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THE PREVALENCE OF BACK PAIN AND RISK FACTORS AMONG HEALTH CARE PROVIDERS IN PRIMARY HEALTH CARE CENTERS IN AL-MUSSAYIAB DISTRICT BABIL, IRAQ 2022.

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Abstract

Background: Healthcare providers are exposed to ergonomic hazards, musculoskeletal disorders, and other work-related injuries. Low back pain is the most common musculoskeletal disorder. The objective of present work is to determine the prevalence of back pain in health providers with emphasis on contributing risk factors and impact of LBP on health and life style habits.

Methods: The present study was a descriptive, cross-sectional study estimates the prevalence and risk factors for low back pain in health personnel. The study conducted on Healthcare providers which were selected by sampling technique. Data were analyzed using Statistical Package for the Social Sciences software, version 28.0 (IBM, SPSS, Chicago, Illinois, USA) software.

Results: results were indicated that the riskiest occupational group consisted of nurses. The majority of participants 328 (81.8%) from the total of 401 reported that they were not doing any activity of running for > 15 minutes, while only 75 (18.5%) were doing Sport >15 min and 309 (77.1%) claimed that they were walking for > 15 min.

Among the 401 healthcare providers, about (304) had low back pain (LBP) in the last 12 months, giving a prevalence of (75.8%) among the studied group. On the other hand, LBP at the time of interview (3 months prevalence) was found in 282 healthcare providers represented (70.3%) of the studied group. Mostly of the participants had not diagnostic as LBP. Results were indicated that most participants (192, 76.5%) who had reported to have LBP were overweight. But unfortunately, this population-based study showed that there was not any association between LBP and the lifestyle factors. Job-related factors were the most important factors associated with low back pain in health care personnel. Occupational factors can increase the chances of low back pain in health care providers. Results were indicated that there was a significant relationship between low back pain and the profession of the medical staff. The Chi-Square was estimated to be 17.975 and p value was (0.021). Also, there was a statistically significant association between Co-morbid diseases and LBP, p value was =0.001.

Conclusion: Results were suspected that LBP has a direct effect on healthcare providers in the PHCCs, and their job restrictions and attendance. Healthcare providers need to make a necessary regulation regarding working in a constant position for a long time, encouraging towards exercise among hospital employees will contribute to decreasing the low back pain incidence ratio.

Keywords: Low back pain, Healthcare providers, Occupational risk factors

Introduction:

Lower back pain (LBP) is a global problem of public health importance, affecting 70–85% of the world's population (1). It is a common cause of work-related disability (2). According to Hartvigsen et al. the annual prevalence of lower back pain ranges from 15 to 45%, with a point prevalence averaging 30%. In the United States (US), back pain is the most common cause of activity limitation in people under the age of 45 years and is considered the second most frequent reason for visits to a physician (3). It is also ranked the fifth leading cause of admission to a hospital and the third leading cause of surgical procedures. As such, two percent of the US workforce is compensated for back injuries annually (3). In addition, LBP is reported to be the second leading cause of work absenteeism and results in lost productivity more than any other medical condition (4) (5). According to Hartvigsen et al. (2), the direct and indirect costs attributable to LBP are enormous in terms of loss of quality of life, productivity and employee absenteeism. This condition is thus the single largest contributor to musculoskeletal disability worldwide.

The majority of occupational risk factors were related to the type of activities performed at work with high physical demands, including those requiring bending and twisting, and lifting and pulling objects. Alsiddiky et al (6) reported that clinicians who often performed back bending and pulling objects at work had a risk of LBP up to eight times higher. Back flexion, especially when combined with lifting weights, has serious consequences on the lower back, as it highly increases the intradiscal pressure (7). There are limited epidemiological data on the prevalence, disability and risk factors on LBP in Iraq. However, to minimize the burden of this problem, the co-morbid factors should be effectively studied by proper design. Considering the projected increase in the burden of LBP extensive research effort is needed to close this knowledge gap. The objective of present work is to determine the prevalence of back pain in health providers with emphasis on contributing risk factors and impact of LBP on health provider works and life style habits.

