.143	.03	.25
Lifting	6.241	62	.000	.810	.55	1.07
Walking	3.215	62	.002	.238	.09	.39
Sitting	6.640	62	.000	.762	.53	.99
Standing	5.478	62	.000	.524	.33	.71
Sleeping	2.531	62	.014	.270	.06	.48
Social Life	3.694	62	.000	.397	.18	.61
Travelling	2.946	59	.005	.333	.11	.56
Homemaking	6.183	58	.000	.525	.36	.70

Table 6.17 : One Sample T-test of Modified Oswestry Disability Questionnaire.

The result displayed in table above indicated that all the activities stated in the questionnaire were interfered with to varying degrees with lifting as the most affected activity with a mean score of 0.81. Then, it is followed by sitting (0.76), homemaking (0.53), standing (0.52) and their pain intensity (0.49). Social life had a mean score of 0.40 while travelling had a mean score of 0.33. Sleeping mean score was 0.27, walking was 0.24 and personal care was 0.14.

7 DISCUSSION

The main findings that are discussed in this study are the prevalence of low back pain, the disability level among university students due to LBP and the association between gender and low back pain.

The findings regarding the prevalence of low back pain (LBP) in different age group, course and year of study, the LBP history such as the intensity and causes of pain, the possible factors of LBP associated with exercise level and associations with educational exposure will also be compared with literature and discussed accordingly.

At last, the limitations and recommendations for the future study on the same or similar topic are discussed.

7.1 Response rates

The response to the 2 survey questionnaires, the 'Undergraduate Students Health and Safety Questionnaire' and the 'Modified Oswestry Disability Questionnaire' was high as the overall response rate was 99.7% and 96.9%, however, the third and fourth year student response being attenuated as most of them are out of the campus for internship at the time of our data collection. Besides that, there is no any fifth year student enrolled to this campus. Therefore, we are suggesting that there is no systematic bias in respondents.

7.2 Prevalence

Several studies which was conducted previously by other researcher found out that there is a high prevalence of low back pain among university students (Alshagga, Nimer, Looi, Ibrahim, Al Ghandi and Al-Dubai, 2013; Moroder, Runer, Resch and Tauber, 2011; Gilkey, Keefe, Peel, Kaasab and Kennedy, 2010). All those studies supported our study as our study revealed that the prevalence of low back pain among university students in UTAR Sg. Long campus is high. Hence, the alternate hypothesis was accepted. Among the total of 99.7% (n=309) of sample size involved in this study, 79% (n=244) of students reported absence of low back pain whereas 21% (n=65) of students reported that they were having low back pain.

7.3 Prevalence of LBP Associated with Gender, Age, Course and Year of Study

Prevalence of LBP within the past one year in the study group of the university students in UTAR Sg. Long Campus students was found to be 21.04%. The prevalence for male (4.85%) was significantly lower than the 16.18% of female in the study. In the research article that titled 'Why do women have back pain more than men? A representative prevalence study in the federal republic of Germany' by Schneider, Randoll and Buchner in 2006 stated that women have a higher prevalence of back pain. This survey study was carried out from October 1997 to March 1999. It comprised a total sample of 5315 persons between the ages of 20 and 64. The result showed that back pain prevalence in the Federal

Republic of Germany is 32% for men and 40% for women and is higher for those overweight subjects, persons with low level of social support, physically inactive individuals, smokers and elderly subjects. Other than that, several research studies also revealed that, women are more affected by LBP than men (Sikiru&Hanifa, 2010; Vindigni et al., 2005; Omokhodion et al., 2000; Macarthur et al., 1997).

It was found out that the prevalence of low back pain among UTAR students with/whose age 20 was 26.7% (n=28) and with age 21 was 18.7% (n=17). The result of this research was very much comparable with a literature review. According to Nyland and Grimmer (2013) who investigated whether low back pain was a problem for undergraduate physiotherapy students, being aged 20 or 21 years was a significant contributor to the prevalence of low back pain as 20 to 21 year old students would be in their final year of physiotherapy program, thus, the findings contributed with the increased risk of low back pain for the fourth year students compared with students in the first year.

