Prevalence and Risk Factors of Low Back Pain Among Academic Staff at Universities in Jeddah: A Cross Sectional Study

Riziq Allah Mustafa Gaowgzeh
Associate professor, Department of Physical Therapy, Faculty of Medical Rehabilitation Sciences, King Abdulaziz University, Jeddah, Saudi Arabia.
rizikjoresearch@gmail.com

Abstract
Low back pain (LBP) is one of the most common causes of disability among workers, resulting in a significant financial burden. This study aimed to determine the prevalence of LBP and examine its risk factors among academic staff at universities in Jeddah, Saudi Arabia. By using a cross-sectional study, where 384 academic staff who works in various universities in Jeddah, with age group between 25-55 years, participated in the study. A self-administered questionnaire was used to identify the prevalence, work-related and sociodemographic characteristics, and risk factors for the LBP of the participants in the study. The collected data was 60.16% male and 39.84% female. The prevalence of LBP was high among the age group 41-45years of age (20.57%), while the lowest was among the age group of 25-30 years of age (2.86%). The highest percentage of LBP was for Medicine/Health UTP (32.03%), whereas the lowest rate was among academia (0.26%). Subjects with 10-15 years of experience have a moderate disability (43.8%) compared to 0-5 years of experience (11.1%.). The findings of this study indicated a high prevalence of LBP among academic staff at universities in Jeddah, highlighting the vital role of physical therapists in the prevention of the same.
Keywords: Low back pain, Prevalence, Risk factors, University teaching staff.
Tob Regul Sci.™ 2021;7(6-1): 7495-7504
DOI: doi.org/10.18001/TRS.7.6.1.69

Introduction

Low back pain (LBP) is the most prevalent musculoskeletal problem, and most utmost people experience it by some point in their life around the earth. It is one of the leading causes of disability, and it ranks second in the physician visit after the common cold [1-3]. About 21.5% to 57% of people experience LBP worldwide experiencing [4-6]. Most of the professionals are at the risk of developing LBP, and it is due to poor fitness or poor postures. LBP is usually preventable; However, it becomes chronic and causes severe disability, reduced quality of life, reduced productivity, impaired functions, and monetary loss.

Saudi Arabia experiences LBP about 18.8% of the general population [7,8]. Earlier epidemiological studies have measured the prevalence of LBP in community settings using self-reported questionnaires [9]. Previous epidemiological studies focused on the individual functional variables used to determine the causes of LBP [10-15]. Other factors that influence the LBP, like lifestyle factors, psychosocial profile, and type of work, are not well discussed [8, 16]. The exclusion of the work-related risk factors and individual work capacity may be beneficial in preventing LBP [6].

This is the first study conducted in the university campus on the prevalence of musculoskeletal disorders, to the best of the researcher's knowledge, no studies have been conducted to assess the prevalence of LBP and its associated factors among academic staff at Universities in Jeddah, Saudi Arabia. Therefore, this cross-sectional

study aimed to determine the prevalence of LBP and examine its risk factors among academic staff at universities in Jeddah.

SUBJECTS AND METHODS

Study Design and Data Collection Methods

This was a cross-sectional study targeting the population of academic staff at universities in Jeddah, namely King Abdulaziz University, King Abdulaziz Medical City, College of Business Administration, College of Telecom &Electronics, IbnSina National College, Jeddah College of Technology for Medical Studies, King Abdullah City of Science and Technology, Jeddah College of Health Care, and King Saud City for Health Sciences. The selected universities provide programs covering a range of specialties, including medicine/health, science, engineering, and arts.

Tools

A Self-administered Nordics Musculoskeletal Questionnaire (NMQ) was used among a sample of 384 academic staff members at various universities in Jeddah. The inclusion criteria are being a member of the educational team at any selected university between the age of 25years to 70 years, both the gender and full-time staff. The exclusion criteria were already diagnosed cases of LBP, any recent injuries, recent trauma, central and peripheral nervous system diseases, and recent surgery pertaining to the spine. Data were collected between May to November 2019. This study was approved by the Scientific Study Ethical Committee, Faculty of the Medical Rehabilitation Sciences, King Abdulaziz University, Jeddah, Saudi Arabia.

