The Prevalence of Low Back Pain and Its Associated Factors Among the Nurses at Sultan Ahmad Shah Medical Centre (SASMEC@IIUM), Kuantan Pahang

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Abstract:

Introduction: Low back pain (LBP) is the most common complaint among health care workers such as nurses. The purpose of this study was to evaluate the prevalence and the associated factors of LBP among nurses at Sultan Ahmad Shah Medical Centre (SASMEC@IIUM), Kuantan Pahang. **Methods:** This cross-sectional study recruited 102 nurses from SASMEC@IIUM through convenient sampling. Data was collected via self-administered questionnaire. Descriptive statistic was used to analyse the prevalence of LBP and to describe the demographic data of the nurses. Chi-square test was used to find the association between the factors and LBP. **Results:** The prevalence of LBP was 58.8% among the nurses. Pre-nursing LBP was the only personal factor found to be significantly associated with LBP ($p < 0.001$). Meanwhile, the total number of patients in one shift was reported to be the work-related factor associated with LBP ($p = 0.009$). **Conclusion:** The prevalence of LBP among nurses was high with significant association of LBP with pre nursing LBP and total number of patients in one shift. Preventive measure such as awareness campaign can be done to promote proper ergonomic technique in reducing the risk of LBP among the nurses.

Introduction:

Low back pain (LBP) is one of the most common complaints among general population and healthcare workers and causes disability that can affect work performances and well-being. Duthey (2013) emphasized that LBP can cause economic burden not only to the individuals but also to the families, communities, industry and even the governments. It was reported that around $77 billion was spent annually for managing patients with musculoskeletal problems in the United States (Yelin, 2003).

Closer to home, Japan spent approximately six billion yen in managing LPB in the mid 90's (Dagenais and Haldeman, 2008).

A systematic analysis for Global Burden of Disease Study (GBD) 2016 has shown that LBP is the leading cause of years lived with disability with average number higher than migraine, age-related and other hearing loss, iron-deficiency anaemia, and major depressive disorder (Naghavi et al., 2017). Healthcare workers such as nurses are vulnerable to LBP as their duties in providing medical and health

services are diverse in the surgical room, accident and emergency departments, wards and also in communities such as outpatients and health clinics (Ibrahim et al., 2019). Hence, various types of health and safety hazards could be faced by them including LBP.

Many studies have shown that nurses are in the high-risk group for LBP. Studies conducted by June and Cho (2011) in South Korea; Lin et al., (2012) in Taiwan and by Karahan et al., (2009) in Turkey found that the prevalence of LBP among nurses were 90.3%, 82.03% and 77.1% respectively. This imminently shows that the nurse's population have indeed a higher LBP prevalence due to the exposure to the occupational hazards in their daily job such as longer working hours, repeated patient lifting, long standing and walking.

In Malaysia, there are many studies on LBP among different professionals but the prevalences are not as high as in the nurse's profession. For office workers, the prevalence of LBP was found to be 37% (Damanhuri et al., 2014). The prevalence of LBP among school teachers was found to be 40.4% (Samad et al., 2010) while the ambulance workers and bus drivers had slightly higher prevalence at 65% and 60.4% respectively (Tamrin et al., 2014; Tuan Lonik et al., 2017).

A study done by Rahmah et al., (2008) shows high prevalence of LBP among nurses in Malaysia which escalated at 79.4%. This is in line with another study conducted by Chan (2017) which indicated that 68.2% of nurses in HUSM suffered from LBP upon entering nursing employment. Therefore, it is pertinent to further study on LBP among nurses in Malaysia to find the root cause and ways to prevent further problems in the future. Hence, this study sought to determine the prevalence of LBP and the associated factors among nurses at SASMEC@IIUM, Kuantan Pahang. This study focused on nurses working at the in-patient department in which they have a higher risk of work-related hazards exposure that could contribute to LBP.

Materials and Methods:

A cross-sectional study was carried out at SASMEC@IIUM Kuantan, Pahang from March to May 2019. A single proportion formula with 68% proportion of nurses with LBP using previous study was used (Chan, 2017). The precision was set at 0.095% and after considering a non-response rate of 10%, the required sample size was 102. Recruitments were through a convenience sampling from various

departments such as general medical, orthopaedics, coronary care unit, obstetrics and gynaecology, general surgical, paediatric ward and emergency department. These included both genders and nurses aged between 20 to 60 years old. Those who were pregnant or had been diagnosed with any musculoskeletal, back or spine problems were excluded from the study.