Methodology

The present study was a descriptive, cross-sectional study using a self-administered questionnaire. The study targeted primary health care centers in the Al-Musayib District. The study conducted on healthcare providers which were selected by sampling technique (each individual was chosen and entirely by chance, such that each individual had the same probability of being chosen during the sampling process). Structured questionnaire was developed specially for this study.

An assessment tool was developed by the researcher based upon known risk indicators for low back pain. The questionnaire forms validated by a group of specialists in rheumatology and community medicine. Participants were interviewed by investigator's researcher, avoiding interpersonal communication on the study and preventing any influence on response from the respondent during the interview period. Information from the questionnaire from all participants were entered a data sheet The data analysis for this work was generated using The Statistical Package for the Social Sciences software, version 28.0 (IBM, SPSS, Chicago, Illinois, USA) and

the Real Statistics Resource Pack software for Mac (Release 7.2) of the resource pack for Excel 2016, Copyright (2013 – 2020). Results of all hypothesis tests with p-values <0.05 (two-side) were considered to be statistically significant.

Results

Table 1 showed the number of professions who were participated in this study. Radiographers, Pharmacists, and Pharmacist assistants represented the lowest proportion of participants; 10 (2.5%) , 11 (2.74% and 24 (6%) respectively. While the highly proportion of the participants were for nurses 92 (22.9 %).

Table 1: Distribution of professions of the healthcare providers of the PHCCs, Al-Musayib District 2022

Professions (job title)	Frequency	Percentage
physician doctors	33	8.23
Dentist	37	9.22
Nurses	92	22.9
Laboratory assistants	31	7.7
Radiographers	10	2.5
Pharmacist assistants	24	6
Assistant doctor	76	19
Other	87	21.71
Pharmacist	11	2.74
Total	401	100

The age of the healthcare providers were divided into four ranges using class interval table as shown in Table 2. The highly participant range was 157 (39.2%) for ages (31- 39) years, while the lowest participation 52 (13%) was for those who were more than 48 years.

On the other hand, gender distribution was more frequent for female than male, the frequency of female was 238 (59.4%) while for male was 163 (40.6%). Based on BMI Category, mostly participants were overweight which about 251 (62.6%) were. History of diabetes mellitus (DM) was found in 22 participants (5.5%), hypertension in 51 (12.7%), arthritis in 124 (30.9%) and 185 participants (46.1%) had no history of any disease. Results were also indicated that most participant were nonsmokers which were about 350 (87.3%) and only 6 (1.5%) were Ex-smoker.

Table 2: Socio-demographic characteristics and medical history of the 401 healthcare providers of the PHCCs, of Al-Musayib District 2022

Variable	Groups	No. of cases	Percentage
Age(Years)	22-30 year	106	26.4
	31-39 year	157	39.2
	41 -48 year	86	21.4
	more than 48 year	52	13
Gender	Male	163	40.6
	Female	238	59.4
BMI Category	Normal weight	75	18.7
	Over weight	251	62.6

	Obese	73	18.7
Diseases	Diabetes (sugar problems)	22	5.5
	Hypertension (high blood pressure)	51	12.7
	Arthritis	124	30.9
	Other:	19	4.7
	No Diseases	185	46.1
Smoking	Non-smoker	350	87.3
	Current	35	8.7
	Occasional	10	2.5
	Ex-smoker	6	1.5
Alcohol consumption	Yes	0	0
	No	401	100

Among the 401 healthcare providers, about (304) had low back pain (LBP) in the last 12 months, giving a prevalence of (75.8%) among the studied group. On the other hand, LBP at the time of interview (3 months prevalence) was found in 282 healthcare providers represented (70.3%) of the studied group. Mostly of the participants had not diagnostic as LBP. Regarding the of disease management, about (140, 34.9%) were cconsulted a specialist while (95, 23.7%) were got Pain medication, about (39, 9.7%) had physical therapy and only (1, 0.2%) was received spine surgery as illustrated in Table 3.