Academic teaching staff from different faculties were randomly selected, as shown in Table 1. A structured, pre-coded questionnaire that utilizes items related to the participants' socio-demographic characteristics, like age, gender, marital status, body mass index, work hours and environment, specialty, and physical activities were collected.

Statistical Analysis

Data were reported in frequencies and percentages and analyzed using the Statistical Package for the Social Sciences (SPSS) version 22.0. To identify the relationship between the low back pain, functional disability due to LBP, and the job characteristics the chi-square χ^2 test was used. A p-value of <0.05 (two-sided test) was accepted as statistically significant.

Results

The Characteristics of the Study Sample

Three hundred eighty-four academic staff members were included, with 231 (60.16%) male participants and 153(39.84%) female participants. Regarding specialty, medical/health faculties had the highest percentage of participants (32.03%), while home economics faculties had the lowest rate (0.26%). The participants were categorized into six groups according to their ages, ranging from 20-50 years. The age group 41-45 years had the highest percentage of participants (20.57%), while the age group 25-30 years had the lowest rate (2.86%), as shown in Table 1 below.

Table 1: Characteristics of the participants

Variable	Categories	n	Percentile data (%)
Gender	Female	153	**39.84**
	Male	231	**60.16**
Age	20 – 30	16	**4.17**
	25-30	11	**2.86**
	31-35	67	**17.45**
	36-40	71	**18.49**
	41-45	79	**20.57**
	46-50	48	**12.50**
Which faculty do you belong to?	Faculty of Arts	80	**20.83**
	Faculty of Engineering	56	**14.58**
	Faculty of Home Economics	1	**0.26**
	Faculty of Sciences	79	**20.57**
	Faculty of medicine	123	**32.03**
	Other	45	**11.72**

The designation "Assistant Professor" had the highest percentage of participants (32%), while "Lecturer" had the lowest rate (7%). Regarding years of experience, 21.09% of the participants had 0-5 years of experience, while only 10.94% had 16-20 years. As for the number of hours of lecturing or practical laboratories per day, 28.65% of the participants responded with "5-6", while 8.85% responded with "0-2". Regarding the number of office hours per day, 28.65% of the participants responded with "0-2", while 19% responded with "7-8". Finally, with regards to the question "What is your main body posture while working?",66.93% of the participants responded with "alternate," while 15.63% responded with "sitting," as shown in Table 2 below.

Table 2: Job characteristics of the participants

Variable	Categories	N	Percentile data (%)
What is your designation?	Lecturer	115	30
	Teaching assistant	26	7
	Assistant professor	125	32
	Associate professor	68	18
	Professor	50	13
Years of experience	0-5	81	21.09
	11-15	67	17.45
	16-20	42	10.94
	21-25	57	14.84
	26 or more	68	17.71
	6-10	69	17.97

How many hours of lecturing or practical do you have per day?	0-2	45	12
	3-4	141	37
	5-6	125	32
	7-8	73	19
How many office hours do you have per day?	0-2	122	32
	3-4	138	36
	5-6	86	22
	7-8	38	10
What is your main body posture whilst working?	Alternate	257	66.93
	Sitting	60	15.63
	Standing	67	17.45

Concerning pain intensity, 31.77% responded with "I don't have pain at the moment," while 0.52% responded with "The pain is very severe at the moment." As for the question, "Personal care wash, dressing? "52.60 % of the participants responded with 'I can take care of myself normally without experiencing extra pain,' while 0.52% responded with 'I need some help but manage most of my care.'