In this study, it was found out that the prevalence low back pain among students from FAM course was 19.6% (n=50) whereas the prevalence of low back pain among students from FMHS course was 27.8% (n=15). This is supported by with a literature review. Alshagga et al (2013) had conducted a research on the prevalence and factors associated with neck, shoulder and low back pains among medical students in a Malaysian Medical College. They revealed that musculoskeletal pain among medical students was considerably high and their study results indicate that medical school authorities should take actions to prevent musculoskeletal pain due to factors related to medical school. FMHS

students were having high prevalence of low back pain because they were continuously experiencing stress, study problems and lengthy training hours in hospitals especially during their medical posting.

In contrast to some of the findings of Nyland and Grimmer (2003), our study did not fully support by the statement “the risk of LBP for students in year 2 to year 4 was significantly greater compared to the first year student.” We found that the year 2 undergraduate students have the highest prevalence of LBP of 21.89%. However, this is then followed by the year 3(21.63%), year 1(21.26%) and the year four (8.33%) student.

7.4 LBP History

Low back pain can be categorised into chronic and acute according to the duration of the pain occurrence. Acute pain always starts suddenly and usually lasts only for few days to weeks while chronic pain always persists for several weeks, months or even years. From the result, we found that most of university students (66.2%) in UTAR Sg. Long Campus claimed that the LBP had persisted for few hours to one day. Hence, we conclude that most of the students were having acute low back pain.

Pengel et al (2003) concluded that people with acute low back pain usually associated with mild to moderate disability level and it will improve rapidly within weeks. Nonetheless, the recurrence of the pain and disability are common in the research study which titled ‘acute low back pain: systematic review of its

prognosis'. According to Croft (1998), their study shown that 90% of the low back pain that present to general practice has resolved within one month.

From the collected data, we found that the most common causes of LBP among university students in UTAR Sg. Long are injuries such as the sports injury or they hurt their back when falling or lifting objects. Thus, the sport activities, wrong lifting techniques were believed to be associated with low back pain amongst the students and identified as a risk exposure. Pope (1989) said that Injuries leading to low back pain can occur by direct trauma, overexertion or repetitive trauma. Overexertion is claimed by most of low back pain patients as the cause of injury. Of these patients with overexertion injuries, 66% implicated lifting and 20% pushing or pulling. We also realised that most of the students in UTAR were unaware about the causes of the LBP as 38.5% of them do not know how and why the pain occur.

7.5 Risk Factors of LBP Associated with Exercise Level and Educational Exposure

This research has also focused on the activity level of students in UTAR. It was found that 54% (n=167) of students in UTAR exercise less than one time per week and 36.2% (n=112) of students performed exercise in less than 30 minutes per session. Therefore, the prevalence of low back pain among students was high as they were being physically inactive. Heneweer et al (2009) assessed physical activity and low back pain: a U-shaped relation. They found that a moderate increased risk for chronic low back pain with a sedentary lifestyle and

those who are being engaged in physical strenuous activity. There was another literature, Holth et al (2008) assessed physical inactivity was associated with chronic musculoskeletal complaints 11 years later: results from the Nord-Trondelag Health Study. They found out that the prevalence of chronic musculoskeletal complaints were lower ($p=0.005$) among active individuals compared to inactive individuals. Besides that, individuals who exercise more than once a week had approximately 20% lower prevalence of chronic musculoskeletal complaints than inactive individuals. This was especially true where 31.4% ($n=97$) of students in UTAR exercise 2-3 times per week. Meanwhile, Vuori (2001) investigated the dose-response of physical activity and low back pain, osteoarthritis, and osteoporosis. He found out that physical activity can be essential in preventing LBP but prolonged, heavy loading can lead to LBP. As for susceptible individuals, extended, repetitive and heavy physical activity at work or in sports can cause LBP.

Exposure to the educational activity of 'working on computer' for more than 6 days per week and at least 90 minutes in a session was most significantly associated with reports prevalence of LBP. 53.4% of the students claimed that they are working on computer more than 6 days in a week and 61.6% of them using the computer for at least 90 minutes in a session. Hakala (2005) found that a frequent computer-related activity which is more than 5 hours is an independent risk factor for NSP and LBP.