Table 3 : Prevalence of duration and management low back pain among 401 healthcare providers of the PHCCs, of al-musayib district 2022

Variable	Groups	No. of cases	Percentage
Low back pain in the last 12 months	Yes	304	75.8
	No	97	24.3
Low back pain at the interview time (At this moment, do you have low back pain)	Yes	282	70.3
	No	119	29.7
Had the LBP diagnosed	Yes	90	22.4
	No	311	77.6
Management	Consulted a specialist	140	34.9
	Pain medication	95	23.7
	Physical therapy	39	9.7
	Receive any spine surg	1	0.2
	Other	6	1.5

In order to investigate the effect of Factors that might be associated with LBP, they were divided into demographic factors, lifestyle factors, profession type of job, type of the physical activity, and higher prevalence factors based on the nature of work. Demographic factors were age groups, gender and marital status. The prevalence of back pain associated with the gender of participants

and marital status. This association was significantly different with P<0.05, as shown in table (4).

Table 4: Relationship of LBP with demographic of healthcare providers in the PHCCs, of Al-Musayib District 2022

Variables		LBP				X^2 Chi-Square	P value
		Yes (n =304)		No (n=97)			
Age (Years)	22 - 30	76	71.7	30	28.3	$X^2 = 6.03$ df = 3	0.11
	31 - 39	114	72.6	43	27.4		
	40 - 48	69	80.2	17	19.8		
	> 48	45	86.5	7	13.5		
Gender	Male	115	70.6	48	29.4	X^2 =4.14 df = 1	0.042*
	Female	189	79.4	49	20.6		
Marital Status	Married	256	77.3	75	22.7	X^2 =9.04 df = 3	0.03*
	Unmarried	31	60.8	20	39.2		
	Divorced	5	100	0	0		
	Widow	12	85.7	2	14.3		

The association between lifestyle factors and LBP was shown in Table 5, results were indicated that most participant (192, 76.5%) who had reported to have LBP were overweight. But unfortunately, this population-based study showed that there was not any association between LBP and the lifestyle factors, as presented in Table 7.

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Table 5: Relationship of LBP with lifestyle factors of 401 healthcare providers in the PHCCs, of Al-Musayib District 2022.

Variables		LBP				X^2 Chi-Square	P value
		Yes (n =304)		No (n=97)			
BMI	Normal	52	69.3	23	30.7	$X^2 = 2.49$ df = 2	0.287
	Overweight	192	76.5	59	23.5		
	Obese	60	80	15	20		
Smoking	Non-smoker	269	76.9	81	23.1	$X^2 = 4.16$ df = 3	0.245
	Current smoker	26	74.3	9	25.7		
	Occasional smoker	5	50	5	50		
	Ex-smoker	4	66.7	2	33.3		

In the present study, job-related factors were the most important factors associated with low back pain in health care personnel. Occupational factors can increase the chances of low back pain in health care providers. Results were indicated that there was a significant relationship between low back pain and the profession of the medical staff. The Chi-Square was estimated to be 17.975 and p value was (0.021) as shown in Table 6.

Table 6: Relationship of LBP with profession of 401 healthcare providers of the PHCCs, of Al-Musayib District 2022

Variables		LBP				X^2 Chi-Square	P value
		Yes (n =304)		No (n=97)			
Job	Physician Doctors	29	9.5	4	4.1	$X^2 = 17.97$ df = 8	0.021*
	Dentist	31	83.8	6	16.2		
	Nurses	74	80.4	18	19.6		
	Laboratory Assistants	25	80.6	6	19.4		
	Radiographers	7	70	3	30		
	Pharmacist Assistants	16	66.7	8	33.3		
	Assistants Doctor	52	68.4	24	31.6		
	Other	64	73.6	23	26.4		
	Pharmacist	7	70	4	30		

In this study, the main analysis was conducted to examine the association of total physical activity with LBP. Frequency of exercise per week was significant (p = 0.05). Other conduct subgroup analyses concerning domain-specific physical activity such as Walking, Running and Sport (group exercise)of the level of physical activity was inasignificantly associated with LBP, p value were >0.05. That might be due to the large variation in methods of measuring each activity. This finding was consistent with several studies that showed a correlation between the prevalence of LBP and physical activity as shown in Table 7.