Regarding the ability to lift,34.90% responded with "I can lift heavy weights without extra pain," and 0.78% responded with "I cannot lift or carry anything at all." As for walking, 33.86% of the participants responded with "Pain does not prevent me from walking any distance," while 1.56% responded with "I am in bed most of the time." For the sitting position, 39.58% responded with "I can sit in any chair as long as I like," while 0.26% responded with "Pain prevents me from sitting for more than 10 minutes" and "Pain prevents me from sitting at all. "With regards to standing, 26.04% of the participants responded with "I can stand as for long as I want, but it gives me extra pain," whilst0.26% responded with "Pain prevents me from standing at all." For sleeping, 49.74% responded with "My sleep is never disturbed by pain," while 0.26% responded with "Because of pain, I get less than 2 hours of sleep". Finally, with regards to the impact of LBP on social life, 29.17% of the participants responded with "My social life is normal but increases the degree of pain." In comparison, 0.52% responded with "Pain has restricted my social life to my home," as shown in Table 3 below.

Table 3: Frequencies and percentages for the prevalence of LBP among the participants

Question	Answer	N	N%
Pain intensity	I have no pain at the moment	122	31.77
	The pain is fairly severe at the moment	28	7.29
	The pain is moderate at the moment	112	29.17
	The pain is the worst imaginable at the moment	3	0.78
	The pain is very mild at the moment	111	28.91
	The pain is very severe at the moment	8	2.8
Personal care washing, dressing?	I can look after myself normally, but it causes me extra pain.	63	16.42

	I can look after myself usually without experiencing extra pain.	302	78.64
	I need some help but manage most of my care.	5	1.30
	It is painful to look after myself, and I am slow and careful.	14	3.64
Lifting	I can lift heavy weights but find this painful to do	277	72.14
	I can lift very light weights	26	6.77
	I cannot lift or carry anything at all	6	1.56
	Pain prevents me from lifting heavy weights off the floor, but I can manage if they are conveniently placed (e.g., on a table)	40	10.42
	Pain prevents me from lifting heavy weights, but I can manage light to medium weights if they are conveniently positioned	35	9.11
Walking	I am in bed most of the time	28	5.51
	Pain prevents me from walking more than 1 mile	185	52.13
	Pain does not prevent me from walking any distance	156	39.21
	Pain prevents me from walking more than 100 yards	15	3.15
Sitting	I can sit in any chair for as long as I like	210	54.69
	Pain prevents me from sitting for more than 30 minutes	17	4.43
	I can only sit in my favorite chair for as long as I like	43	11.20
	Pain prevents me from sitting for more than 10minutes	2	0.52
	Pain prevents me from sitting for more than one hour	57	14.84
	I can only sit in my favorite chair for as long as I like	53	13.80
	Pain prevents me from sitting at all	2	0.52
Standing	Pain prevents me from standing for more than 30 minutes	58	15.11
	Pain prevents me from standing for more than 1 hour	21	8.89
	I can stand for as long as I want but experience extra pain	165	42.26
	I can stand for as long as I want without experiencing extra pain	139	33.33
	Pain prevents me from standing at all	1	0.41
Sleeping	Because of pain, I get less than 6 hours of sleep	31	11.56
	Because of pain, I get less than 2 hours of sleep	9	4.26
	Because of pain I have less than 4 hours of sleep	15	7.04
	My sleep is never disturbed by pain	213	49.74
	My sleep is occasionally disturbed by pain	112	24.68

	Pain prevents me from sleeping at all	4	2.72
Social life	My social life is normal but increases the degree of pain	141	30.86
	Pain has no significant effect on my social life apart from limiting my more energetic interests (e.g., sports)	42	11.39
	I have no social life because of pain	11	5.72
	My social life is normal and causes me no extra pain	169	39.45
	Pain has restricted my social life, and I do not go out as often	15	7.94
	Pain has restricted my social life to my home	2	0.52
Travelling	I can travel anywhere but it causes me extra pain	165	42.97
	I can travel anywhere without pain	191	49.74
	Pain is bad but I manage journeys over two hours	24	6.25
	Pain restricts me to journeys of less than one hour	2	0.52
	Pain restricts me to short necessary journeys under 30 minutes	2	0.52