Other than that, 'Sitting in class' and 'Studying' for more than 15 hours in a week were also associated with the prevalence of LBP. This may be due to the

prolonged sitting, sitting with in wrong postures and the poor ergonomics design of the chair. However, Hartvigsen (2000) reviewed to 35 reports, 8 studies were found to have a clear definition of LBP and a clear association between sitting-while-working and LBP, 1 of studies associated sitting in a poor posture with LBP.

Sleeping and lying down are the activities that will be performed every day, these activities seems less likely to cause LBP among university students in UTAR Sg. Long campus. We believed that this is because of the quality of the mattress that used. However, Kovacs (2003) wrote in the article, 'Effect of firmness of mattress on chronic non-specific low-back pain: randomised, double-blind, controlled, multicentre trial', there was no evidence on the use of mattresses for the back pain.

There was no association found between LBP and watching television or movies, frequency and hours of leisure sitting and reading.

7.6 LBP Disability Level among University Students

From the Modified Oswestry Disability Questionnaire, we can see that overall the university students in this campus had minimal disability. However, lifting is the most disrupted activity among all as the result showed the highest points given by the students. The disability may be due to the spinal loads that increase when lifting is done. Marras et al. (2004) found out that spinal load is greater in patients with LBP compared with asymptomatic individuals when

performing similar lifting exertions. Not only that, they also found out that spinal loading during lifting also depends on the lifting origin location and the weight of object lifted. Thus, due to the spinal loads, back pain increases and causes lifting to be difficult in individuals with LBP. Another reason is that due to the improper lifting techniques adopted by the students. Although so far none of the researchers had conducted a study on awareness of lifting techniques among students, but we believed that there is a low awareness on proper lifting techniques among students. The improper techniques in lifting causes back pain in students. Thus, it is important to teach lifting techniques to the students.

Social life and travelling is another two activities disrupted due to LBP. In an article by Strunin et al (2004), they found out that their social lives with family and work is highly disrupted. Thus, same problem also happened among the students with LBP but the students are able to manage their pain well. Difficulty in travelling may be due to prolonged sitting, standing, and the use of backpack and other associated factors that increases the spinal loads on the low back. Heuscher (2010) investigated the use the association of back pack use and back pain among students and their results showed that there is a significant association with back pack weight and back pain. As travelling normally requires the usage of a back pack, it is not surprised that travelling is one of the disability caused by LBP.

Sitting and standing are another two disrupted activities. The reason behind it may be prolonged sitting and standing with the improper posture that causes a different spinal loading pattern. In 2005, a study done by O' Sullivan

showed that prolonged sitting is the common aggravating factor in individuals with LBP. In another study by O' Sullivan in 2012 in which they investigated the best sitting spinal posture considered by the physiotherapists, the result showed that a relatively neutral spine sitting posture with lordosis mainly in the lumbar spine and with relaxation of the thoracic spine was the best posture among all. This shows that sitting posture is important for the students to avoid LBP as well as preventing disability.

Low back disability also causes the changes in standing posture. Wong et al. (2008) stated that there is a presence of agonist-antagonist muscle co-activation in people who reported LBP. One known consequences is a commensurate increase in spinal loading. Thus, students who are having LBP are more likely to have standing disability.

We can see that sleeping, walking and personal care are very less disrupted. This may be due to they are able to tolerate their pain without having to use pain medication and able to take care of themselves without increased pain. In this study, LBP was not a significant cause of disability particularly affecting the student's lifestyle in UTAR, Sg. Long campus although the prevalence is high among the university students. However, this may have a complication in their study and daily activities as most of the time students spent their time in doing all these activities.

7.7 Limitations

In this study, there is a lack of a detailed history regarding LBP in the questionnaire. The risk factors that may lead to LBP among university students were not clearly asked. Hence, the most common or possible causes of LBP among university students in UTAR Sg. Long campus may not be accurate.

The use of the Undergraduate Students Health and Safety Questionnaire required the participants to remember and indicate the history such as duration, intensity and possible causes of the LBP. Therefore, the accuracy of the recalled information cannot be guaranteed as some of them may be not sure or unable to recall regarding their LBP.

Besides that, convenience sampling method was used in this survey study. Although the study sample was obtained from both of the faculties in UTAR Sg. Long Campus, these collected sample might not be representative enough to generalize the findings of the study to the entire population in UTAR Sg. Long Campus as only 14.49% (310 out of 2149) of the students were participated in the study. In addition, most of the samples that we collected were the first and second year student as most of the third and fourth year students were not available in the campus due to their internship. This may cause the bias in respondents and affects the consistency or accuracy of the results.