Table 7: Relationship of LBP with physical activity of 401 healthcare providers of the PHCCs, of Al-Musayib District 2022

Variables		LBP				X^2 Chi-Square	P value
		Yes (n =304)		No (n=97)			
Walking > 15 minutes	Yes	235	76.1	74	23.9	$X^2 = 0.043$ df = 1	0.836
	No	69	75	23	25		
Running > 15 min	Yes	55	75.3	18	24.7	$X^2 = 0.11$ df = 1	0.432
	No	249	75.9	79	24.1		
Sport >15 min (group exercise)	Yes	57	77	17	23	$X^2 = 0.073$ df = 1	0.787
	No	247	75.5	80	24.5		
Frequency of exercise per week	1 – 2 times per week	188	77.4	55	22.6	$X^2 =$ 9.067 df = 4	**0.05**
	3 – 4 times per week	32	68.1	15	31.9		
	5 – 7 times per week	7	58.3	5	41.7		
	More than 7 times per week	3	42.9	4	57.1		
	No exercise	74	80.4	18	19.6		

Association of LBP and occupational -related activities such as Sitting/ Standing time, Walking or

Lifting objects during work was also studied. The analysis of the relationships between sitting/ standing behavior during 7hrs of work and LBP were indicated to be not statistically associated, p value was >0.05. On the other hand, neither Walking nor Lift objects were associated, as shown in Table 8.

Table 8: Relationship of LBP with the occupational related factors of 401 healthcare providers of the PHCCs, of Al-Musayib District 2022

Variables		LBP				X 2 Chi-Square	P value
		Yes (n =304)		No (n=97)			
Sitting time hr./7hrs of work	< 2 hours	146	74.5	50	25.5	$X^2 =$ 1.305 df = 3	0.728
	2-4 hours	90	76.3	28	23.7		
	4-6 hours	46	75.4	15	24.6		
	More than 6 hours	22	84.6	4	15.4		
Standing time hr./7hr of work	< 2 hours	194	77.6	56	22.4	$X^2 =$ 4.683 df = 3	0.197
	2-4 hours	86	71.7	34	28.3		
	4-6 hours	8	61.5	5	38.5		
	More than 6 hours	16	88.9	2	11.1		
Walking Hours./7hr of work	< 2 hours	248	77.3	73	22.7	X^2 = 2.528 df = 3	0.470
	2-4 hours	45	682	21	31.8		
	4-6 hours	7	77.8	2	22.2		
	More than 6 hours	4	80	1	20		
Lift objects or people	Yes	182	76.5	56	23.5	X^2 = 0.139 df = 1	0.709
	No	122	74.8	41	25.2		

Data from the participant's history were used to undertake the analysis on the association between common Co-morbid disease and LBP. the Co-morbid diseases was identified as one of the risk factors associated with low back pain, Information on hypertension, T2DM, Arthritis and other diseases were collected.

There was a statistically significant association between Co-morbid diseases and LBP, p value was =0.001 as shown in Table 9.

Table 9: Relationship of LBP with Co-morbid diseases of 401 healthcare providers in the PHCCs, of Al-Musayib District 2022

Variables		LBP				X 2 Chi-Square	P value
		Yes (n =304)		No (n=97)			
Diabetes (sugar problems)	Yes	20	90.9	2	9.1	X^2 = 39.402 df = 4	0.001*
	No	284	74.9	95	25.1		
Hypertension (high blood pressure)	Yes	40	78.4	11	21.6		
	No	264	75.4	86	24.6		

Arthritis	Yes	114	91.9	10	8.1		
	No	190	68.6	87	31.4		
other	Yes	15	78.9	4	21.1		
	No	289	75.6	93	24.3		
No Diseases	Yes	115	62.2	70	37.8		
	No	189	87.5	27	12.5		

Discussion

Occupational low back pain developed as a result of exposure to factors such as heavy lifting, working by bending forwards, and improper working conditions is a common cause of injury (8). It is considered that the low back pain is more frequent today as a result of decreased body movements despite the spread of technology (9).

Because of this, research on low backpain frequency and risk factors has an important place in preventing low back pain. Hospital employees encounter more occupational health problems than other professionals, and the most common of them is low back pain (10). When the low back pain frequency was evaluated based on occupational groups, it was witnessed that the riskiest occupational group consisted of nurses; this results were completely agreed with the previously reported by Keriri (11).