Table 4: Relationship between job characteristics and pain intensity

			Pain intensity?							Pearson's chi-squared test	P-value
			I have no pain at the moment	The pain is fairly severe at the moment	The pain is moderate at the moment	The pain is the worst imaginable at the moment	The pain is very mild at the moment	The pain is very severe at the moment	The pain is very severe at the moment		
Designation	Lecturer	n	36	17	18	16	14	13	1		0.86
		N%	31%	15%	16%	14%	12%	11%	1%	37.45	
	Teaching Assistant	n	9	6	5	3	3	0	0		
		N%	35%	23%	19%	11%	12%	0%	0%		
	Assistant professor	n	45	22	19	16	10	9	4		
		N%	36%	18%	15%	13%	8%	7%	3%		
	Associate professor	n	22	11	10	8	9	7	1		
		N%	32%	16%	15%	12%	13%	10%	2%		
	Professor	n	18	10	7	6	4	5	0		
		N%	36%	20%	14%	12%	8%	10%	0%		
Years of experience	0-5	n	33	2	18	1	26	1	0		0.1
		N%	40.70%	2.50%	22.20%	1.20%	32.10%	1.20%	0.00%	39.991	
	11-15	n	15	6	19	0	22	3	2		
		N%	22.40%	9.00%	28.40%	0.00%	32.80%	4.50%	3.00%		
	16-20	n	11	2	16	0	11	2	0		
		N%	26.20%	4.80%	38.10%	0.00%	26.20%	4.80%	0.00%		
	21-25	n	14	8	17	1	17	0	0		
		N%	24.60%	14.00%	29.80%	1.80%	29.80%	0.00%	0.00%		
		n	21	5	23	0	19	0	0		

	26 or more	N%	30.90%	7.40%	33.80%	0.00%	27.90%	0.00%	0.00%		
	6-10	n	28	5	19	1	16	0	0		
		N%	40.60%	7.20%	27.50%	1.40%	23.20%	0.00%	0.00%		
Hours of lecturing/practical per day	0-2	n	15	11	8	5	4	2	0	28.52	0.23
		N%	33%	24%	18%	11%	9%	5%	0%		
	3-4	n	59	31	20	16	8	5	2		
		N%	42%	22%	14%	11%	6%	4%	1%		
	5-6	n	43	22	19	17	15	8	1		
		N%	34%	18%	15%	14%	12%	6%	1%		
	7-8	n	27	16	12	8	7	5	0		
		N%	36%	21%	16%	11%	9%	7%	0%		

Office hours per day	0-2	N	46	27	19	16	9	4	1	26.132	0.34
		N%	38%	22%	16%	13%	7%	3%	1%		
	3-4	N	52	27	23	17	13	6	0		
		N%	38%	20%	17%	12%	9%	4%	0%		
	5-6	N	28	17	14	10	9	7	1		
		N%	33%	20%	16%	12%	10%	8%	1%		
	7-8	n	13	7	6	6	3	2	1		
		N%	34%	18%	16%	16%	8%	5%	3%		
what is your main body posture during work	Alternate	n	84	21	68	2	76	5	1	8.516	0.74
		N%	32.70%	8.20%	26.50%	0.80%	29.60%	1.90%	0.40%		
	Sitting	n	17	2	23	0	17	0	1		
		N%	28.30%	3.30%	38.30%	0.00%	28.30%	0.00%	1.70%		
	Standing	n	21	5	21	1	18	1	0		
		N%	31.30%	7.50%	31.30%	1.50%	26.90%	1.50%	0.00%		

Data are shown in frequencies (n) and percentages (n percent); n=384. There was no significant relationship between work characteristics and pain intensity ($P > 0.05$, Chi-square test).

Discussion

The study aims to identify the prevalence of LBP among the academic staff at universities in Jeddah, Saudi Arabia, in addition, it also examines the associated risk factors among academic staff from different faculties in universities in Jeddah. Low back pain occurs due to numerous aspects, such as lifestyle, working conditions, working hours, heavy physical loads, abnormal postures, awkward lifting techniques, and prolonged standing.