In terms of study design, it would be more preferable to conduct this type of prevalence study on a cohort of students progressing from first to final year rather than carry out a cross-sectional prevalence study in which it is more

difficult to establish the risk factors or to get reliable information on the history of LBP (Abramson and Abramson, 2000).

7.8 Recommendations

In a study that carried out in UK by The Chartered Society of Physiotherapy (2006), many students believed that they were not at risk and they were always readily prepared and trained to avoid themselves from the LBP injuries. However, LBP appears to be a common issue for university students. Therefore, it is important to identify the causes and risk factors of LBP. The university students should be aware of the appropriate preventative steps and treatment of LBP to reduce the risks getting of LBP. Hence, the future study on the similar topic should be more emphasis on the causes, risk factors and preventions of LBP in students without the history LBP. There should be a development of risk factors assessment tools or questionnaire that can help to identify the specific exercise or educational and exposure hazards for the university students. The education on the correct postures, ergonomics and safety activities should be emphasised, in order to make the students more aware and to better equip them to protect themselves from LBP.

8 CONCLUSION

The overall prevalence of low back pain among university students in UTAR Sg. Long campus was high, with female gender having the highest prevalence of low back pain compared to males. The overall disability level among university students due to LBP was minimal. It is recommended that the future study on the similar topic should be more emphasis on the causes, risk factors and preventions of LBP in students without the history LBP. There should be a development of risk factors assessment tools or questionnaire that can help to identify the specific exercise or educational and exposure hazards for the university students.

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APPENDICES

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Appendix A

Ethical Approval Letter

 **UNIVERSITI TUNKU ABDUL RAHMAN**
Wholly Owned by UTAR Education Foundation (Company No. 57K227-M)

8 November 2013

Mr Deivendran Kalirathinam
Department of Physiotherapy
Faculty of Medicine and Health Sciences
Universiti Tunku Abdul Rahman
Jalan Sungai Long
Bandar Sungai Long
43000 Kajang
Selangor

Dear Mr Deivendran,

Ethical Approval For Research Project/Protocol

We refer to your application dated 29 October 2013 for ethical approval for your research project and are pleased to inform you that your application has been approved under expedited review.

The details of your research project are as follows:

Research Title	The Prevalence of Low Back Pain among University Students
Investigator(s)	Mr Deivendran Kalirathinam (PI) Lim Chia Voon (UTAR Student) Sharanjit Kaur (UTAR Student) Tan Chiew Ling (UTAR Student)
Research Area	Medical and Health Sciences
Research Location	UTAR Sg Long Campus
Research Costs	Self-funded
Approval Validity	2013 – 2014

The conduct of this research is subject to the following:

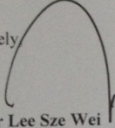
- (1) The participants' informed consent have to be obtained prior to the commencement of the research.
- (2) Confidentiality of participants' personal data must be maintained; and
- (3) Compliance with procedures set out in related policies of UTAR such as the UTAR Research Ethics and Code of Conduct, Code of Practice for Research Involving Humans and other related policies/guidelines.

The University wishes you all the best in your research.

Address: 9, Jalan Bersatu 13/4, 46200 Petaling Jaya, Selangor Darul Ehsan, Malaysia Postal Address: P.O Box 11384, 50744 Kuala Lumpur, Malaysia
Tel: (603)7958 2628 Fax: (603) 7956 1923 Homepage: <http://www.utar.edu.my>

Thank you.

Yours sincerely


Professor Dr Lee Sze Wei
Chairman
UTAR Scientific and Ethical Review Committee

c.c Dean, Faculty of Medicine and Health Sciences
Director, Institute of Postgraduate Studies and Research