The data collection tool employed an English version of self-administered questionnaire adopted from Chan (2017) with a Cronbach's alpha of 0.75 and has 3 parts; Part A: Demographic data consisting of 9 items such as age, gender, marital status, height and weight, Part B: 22 items on nursing and LBP such as type of ward, working hours per week, current working ward and frequent of LBP and Part C: treatment options consisting of 7 items such as the health care seeking among nurses and satisfaction of the treatment. The study obtained the approval from the Kulliyyah Postgraduate and Research Committee (KPGRC) [KAHS 064/19] and the Hospital Director of SASMEC@IIUM.

Data Analysis

Data was analyzed using the Statistical Package for the Social Sciences (SPSS) version 12.0.1 for Windows. Descriptive statistics was used to analyze the prevalence of LBP while Chi-square test was used to find the association between associated factors and LBP.

Result:

From 131 questionnaires distributed, only 102 questionnaires were filled and returned, giving a 77.86% response rate. Majority of the respondents participated in this study were female nurses (83.3%), aged between 20-30 years (88.2%), single (54.9%), with no child (67.6%) and non-smokers (96.1%) (Table 1). Interestingly, most of them were overweight (62.7%) and 53.9% participated in regular sport activities. The respondents mainly had nursing experiences of more than 5 years (50.9%).

More than half of the respondents complaint of experiencing low back pain [60 (58.8%)]. Table 2 shows the association between personal factors and LBP. Although the prevalence was non-significant, the percentage of LBP among female nurses is higher compared to male nurses which is 86.7% and 13.3% respectively. The prevalent of LBP of those who were single and married was similar. There were no significant interactions found despite a higher

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percentage of LBP shown by respondents who had no child, not smoking, overweight (BMI > 23kg/m²), not having any regular exercises or sports, respondents who had 0-5 years of nursing experiences and those who were stress.

Table 1: Demographic description of the respondents

Demographic	Frequency (n = 102)	Percentage (%)
Gender		
Male	17	16.7
Female	85	83.3
Age (years)		
20 - 30	90	88.2
30 - 40	12	11.8
Marital status		
Single	56	54.9
Married	46	45.1
Total number of children		
0	69	67.6
1 - 3	33	32.4
Body mass index (kg/m²)		
< 23.0	38	37.3
> 23.0	64	62.7
Smoking status		
Non- smoker	98	96.1
Smoker	4	3.9
Regular sport activity		
No	55	53.9
Yes	47	46.1
Nursing experience (years)		
1 - 5	50	49.0
6 - 10	39	38.2
11 – 20	13	12.7

For the personal factors, only pre nursing LBP had significant association with LBP ($p < 0.001$). However, gender, age, marital status, total number of children, smoking status, BMI, years of working experience and years of nursing experience had no association with LBP among the respondents.

Table 3 shows the association between work-related factors and occurrence of LBP. Nurses who are working on day and night shift, with 10 - 40 working hours per week, and have high workload had a higher

prevalence of LBP. On top of that, a higher prevalence of LBP is demonstrated by those who worked at the general medical ward, with a total of 0 - 5 patients need to be mobilized and those who worked overtime. Only one factor which is total patients in one shift demonstrated a significant association with LBP ($p = 0.009$). Nurses who had a total of 11 to 20 patients in one shift predominate a high prevalence of LBP which is 46 (76.6%). However, other environmental factors such as working shift, total working hours per week, current working ward, total patients need mobilizing, job workload, work overtime and stress had no association with low LBP.

Discussion:

The prevalence of LBP among the nurses in this study was 58.8% which was considered high and in line with Emmanuel et al. (2015) who reported 53.4% of the nurses experienced LBP. Other studies in Malaysia conducted by Rahmah et al. (2008) and Chan (2017) showed a higher prevalence of LBP which was 68.2 % and 79.4% respectively. Meanwhile, LBP among nurses had shown a higher prevalence in several other countries such as in Thailand, Iran and Taiwan and in which more than half of the nurses was revealed to suffer from LBP (Suliman, 2018 and Shieh et al., 2016).

Nurse's population has shown a high proportion of LBP occurrence compared to other health care professionals. Karahan et al. (2009) had conducted a study among hospital staff in Turkey and found a higher percentage of LBP among nurses which is 77.1%. This can be an indication that nurses are very much prone to develop LBP and this can be due to their nature of work which involve prolonged standing and patient lifting activities. Prolonged standing may trigger LBP from increased pressure on the soft tissues surrounding the spine (Ibrahim et. al, 2019) while frequent patient lifting produces extra biomechanical load to the spine (Jager et. al, 2013).