LBP may also result from trauma, osteoporosis, tumors, infections, and bone metastasis [17]. It is the common cause of disability that leads to substantial financial burden and significant impact on daily life and job performance [18]. This study was conducted to identify the prevalence of LBP in university staff. This was performed for about six months to determine the prevalence of LBP among UTP in Jeddah Universities, Saudi Arabia. Among the academic staff members in this study, 69.1% complained of minimal disability, while 25.2% complained of

moderate disability. These results indicate a high prevalence of LBP in staff, and it was also related to the studies conducted in other countries [**10, 19, 20**]. These findings can also be attributed to alternating working postures between standing and sitting and years of practice [**21,22**]. **Kebede et al.** [**23**] reported that LBP is one of the significant health problems that cause disability and considerable impacts on individuals' quality of life. It also causes severe effects on the health and productivity of workers in both developed and developing countries. This study identifies that 70% to 85% of the global population experience low back pain at some time in their lives.

Static LBP may cause disturbance in sleep; it is perceived that static work postures or posture, which require very minimal movement, cause static loading over the muscles causes strains. The muscles become fatigued and pronounce to pain on even following simpler movements [**24**]. This study identifies that 73.3% of the participants reported using alternative body postures, which is inconsistent with the findings of previous studies that have reported standing for prolonged periods to be the leading cause of LBP among participants [**3,9,11**]. However, these study findings were also backed by a Swedish study, which reported to have an association between LBP and alternate working posture [**9,14**]. In this study, there is a moderate disability identified in 43.3% of the participants with 10-15 years of experience. A previous study also identified that LBP prevalence among operation room staff found that 80.4% of staff members with more than ten years of experience [**7,21**]. These findings were opposed by other two studies, which state there is no relationship between the years of experience and LBP [**8,16,25**]. There is a strong association identified between physical activity and the prevalence of low back pain, and it was also determined that physical exercises aids in reducing the occurrence of low back pain [**26**]. The studies have identified no strong association between the age group and the occurrence of LBP [**4**]. Previous studies also identified no significant relationship between gender and LBP [**5,27, 28**]; this study also demonstrated that the prevalence of LBP is slightly higher among male participants than female participants. However, a previous study conducted among Iranian nurses shows that the prevalence of LBP was higher among females than males [**29**]. **Elias et al.** [**30**] identified the prevalence of LBP among female primary school teachers in rural Western Kenya to be 64.98%. Whereas the study by **Alzidani et al.** [**31**] identified no significant difference in LBP between male and female surgeons.

This study identifies an association between BMI and LBP. This finding was supported by **Jensen et al.** [**32**], who reported a higher risk of LBP among obese and overweight participants compared to participants with normal BMI. **Alnaami et al.** [**8**] also identified the association between BMI & LBP. They examined the overweight and obese participants with the average BMI on the episode of LBP, and they identified an association between BMI and LBP.

Prevention strategies for the LBP require early identification of the symptoms and the workstation, work posture, and working activity to be analyzed. Previous kinds of literature strongly support that poor fitness is recognized as the cause for LBP [**8,16**]. Physical therapy measures play a significant role in prevention as well as in the rehabilitation of the LBP. This study also identifies that regular physical therapy sessions reduced pain, reduced functional disability, and improved work productivity among university academic staff. It was observed that regular exercises significantly affect LBP prevention, whereas weakened core muscles or awkward postures are prone to LBP [**33**].

Conclusion

The findings of this study have shown that there is a significant problem of low back pain among teaching staff at King Abdulaziz University and that the situation in other higher education institutions in Saudi Arabia is changing. Given the similarity of demographics and working conditions across the public and private universities in Saudi Arabia, these findings widely apply to other public universities and faculties or colleges in the world.