Based on the previous researches, among the factors studied, age, gender, body mass index, lack of regular physical activity, occupational-related factors, patient-related factors, posture at work and stress associated with lower parts (12).

In the present study, the age of health care staff was identified as one of the risk factors associated with low back pain, although this relationship was not very strong. With age, the risk of musculoskeletal disorders and especially low back pain increases (13).

In spite of that men were predicted to have greater muscle strength and are thought to be able to cope better with hard work, however, the results of the present study showed that women health care personnel were shown more frequency in the developing lower back pain.

Body mass index is another risk factor associated with low back pain in health care personnel. A normal body mass index is a measure of fitness, which reduces the load on the lower back and reduces pain in this area. But the Body composition is an important factor in health. In cases of over wight, putting extra abdominal weight on the vertebrae, can cause chronic spasms in the lower back, when the back muscles contract to hold the abdomen high. Abnormal forces on the vertebrae cause disc damage and arthritis in the spine (14).

The prevalence of back pain associated with the gender of participants and marital status. This association was significantly different with $P<0.05$.

The current study showed that the majority of participants were married. Additionally, the results revealed a high prevalence of LBP among married participants as compared to single and divorced and widows. Because of cultural beliefs, women, especially married women, are exposed to strenuous activities and household activities such as daily and nightly routine domestic tasks that involve taking care of their families besides doing their job-related activities.

These consequently increase their risk of suffering LBP. This is comparable with a study that

reported that 69.1% of married women complained of LBP (15). There was a significant relation between prevalence of LBP and marital status in this study, which is in agreement with the literature.

Han et al. Found that overweight women have a significantly increased likelihood of LBP and no significant interaction between body mass index and low back pain symptoms was found (16). On the other hand, some studies have shown a statistically significant but weak positive association between body weight and LBP. Increased mechanical demands resulting from a higher body weight have been suspected of causing LBP (17). Similarly, this study supports that body weight and BMI should be accepted as weak risk signals for LBP due to lower relations.

Results were indicated that there was a significant relationship between low back pain and the profession of the medical staff.

The highest prevalence rates of work-related lower back problems were demonstrated among nurses and LBP ranked third among musculoskeletal occupational health problems among nurses. This concern was linked to nurses' physical activity in the hospitals and to ergonomics risk factors (18).

The high prevalence of LBP amongst nurses emphasizes the importance of the problem of back pain in nursing personnel. The differences in LBP prevalence rates reported in the literature across countries can be attributed to the nature of the workplace and variations in the methodological approach used for the measurement of LBP prevalence. Cultural differences might also influence respondents' willingness to report LBP and tolerance of pain. This is possibly linked with the higher physical workload and the amount of work pressure preoperative and postoperative patients create. They require more assistance with moving in bed and with transfers in the surgical department. The findings of the current study correspond with the results of previous study (19). As a result, it was suggested that nurses must be rotated in their workplace to provide a balance level (20).

The level of physical activity was not significantly associated with LBP, p value were > 0.05. That might be due to the large variation in methods of measuring each activity. This finding was consistent with several studies that showed a correlation between the prevalence of LBP and physical activity.

These studies showed that sedentary lifestyle and strenuous levels of physical activity are more associated with LBP than moderately intense physical activity. Despite these citations and their widespread acceptance, there have been few published articles (21) (22) (23) showing the relationship between LBP and daily physical activity levels in female desk- job workers. Scientific evidence of the role of daily physical activity in prevention and management of LBP was lacking in the case of young, female workers. It is hypothesized that maintaining moderate levels of daily physical activity would be associated with fewer LBP complaints.

The relationships between sitting/ standing behavior during 7hrs of work and LBP were indicated to be not statistically associated, p value was > 0.05.

In spite of that this study doesn't show a significant association with occupational related factors, public health guidelines recommend regular physical activity to minimize the risk of chronic

diseases. Previous studies have demonstrated that there is a U-shaped relationship between LBP and physical activity.