Association between Personal Factors and Low Back Pain

There was no association found between personal factors and LBP except for the pre nursing LBP ($p < 0.001$). Nurses who had no pre nursing LBP are those nurses who had never experience LBP before entering nursing profession. This group shows a high percentage of LBP when entering nursing profession which is 68.3%. Similar finding is reported by Chan (2017) and Karahan et al. (2009) that indicated 84.5 % and 78.3 % of the nurses had LBP after embarking on the nursing job. This might be explained by nursing job that poses greater amount of physical work and

Table 2: Association between personal factors and low back pain (n=102)

Variables	Low back pain		Chi-square statistic (df)**	*p*-value
	Yes n (%)	No n (%)		
Gender				
Male	8 (13.3)	9 (21.4)	1.166 (1)	0.280
Female	52 (86.7)	33 (78.6)		
Age (years)				
20 - 30	53 (88.3)	37 (88.1)	0.001 (1)	1.000
30 - 40	7 (11.7)	5 (11.9)		
Marital status				
Single	30 (50.0)	26 (61.9)	1.414 (1)	0.234
Married	30 (50.0)	16 (38.1)		
Total number of children				
0	39 (65.0)	30 (71.4)		
1 - 3	21 (35.0)	12 (28.6)	0.467 (1)	0.495
Height (cm)				
141 - 160	57 (95.0)	38 (90.5)		
> 160	3 (5.0)	4 (9.5)	0.791 (1)	0.442
Weight (kg)				
< 51	18 (30.0)	7 (16.7)		
51 - 60	16 (26.7)	17 (40.5)	4.501 (3)	0.212
61 - 70	16 (26.7)	8 (19.0)		
> 70	10 (16.7)	10 (23.8)		
Body mass index (kg/m^2)				
< 23.0	26 (43.3)	12 (28.6)	2.303 (1)	0.129
> 23.0	34 (56.7)	30 (71.4)		
Smoking status				
Non- smoker	57 (95.0)	4 (97.6)	0.450 (1)	0.641
Smoker	3 (5.0)	1 (2.4)		
Regular sport activity				
No	32 (53.3)	23 (54.8)	0.020 (1)	0.887
Yes	28 (46.7)	19 (45.2)		
Nursing experience (years)				
1 - 5	29 (48.3)	21 (50.0)	0.689 (2)	0.709
6 - 10	22 (36.7)	17 (40.5)		
11 - 20	9 (15.0)	4 (9.5)		
Pre nursing LBP				
No	41 (68.3)	41 (97.6)	13.442 (1)	< 0.001*
Yes	19 (31.7)	1 (2.4)		

(*) indicates significant difference at *p* < 0.05   **df = degree of freedom

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Table 3: Association between work-related factors and low back pain (n=102)

Variables	Low back pain		Chi-square statistic (df)**	p-value
	Yes n (%)	No n (%)		
Working shift				
Day	2 (3.3)	3 (2.1)	0.769 (1)	0.400
Day and night	58 (96.7)	39 (92.9)		
Total working hours per week (hours)				
10 - 40	40 (66.7)	21 (50.0)	0.791 (1)	0.442
> 40	20 (33.3)	21 (50.0)		
Job workload				
Medium	27 (45.0)	23 (54.8)	0.942 (1)	0.332
High and very high	33 (55.0)	19 (45.2)		
Current working ward				
General medical	16 (26.7)	7 (16.7)	7.164 (5)	0.209
General surgical	10 (16.7)	11 (26.2)		
Emergency department	10 (16.7)	3 (7.1)		
Paediatric	4 (6.7)	3 (7.1)		
Orthopaedic	14 (23.3)	8 (19.0)		
Others (O&G, CCU)	6 (10.7)	10 (23.8)		
Total patients in one shift				
0 - 10	7 (11.7)	13 (31.0)	9.409 (2)	0.009*
11 - 20	46 (76.7)	20 (47.6)		
>20	7 (11.7)	9 (21.4)		
Total patients need mobilizing				
0 - 5	52 (86.7)	37 (88.1)	0.045 (1)	0.831
> 5	8 (13.3)	5 (11.9)		
Work overtime				
No	45 (75.0)	28 (66.7)	0.843 (1)	0.358
Yes	15 (25.0)	14 (33.3)		
Stress				
No	11 (18.3)	10 (23.8)	0.453 (1)	0.501
Yes	49 (81.7)	32 (76.2)		

(*) indicates significant difference at $p < 0.05$ **df = degree of freedom

psychological stress and it will indirectly increase the risk of LBP among the nurses.

Surprisingly, although the percentage of female nurses who had LBP is higher compared to male nurses, the association between gender and LBP is not evident (p=0.28). The increase in the percentage of LBP with female gender concurred with Suliman (2018) who demonstrated that LBP is more prevalent among female nurses. Woman tends to get LBP due to their

anatomical and physiological differences and likely to develop LBP (Sikiru et al., 2010).