Acknowledgement

The author gratefully acknowledges the efforts of all the participants and data collectors. This project was supported and funded by the Deanship of Scientific Research (DSR), King Abdulaziz University, Jeddah, Saudi Arabia, under grant No. (511-142-D1440). The author gratefully acknowledges the technical and financial support of the DSR.

References.

1. Balague F, Mannion AF, Pellise F, et al. Non-specific lowback pain. Lancet 2012; 379:482–491.
2. Delitto A, George SZ, Van Dillen LR, et al. Low back pain. J Orthop Sports Phys Ther. 2012;42: A1–A57.
3. Parreira P, Maher C, Steffens D, Hancock M, Ferreira M. Risk factors for low back pain and sciatica: an umbrella review. Spine J. 2018.
4. Genevay S, Cedraschi C, Courvoisier DS, Perneger TV, Grandjean R, Griesser AC, et al. Work-related characteristics of back and neck pain among employees of a Swiss Univer- sity Hospital. Joint Bone Spine 2011;78(4):392–7.
5. Keriri HM. Prevalence and risk factors of low back pain among nurses in operating rooms, Taif, Saudi Arabia. American Journal of Research Communication 2013;1(11):45– 70.
6. Homaid, M. B., Abdelmoety, D., Alshareef, W., Alghamdi, A., Alhozali, F., Alfahmi, N., ... & Elmorsy, S. Prevalence and risk factors of low back pain among operation room staff at a Tertiary Care Center, Makkah, Saudi Arabia: a cross-sectional study. Annals of occupational and environmental medicine 2016, 28(1), 1-8.
7. Al-Arfaj AS, Al-Saleh SS, Alballa SR, Al-Dalaan AN, Bahabri SA, Al-Sekeit MA, Mousa MA. How common is back pain in Al-Qaseem region? Saudi medical journal 2003; 24(2):170–173
8. Alnaami, I., Awadalla, N. J., Alkhairy, M., Alburidy, S., Alqarni, A., Algarni, A., ... & Mahfouz, A. A. Prevalence and factors associated with low back pain among health care workers in southwestern Saudi Arabia. BMC musculoskeletal disorders 2019, 20(1), 1-7.
9. Edwards, J., Hayden, J., Asbridge, M., & Magee, K. The prevalence of low back pain in the emergency department: a descriptive study set in the Charles V. Keating Emergency and Trauma Centre, Halifax, Nova Scotia, Canada. BMC musculoskeletal disorders 2018, 19(1), 1-10.
10. Omokhodion FO, Umar US, Ogunnowo BE. Prevalence of low back pain among staff in a rural hospital in Nigeria. Occup Med (Lond) 2000; 50: 107-10.
11. Yip Y. A study of work stress, patient handling activities and the risk of low back pain among nurses in Hong Kong. J AdvNurs 2001; 36: 794-804.
12. Walker BF, Muller R, Grant WD. Low back pain in Australian adults: prevalence and associated disability. J Manipulative PhysiolTher 2004; 27: 238- 44.
13. Bensa-ard N, Tuntiseranee P, Anumtaseree S. Work conditions and prevalence of musculoskeletal pain among para-rubber planters: a case study in TambonNakleua, Kantang District, Trang Porvince. Songkla. Med J 2004; 22: 101-10.
14. Mazloum A, Nozad H, Kumashiro M. Occupational low back pain among workers in some small-sized factories in Ardabil, Iran. Ind Health 2006; 44: 135-9.