Other has found that sedentary workers who have to work in non-neutral positions are more at risk of LBP. Pataro and Fernandes (2014) state that LBP was associated with longer working hours, flexion and trunk rotation. Dynamic activity such as walking or running served as a protective factor (24). Moreover, Caban et al. (2014) found that the percentage of workers with ankle and knee pain was significantly higher among workers who join regular moderate and vigorous PA programs than among those who do not attend such programs (25).

There was a statistically significant association between Co-morbid diseases and LBP, p value was =0.001.

Comorbidity is the presence of one or more additional diseases or disorders co-occurring with (that is, concurrent with) a primary disease or disorder and the rate of comorbidity and the number of chronic diseases experienced increases with age (26).

In Australia, almost 1 in 3 (29%) people aged 65 and over reported having three or more chronic diseases, compared with just 2.4% of those under 45 (27). For a patient, comorbidities may have profound implications as the degree of physical and social disability rise with the number of co-existing conditions, which present several challenges in care (28).

Comorbidities are known to be associated with higher mortality and reduced quality of life and health providers need to take comorbid diseases into account when treating patients (29). It is also suggested that future studies on consequences of comorbidity should investigate specific disease combinations (30).

Hypertension, osteoarthritis were the two most prevalent conditions for LBP patients in the healthcare providers in the PHCCs. Both were also ranked top three in the other studies (31). A significant finding from this study confirmed that patients who had comorbid conditions were at greater risk of LBP.

References

1. Buchbinder R, van Tulder M, berg B, Costa LM, Woolf A, Schoene M, et al. Low back pain: a call for action. Lancet. (2018) 391:2384–8. doi: 10.1016/S0140-6736(18)30488-4.

2. Hartvigsen J, Hancock MJ, Kongsted A, Louw Q, Ferreira ML, Genevay S, et al. What low back pain is and why we need to pay attention. Lancet. (2018) 391:2356–67. doi: 10.1016/S0140-6736(18)30480.

3. Violante FS, Mattioli S, Bonfiglioli R. Low-back pain. Handbook of Clinical Neurology. (2015) 131:397–410. doi: 10.1016/B978-0-444-62627-1.00020-2.

4. D'Errico A, Viotti S, Baratti A, Mottura B, Barocelli AP, Tagna M, et al. Low back pain and associated presenteeismamong hospital nursing staff. J Occupat Health. (2013) 55:276–83. doi: 10.1539/joh.12-0261-OA.

5. Bernal D, Campos-Serna J, Tobias A, et al. Work-related psychosocial risk factors and musculoskeletal disorders in hospital nurses and nursing aides. Int J Nurs Stud. (2015) 52:635–48.