Appendix B

Consent Form for Participation in a Research Study

<p>1. Investigator's Name :</p>	<p>Lim Chia Voon (10UMB04713)</p> <p>Sharanjit Kaur (11UMB07256)</p> <p>Tan Chieu Ling (11UMB07512)</p>	<p>Faculty : FMHS – Physiotherapy</p>
<p>Title of research project :</p> <p>Purpose of study :</p> <p>Procedure :</p> <p>Risk and Discomfort :</p> <p>Benefit :</p>	<p>The Prevalence of Low Back Pain and Disability among University Students: A Cross-Sectional Study</p> <p>This research study aimed to investigate the prevalence of low back pain and the disability level among students in Universiti Tunku Abdul Rahman (UTAR), Sungai Long Campus.</p> <p>We are giving a detailed explanation regarding this study to you. We are obtaining your consent prior to participating in this study. Only those who meet the inclusion and exclusion criteria will be selected to take part in this study. The questionnaire is given to you where you are required to fill the first tool which is the self-administered questionnaire entitled “Undergraduate Student Health and Safety Questionnaire”. Next, you are given the Modified Oswestry Low Back Disability Questionnaire to complete the study if you are having low back pain. You are required to complete all the questions in the presence of the investigator. The questionnaires will then be collected and you will receive a pamphlet comprising of low back care.</p> <p>Nil.</p> <p>The significance of this research study is to investigate low back problems and to what extent the activities of daily living of the students are affected. Hence, a pamphlet comprising low back care will be given to all the participants at the end of their participation.</p>	
<p>Contact Person :</p>	<p>Mr. Deivendran Kalirathianam- deivendran@utar.com.my</p>	
<p><i>Note: 1. All volunteers involved in this study will not be covered by insurance 2. Contact person must be the principal investigator</i></p>		

2. Voluntary participation

You understand that participation in this study is voluntary and that if you decide not to participate, you will experience no penalty or loss of benefits to which you would otherwise be entitled. If you decide to participate, you may subsequently change your mind about being in the study, and may stop participating at any time. You understand that you must inform the principal investigator of your decision immediately.

3. Available Medical Treatment

If you are injured during your participation or in the course of the study or whether or not as a direct result of this study, UTAR will not be liable for any loss or damage or compensation or absorb the costs of medical treatment. However, assistance will be provided to you in obtaining emergency medical treatment.

4. Confidentiality

All information you have supplied will be kept confidential by the principal investigator and the research team and will not be made available to the public unless disclosure is required by law.

5. Disclosure

Data obtained from this study will not identify you individually. The data may be given to the sponsor and/or regulatory authorities and may be published or be reused for research purposes not detailed within this consent form. However, your identity will not be disclosed. The original records will be reviewed by the principal investigator and the research team, the UTAR Scientific and Ethical Review Committee, the sponsor and regulatory authorities for the purpose of verifying research procedures and/or data.

By signing this consent form, you authorize the record review, publication and re-utilisation of data, information and sample storage and data transfer as described above.

6. Declaration

I have read or have the information above read to me, in the language understandable to me. The above content has been fully explained to me.

I have asked all questions that I need to know about the study and this form. All my questions have been answered. I have read, or have had read to me, all pages of this consent form and the risks described. I voluntarily consent and offer to take part in this study. By signing this consent form, I certify that all information I have given, including my medical history, is true and correct to the best of my knowledge.

I will not hold UTAR or the research team responsible for any consequences and/or liability whatsoever arising from my participation in this study.

7. Consent

If you wish to participate in this study, please sign below.

Signature of Volunteer : _____

Name of Volunteer : _____

IC. No. : _____

Date : _____

Signature of witness : _____

Name of witness : _____

IC. No. : _____

Date : _____

8. Statement of Principal Investigator

I have fully explained to the volunteer taking part in this study what he / she can expect by virtue of his / her participation. The volunteer who is giving consent to take part in this study

- Understands the language that I have used.
- Reads well enough to understand this form, or is able to hear and understand the contents of the form when read to him or her.
- Is of the age of majority of 18 or above.

To the best of my knowledge, when the volunteer signed this form, he or she understands:

- That taking part in the study is voluntary.
- What the study is about.
- What needs to be done.
- What are the potential benefits.
- What are the known risks.

Signature of Investigator : _____

Name of Investigator : _____

IC. No. : _____

Date : _____

Appendix C

**UNDERGRADUATE STUDENT HEALTH AND
SAFETY QUESTIONNAIRE**

Please answer **ALL** the questions by placing a **tick (√)** in only **ONE (1)** box for each question.