15. Karahan A, Kav S, Abbasoglu A, Dogan N. Low back pain: prevalence and associated risk factors among hospital staff. J AdvNurs 2009; 65: 516-24.
16. Gaowgzeh, R. A., Chevidikunnan, M. F., Al Saif, A., El-Gendy, S., Karrouf, G., & Al Senany, S. (2015). Prevalence of and risk factors for low back pain among dentists. Journal of physical therapy science, 27(9), 2803-2806.
17. Béatrice D. Priority Medicines for Europe and the World "A Public Health Approach to Innovation" Update on 2004 Background Paper, BP 6.24 Low back pain 2013;6.24
18. Huberty, H., Klingbeil, J., Miller, M., & Utt, M. EMG Analysis of Latissimus Dorsi, Erector Spinae, and Middle Trapezius Muscle Activity during Spinal Rotation: A Pilot Study. 2018.
19. Gilgil E, Kacar C, Butun B, Tuncer T, Urhan S, Yildirim C, et al. Prevalence of low back pain in a developing urban setting. Spine (Phila Pa 1976) 2005; 30: 1093-8.
20. Clermont E. DionneKate M. DunnPeter R. Croft. Does back pain prevalence really decrease with increasing age? A systematic review, 2006,35, 3, 229–234.
21. Bejia I, Abid N, Ben Salem K, Letaief M, Younes M, Touzi M, et al. Low back pain in a cohort of 622 Tunisian school children and adolescents: an epidemiological study. Eur Spine J 2005; 14: 331-6.
22. Griffith LE, Hogg-Johnson S, Cole DC, Krause N, Hayden J, Burdorf A, et al. Low-back pain definitions in occupational studies were categorized for a meta-analysis using Delphi consensus methods. J ClinEpidemiol 2007; 60: 625-33.
23. Kebede A, Abebe SM, Woldie H, Yenit MK (2019). Low Back Pain and Associated Factors among Primary School Teachers in Mekele City, North Ethiopia: A Cross-Sectional Study. Occupational Therapy International. 2019:3862946
24. Naude, B. Factors associated with low back pain in hospital employees (Doctoral dissertation, University of the Witwatersrand. 2008.
25. Shiri R, Solovieva S, Husgafvel-Pursiainen K, Taimela S, Saarikoski LA, Huupponen R, et al. The association between obesity and the prevalence of low back pain in young adults: the Cardiovascular Risk in Young Finns Study. Am J Epidemiol 2008; 167: 1110-9.
26. Abebe, A. D., Gebrehiwot, E. M., Lema, S., & Abebe, T. W. Prevalence of low back pain and associated risk factors among Adama Hospital Medical College Staff, Ethiopia. Eur J Prev Med, 2015, 3(6), 188-192.
27. Mohseni-Bandpei, M. A., Ahmad-Shirvani, M., Golbabaei, N., Behtash, H., Shahinfar, Z., & Fernández-de-las-Peñas, C. Prevalence and risk factors associated with low back pain in Iranian surgeons. Journal of manipulative and physiological therapeutics, 2011, 34(6), 362-370.
28. Edwards J, Hayden J, Asbridge M, Gregoire B, Magee K. Prevalence of low back pain in emergency settings: a systematic review and meta-analysis. BMC MusculoskeletDisord. 2017;18(1):143.
29. Palmer KT, Walsh K, Bendall H, Cooper C, Coggon D. Back pain in Britain:Comparison of two prevalence surveys at an interval of 10 years. BMJ2000; 320:1577-8.
30. Elias, H. E., Downing, R., & Mwangi, A. Low back pain among primary school teachers in Rural Kenya: Prevalence and contributing factors. African journal of primary health care & family medicine, 2019, 11(1), 1-7.
31. Alzidani, T. H., Alturkistani, A. M., Alzahrani, B. S., Aljuhani, A. M., & Alzahrani, K. M. Prevalence and risk factors of low back pain among Taif surgeons. Prevalence, 2018, 7(3), 172-177.
32. Jensen, J. N., Holtermann, A., Clausen, T., Mortensen, O. S., Carneiro, I. G., & Andersen, L. L. The greatest risk for low-back pain among newly educated female health care workers; body weight or physical workload? BMC Musculoskeletal disorders, 2012, 13(1), 1-6.
33. Shieh SH, Sung FC, Su CH, Tsai Y, Hsieh VCR. Increased low back pain risk in nurses with high workload for patient care: a questionnaire survey. Taiwanese Journal of Obstetrics and Gynecology. 2016; 55(4):525–529.