6. Alsiddiky AM, Algarni N, Alluhaidan A. Prevalence and associated factors of low back pain

among clinicians of a major referral hospital. Med J Malaysia. 2015 and 70:12-17. 2010.
7. Wilke HJ, Neef P, Caimi M, Hoogland T, Claes LE. New in vivo measurements of pressures in the intervertebral disc in daily life. Spine. 1999 and 24(8):755-762. 1999.
8. Mendelek F, Kheir RB, Caby I, Thevenon A, Pelayo P. On the quantitative relationships between individual/occupational risk factors and low back pain prevalence using nonparametric approaches. Joint Bone Spine 2011 and 78(6):619–24. 2011.
9. Karahan A, Kav S, Abbasoglu A, Dogan N. Low back pain: prevalence and associated risk factors among hospital Prevalence of and risk factors for low back pain among healthcare workers in Denizli staff. J Adv Nurs 2009 and 65(3):516–24. 2009.
10. Bejia I, Younes M, Jamila HB, Khalfallah T, Ben Salem K, Touzi M, et al. Prevalence and factors associated to low back pain among hospital staff. Joint Bone Spine 2005 and 72(3):254–9. 2005.
11. Keriri HM. Prevalence and risk factors of low back pain among nurses in operating rooms, Taif, Saudi Arabia. American Journal of Research Communication 2013 and 70., 1(11):45–. 2013.
12. S. Hegde, A. Donly, K. Shankar, Prevalence of musculoskeletal disorders among dental professionals–A questionnaire study, EXECUTIVE EDITOR 9 (3) (2018) 33. 2018.
13. Bareza Rezaei, Elahe Mousavi, Bahram Heshmati, Shaphagh Asadi, Low back pain and its related risk factors in health care providers at hospitals: A systematic review, Annals of Medicine and Surgery, Volume 70, 2021, 102903,. 2021.
14. E.A. Janke, A. Collins, A.T. Kozak, Overview of the relationship between pain and obesity: what do we know? Where do we go next? J. Rehabil. Res. Dev. 44 (2) (2007). 2007.
15. Chan S.G. Factors Associated with Low Back Pain among Nurses in Critical Care Units, Hospital Universiti Sains Malaysia. Biomed. J. Sci. Tech. Res. 2017 and doi: 10.26717/BJSTR.2017.01.000613., 2017:2025–2030. 2015.
16. Han T, Schouten J, Lean M, Seidell J. The prevalence of low back pain and associations with body fatness, fat distri- bution and height. Int J Obesity. 1997 and 21(7):600–7. 1997.
17. 2000, Leboeuf-Yde C. Body weight and low back pain: A sy- stematic literature review of 56 journal articles reporting on 65 epidemiologic studies. Spine. and 25(2):226. 2000.
18. Gaowgzeh R. Low back pain among nursing professionals in Jeddah, Saudi Arabia: Prevalence and risk factors. J. Back Musculoskelet. Rehabil. 2019 and doi: 10.3233/BMR-181218., 32:555–560. 2019.
19. Thon C.C., Feng P.K.J., Lian C.W. Risk factors of low back pain among nurses working in Sarawak General Hospital. Health Environ. J. 2016 and 7:13–24. 2016.
20. Emmanuel N.M., Ezhilarasu P., Bheemarao A.B. Low back pain among nurses in a tertiary hospital, south India. J. Osteoporos. Phys. Act. 2015 and doi: 10.4172/2329-9509.1000161., 161:1–3. 2015.
21. Heneweer H, Vanhees L, Picavet HSJ. Physical activity and low back pain: A U-shaped relation? Pain. 2009 and 143(1):21–5. 2008.
22. Heneweer H, Staes F, Aufdemkampe G, van Rijn M, Van- hees L. Physical activity and low back pain: A systematic review of recent literature. Eur Spine J. 2011 and 20(6):826–45. 2011.

23. an Uffelen JG, Wong J, Chau JY, van der Ploeg HP, Riphagen I, Gilson ND, et al. Occupational sitting and health risks: A systematic review. Am J Prev Med. 2010 and 379–88, 39(4):. 2010.
24. Pataro S, Fernandes R. Heavy physical work and low back pain: The reality in urban cleaning. Rev Bras Epide- miol. 2014 and 17(1):17–30. 2014.
25. Caban A, Lowe K, Herrick R, Kenwood C, Gagne J, Back- er J. Construction workers working in musculoskeletal pain and engaging in leisure-time physical activity: Findings from a mixed-methods pilot study. Am J Ind Med. 2014 and 819–25, 57(7):. 2014.
26. Springer, Newman AB. Comorbidity and multimorbidity. Dordrecht: and 2012. 2012.
27. Australian Institute of Health and Welfare . Australia's. Health 2016. In: AIHW, editor. Australia's Health Series No 15. Catalogue No AUS 199. 2016. 2016.
28. Søndergaard E, Willadsen TG, et al. Problems and challenges in relation to the treatment of patients with multimorbidity: general practitioners' views and attitudes. Scand J Prim Health Care. 2015 and 33(2):121–126. 2015.
29. Hestbaek L, Leboeuf-Yde C, Manniche C. Is low back pain part of a general health pattern or is it a separate and distinctive entity? A critical literature review of comorbidity with low back pain. J Manip Physiol Ther. 2003 and 26(4):243–252. 2003.
30. Gijsen R, Hoeymans N, Schellevis F, Ruwaard D, Satariano W, van den Bos G. Causes and consequences of comorbidity. J Clin Epidemiol. 2001 and 54(7):661–674. 2001.
31. Ramanathan S, Hibbert P, Wiles L, et al.,What is the association between the presence of comorbidities and the appropriateness of care for low back pain? BMC Musculoskelet Disord. 2018 Nov 6 and 19(1):391. 2018.