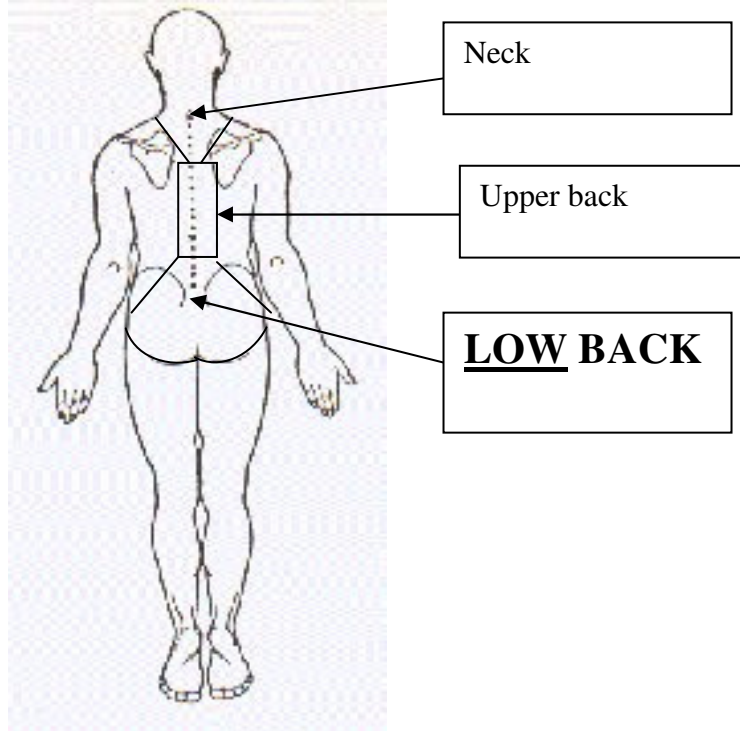
1. Gender: Female Male

2. Age: _____ years

3. Course of study: FAM FMHS

4. Year of study: 1 2 3 4 5

The following diagram shows the region of **LOW BACK** area. Please answer the following question by referring the diagram below.



Have you ever had **LOW BACK** problem in the **past one (1) year** (ache, pain or discomfort in the area specified, whether or not it extends from there to one or both legs)?

No →Please answer from **QUESTION 8** onwards.

Yes →Please answer **ALL** the following questions.

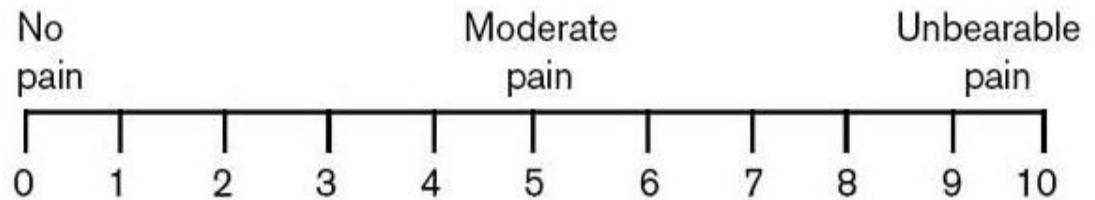
Please answer the following questions.

LOW BACK PAIN HISTORY

1. When did your last episode of low back pain occur?

I have low back pain at the moment	
During the last week	
During the last month	
During the past 6 months	
During the past 12 months	
More than 12 month ago	

2. Mark on the line below the **worst** intensity low back pain you've ever experienced?



3. When you have low back pain, the pain is:

Continuous

Intermittent

4. How often do you have back pain?

Every day	
One to 3 times per week	
Once every 2 weeks	
Once per month	
Once every 3 to 6 months	
Less than once in 6 months	

5. How long does the pain last when it is present?

A few hours to one day	
2 to 3 days	
4 to 5 days	
One week	
Longer than one week	

6. Can you identify what initiated your low back pain?

Started spontaneously	
Motor vehicle accident	
Sports injury	
Other injury (fall, lifting object)	
Don't know	
Can't remember	

ACTIVITY LEVEL

7. How often do you exercise?

Never	
≤ 1 time per week	
2-3 times per week	
4-5 times per week	
> 5 times per week	

8. For how long do you exercise in each session?

Never	
< 30 minutes	
30 minutes	
45 minutes	
60 minutes	
90 minutes or more	

EDUCATIONAL EXPOSURE

9. How often do you do the following activities?

(Use the table below as a guideline to rate the activities)