Smoking was found to have no association with LBP in this study. This might be due to the very small number of respondents who smoked (3.9%). Ovayulu (2014) indicated that one fourth of the nurses who smokes were reported to experience LBP. Meanwhile, Biglarian (2012) found that smoking is significantly associated with LBP and this may be explained by the

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effect of smoking that can cause disc impairment and reduced blood flow which can lead to LBP (June et al., 2011). Besides, majority of the nurses with no regular exercises was found to have a high prevalence of LBP. This is in parallel with the findings by Chan (2017) and Suliman (2018) which reported nurses who practised none or irregular exercises had higher LBP percentage which were 49. 1 % and 89.1% respectively. Being inactive causes the muscles to become stiffed and weakened and may aggravate LBP (Karlsson et. al, 2020).

Our demographic data showed that there were younger nurses aged between 20 to 30 years compared to nurses who aged more than 30 years old. The prevalence of LBP among younger nurses was higher (88.3%) although statistically there was no significant association between age and LBP. Similar findings were discovered by Chan (2017) who reported that nurses aged between 20 to 30 have high prevalence of LBP. Younger nurses have higher tendency to develop LBP because they are usually handling more patients, have less working experience and less knowledgeable about proper body mechanic compared to senior nurses. In contrast, other studies have reported no links between age and LBP (Suliman, 2018).

A high proportion of nurses who were overweight and obese (56.7%) reported to experienced LBP. This is in concordance with studies by Suliman (2018) and Chan (2017) who eloquently stated that almost half of the nurses who were overweight complaint of LBP. Obesity is the contributing factors of lumbar pain that lead to LBP (Chan, 2017). Nevertheless, although half of the nurses participated in this study were overweight and obese, there was no association found between BMI and LBP.

Nursing experience had been found to be not associated with LBP. This study showed that nurses who had nursing experience of more than 5 years had a higher percentage of LBP. This might be due to longer exposure to physical and psychological hazards at work seen among nurses with longer working experience (Emmanuel, 2018).

Association between Work-Related Factors and Low Back Pain

This study found that there was a significant association (p = 0.009) between LBP and number of patients in one shift. This suggests that a total number of patients in one shift is an important associated factor of LBP. The prevalence of LBP increases with the increased number of patients, which is more than 10 patients per shift. This finding can be supported by Shieh et al. (2016) which discouraged the practice of

individual nurses caring for large numbers of patients per shift. However, this factor had not been a strong predictor for LBP in previous study by Suliman (2018) which found that there was no association between number of patients and LBP.

It was found that approximately 59% of the nurses working in both morning and night shift had LBP. According to Ovayolu et al. (2014), nurses who worked in shifts had higher LBP prevalence. In another study by June et al. (2011), a significant relationship between LBP and night shifts was found in which nurses with more night shifts are prone to experience LBP than those with fewer night shifts. Chan (2017) believed that nurses who work in the morning shift are likely to have LBP as the nursing care duties mostly done in the morning shift.

We also found that nurses working in medical ward (26.7%) and orthopaedic ward (23.3%) have higher prevalence of LBP, although there was no association between current working ward and LBP (p = 0.209). The results of this study corresponded with the findings of previous study, concluding that no association was found between current working ward and LBP occurrence (Chan, 2017). Most nurses (55%) that had high and very high workload complaint of LBP. This finding is congruent with Shieh et al. (2016) which found that nurses with overload workload had high prevalence of LBP. This study also showed that majority of the nurses that experienced stress in work had LBP. Chan (2017) revealed that more than half of the nurses who were stressed had LBP and psychological stress at work is a common factor in LBP among nurses.

Among the limitations of the study was that the results were obtained from self-administered questionnaires. Hence, the potential for recall bias and information bias could occur due to different judgement and understanding among the nurses when answering the questionnaires. Besides, a small sample size and the absence of medical examination to confirm the occurrence of LBP among the nurses generates another concern.

Conclusion:

This study demonstrated a high prevalence of LBP among nurses which was 58.8%. A significant association was found between pre nursing LBP with LBP but not for gender, age, smoking status, regular exercises, BMI and nursing experience. None of the work-related factors showed any association with LBP except for the total number of patients in one shift. Working shift, number of patients need mobilizing,

current working ward, workload and stress were not related to LBP. Since the prevalence of LBP among the nurses in SASMEC@IIUM was found to be high, the hospital management could propose to work hand in hand with the nurses in providing education on proper ergonomic when handling patients. This could improve the knowledge and awareness among the nurses to care for their backs and reduces the risk of getting LBP.

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