1	2	3	4	5	6
None	Once every 2 weeks	1-2 times/week	3 times/week	4-5 times/week	> 6 times/week

Activities	How often?
In class (sitting)	1 2 3 4 5 6
Studying	1 2 3 4 5 6
Work on computers	1 2 3 4 5 6
Watch television/movies	1 2 3 4 5 6
Lying down	1 2 3 4 5 6
Reading	1 2 3 4 5 6
Sitting	1 2 3 4 5 6
Sleeping during the day	1 2 3 4 5 6

10. For how long you do the following activities in each session?

(Use the table below as a guideline to rate the activities)

1	2	3	4	5	6
None	<30 minutes	30 minutes	45 minutes	60 minutes	90minutes/more

Activities	How long?
In class (sitting)	1 2 3 4 5 6
Studying	1 2 3 4 5 6
Work on computers	1 2 3 4 5 6
Watch television/movies	1 2 3 4 5 6
Lying down	1 2 3 4 5 6
Reading	1 2 3 4 5 6
Sitting	1 2 3 4 5 6
Sleeping during the day	1 2 3 4 5 6

Thank you for taking time to complete this survey.☺

Appendix D

Modified Oswestry Low Back Disability Questionnaire

Instructions

This questionnaire has been designed to give the information as to how your back pain has affected your ability to manage in everyday life.

Please answer every question by placing a *tick* (✓) in only **ONE(1)** box in each section for the statement that **BEST** describes your condition today.

We realize you may feel that two of the statements in any one section may describe your condition, but **please mark only the box which most closely describes your current condition.**

Section 1 - Pain Intensity

- I can tolerate the pain I have without having to use pain medication.
- The pain is bad but I can manage without having to take pain medication.
- Pain medication provides me complete relief from pain.
- Pain medication provides me with moderate relief from pain.
- Pain medication provides me with little relief from pain.
- Pain medication has no affect on my pain.

Section 2 - Personal Care (Washing, Dressing etc.)

- I can take care of myself normally without causing increased pain.
- I can take care of myself normally but it increases my pain.
- It is painful to take care of myself and I am slow and careful.
- I need help but I am able to manage most of my personal care
- I need help every day in most aspects of my care.
- I do not get dressed, wash with difficulty and stay in bed.

Section 3 - Lifting

I can lift heavy weights without increased pain.
I can lift heavy weights but it causes increased pain.
Pain prevents me from lifting heavy weights off the floor, but I can manage if the weights are conveniently positioned (Eg. on a table).
Pain prevents me from lifting heavy weights, but I can manage light to medium weights if they are conveniently positioned.
I can lift only very light weights.
I cannot lift or carry anything at all.

Section 4 - Walking

Pain does not prevent me from walking any distance.
Pain prevents me from walking more than 2 kilometers.
Pain prevents me from walking more than 1 kilometer.
Pain prevents me from walking more than 500 meters.
I can only walk with crutches or a cane.
I am in bed most of the time and have to crawl to the toilet.

Section 5 - Sitting

I can sit in any chair as long as I like.
I can only sit in my favorite chair as long as I like.
Pain prevents me from sitting for more than 1 hour.
Pain prevents me from sitting for more than ½ hour.
Pain prevents me from sitting for more than 10 minutes.
Pain prevents me from sitting at all.

Section 6 - Standing

I can stand as long as I want without increased pain.
I can stand as long as I want but increases my pain.
Pain prevents me from standing more than 1 hour.
Pain prevents me from standing more than ½ hour.
Pain prevents me from standing more than 10 minutes.
Pain prevents me from standing at all.

Section 7 - Sleeping

Pain does not prevent me from sleeping well.
I can sleep well only by using pain medication.
Even when I take pain medication, I sleep less than 6 hours.
Even when I take pain medication, I sleep less than 4 hours.
Even when I take pain medication, I sleep less than 2 hours.
Pain prevents me from sleeping at all.

Section 8 - Social Life (Sports, Dance, Driving etc.)

My social life is normal and does not increase my pain.
My social life is normal, but it increases my level of pain.
Pain prevents me from participating in more energetic activities (Eg. sports, dancing etc.)
Pain prevents me from going out very often.
Pain has restricted my social life to my home.
I have hardly any social life because of my pain.

Section 9 - Traveling

I can travel anywhere without increased pain.
I can travel anywhere but it increases my pain.
My pain restricts travel over 2 hours.
My pain restricts my travel over 1 hour.
My pain restricts my travel to short necessary journeys under ½ hour.
My pain prevents all travel except for visits to the doctor/therapist or hospital.

Section 10 – Homemaking (Lifting, Washing clothes, Vacuuming, Mopping etc.)

My normal homemaking does not cause pain.
My normal homemaking increases my pain, but I can still perform all that is required of me.
I can perform most of my homemaking, but pain prevents me from performing more physically stressful activities (Eg. lifting, vacuuming)
Pain prevents me from doing anything but light duties.
Pain prevents me from doing even light duties.
Pain prevents me from performing any job or homemaking chores.

Section 11 - Previous Treatment

Over the past three months have you received treatment, tablets or medicines of any kind for your back or leg pain?

No

Yes

(If yes, please state the type of treatment you have received)

Comments:

“Thank you for your participation. 😊”

Appendix E

Scoring instructions

For each section the total possible score is 5 (except Section 11 which is not included in the scoring): if the first statement is marked the section score = 0; if the last statement is marked, it = 5. If all 10 sections are completed the score is calculated as follows:

Example:

$$16 \text{ (total scored)} / 50 \text{ (total possible score)} \times 100 = 32\%$$

**If one section is missed or not applicable the score is calculated:*

$$16 \text{ (total scored)} / 45 \text{ (total possible score)} \times 100 = 35.5\%$$

Minimum detectable change (90% confidence): 10% points (change of less than this may be attributable to error in the measurement)

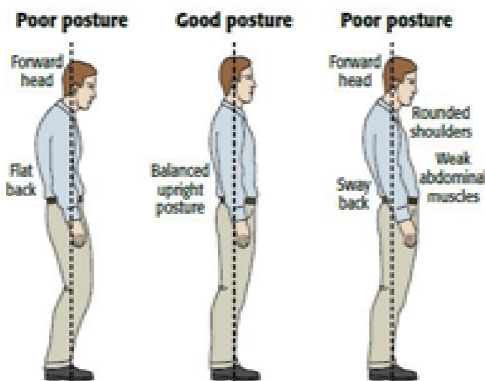
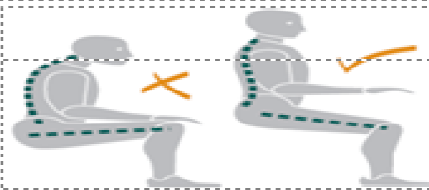
Interpretation of scores 0% to 20%: minimal disability:	The patient can cope with most living activities. Usually no treatment is indicated apart from advice on lifting sitting and exercise.
21%-40%: moderate disability:	The patient experiences more pain and difficulty with sitting, lifting and standing. Travel and social life are more difficult and they may be disabled from work. Personal care, sexual activity and sleeping are not grossly affected and the patient can usually be managed by conservative means.
41%-60%: severe disability:	Pain remains the main problem in this group but activities of daily living are affected. These patients require a detailed investigation.
61%-80%: crippled:	Back pain impinges on all aspects of the patient's life. Positive intervention is required.
81%-100%: bed-bound or exaggerating:	These patients are either bed-bound or exaggerating their symptoms.

Appendix F
PAMPHLET

Some Common Causes + Prevention Tips!

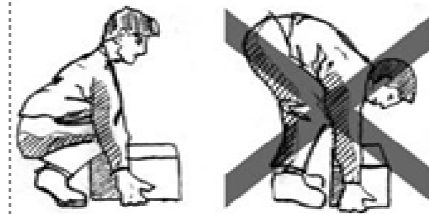
- Prolonged sitting
- Poor Postures

Proper Postures



- Wrong lifting technique

Proper Lifting Technique



- Lack of exercise
- Heavy backpack
- Smoking
- Stress

*Please meet your personal physician or physiotherapist to know more about the cause for your pain and for further information.

Exercises



*If you have low back pain or any related problems, please speak to your personal physician or physiotherapist on what exercise to do and what exercise to avoid.

