AJMAS
https://alqalam.utripoli.edu.ly/science/ eISSN 2707-7179

Original article

Pattern and Determinants of Self-Reported Lower Limb Pain Among Libyan Female Teachers in Elementary Schools of Tripoli, Libya

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ARTICLE INFO

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Received: 13-02-2022 ***Accepted***: 21-02-2022 ***Published***: 23-02-2022
Keywords: Lower Limb Pain, Standing, Female, Teachers, Libya.

ABSTRACT

Background and aims. *School teachers represent an important work group. Lower limb pain is a common work-related problem among teachers, though its magnitude and pattern were not explored in Libyan school settings. This study described the prevalence and pattern of self-reported lower limb pain among Libyan female school teachers. The study also examined the association between the self-reported lower limb pain and selected demographic, medical and work-related factors.* ***Methodology****: A cross sectional study was conducted among female school teachers in the western district of Tripoli. Data analysis was performed using the SPSS version 6.* ***Results****. A total of 241 female school teachers participated in the study, their mean age was 40.5 (SD=8.5) years. The prevalence of lower limb pain was 80.1%. In the majority of those who reported lower limb pain, the pain was a bilateral legs pain (81.3%), and in about half of them was provoked by prolonged standing (51.3%). Out of all studied variables, the bivariate analysis showed a statistically significant association between the self-reported lower limb pain and the presence of chronic disease (p=0.011). The contribution of having a chronic disease to reporting lower limb pain persists in the multivariate analysis (OR=9.647, 95% CI= 1. 279-72.784), though, this should be cautiously interpreted because of the wide confidence interval of the odds ratio.* ***Conclusion.*** *Lower limb pain is a considerable problem among female school teachers in Libya. Programs directed to increase awareness among teachers about the impacts of static standing and to promote practicing dynamic standing are recommended.*

Cite this article. *Benrween A, Eshakshouki S, Ashur S, Ibrahium F. Pattern and Determinants of Self-Reported Lower Limb Pain Among Libyan Female Teachers in Elementary Schools of Tripoli, Libya. Alq J Med App Sci. 2022;5(1):126-133.* https://doi.org/10.5281/zenodo.6249399

INTRODUCTION

Work is an important earning component in life, but if not done in an appropriate way, it can lead to health hazards. School teachers constitute a distinguished work group. In Libya, teaching is one of the largest professions. There are 400,000 school teachers in the country, and females comprise 85% of them [1]. The education sector is the largest in terms of total public service employees, and the proportion of female teachers is rising in most countries [2]. Teaching is a profession that demands prolonged static standing periods, which represents one of the main ergometric risks [3]. The role of school teachers includes teaching students, planning classes, correcting homework, and administrative chores. While standing to give a lesson in the classroom, teachers tend to slouch and move their weights from one foot to the anther in order to relieve stress. Slouch encourages a fixed attitude that makes the employee less aware and more passive. Static standing for long duration can lead to several adverse health impacts [4], including muscle pain and discomfort [5,6]. Correspondingly, several studies have identified prolonged standing as a significant determinant of musculoskeletal pain among teachers [7-10].

Experiencing pain in various body segments is among the most commonly reported health complains among school teachers [11]. Several studies have shown that lower limbs represent one of most commonly reported pain sites. For instance, pain in the lower extremities was more prevalent than pain in the upper limbs in Brazilian school teachers [12]. Likewise, a study among school teachers in India reported that more than one quarter of the respondents have lower limb pain, with knees was the most common site, followed by ankle and hip [13]. Similarly, an Iranian study found that leg pain

was the third most common health complaints among school in teachers and the second most common severe complaint [14]. Higher figures of pain in lower limb sites were reported in a more recent study among teachers in Kenya [9]. A Saudi study reported a prevalence of legs pain among female teachers of 40% [15].

Nevertheless, relatively more attention has been paid to the epidemiology of pain and musculoskeletal disorders of the upper limbs and low back region [16], while relatively little research addressed self-reported lower limb pain.

Several studies have reported that the problem of musculoskeletal pain is higher among female teachers than among male teachers regardless the compared anatomical site of the pain, both among Arab [8,17], and non-Arab settings [12,13].

Having lower limb pain could impact the health quality of life of teachers [18-20]. Other consequences include increase the risk of sick leaves intake [8] and reduction in productivity. To our knowledge, this study is the first to investigate lower extremity pain among school teachers in Libya. The study examined the prevalence and pattern of the self-reported lower limb pain among Libyan female school teachers. It also assessed the association between the reported lower limb pain and selected demographic, medical and work-related factors.

METHODS

A cross sectional study was conducted in 2019 among Libyan female teachers in the public elementary schools located in the western district of Tripoli- Libya; Janzur. Using Kish formula, and a prevalence of legs pain of 40% reported among female school teachers in a recent study in a comparable setting (15), the sample size needed for estimating lower limb pain prevalence was 368. The respondents were recruited from the public elementary schools in the district using a convenient sampling technique, and the participation in the study was voluntary.

A structured self-administered questionnaire was used to collect selected demographic (age), medical (e.g., presence of chronic diseases), and work-related information (e.g. work hours per week, shift work). Hight and wight data needed to calculate the BMI variable were measured using tape and portable weighting scale, except for those who self-reported their recent measurements taken within one week prior the study assessments. The outcome variable of interest; lower limb pain, was measures using a single item: “Have you experiencing any pain in your lower limbs (hips, thighs, knees, legs, or feet)? This question was attached to a two-response scale: yes and no.

The statistical package for social sciences (SPSS), version 26 was used to conduct the statistical analysis. Frequency and percentages were used to summarize the categorical variables. Mean and standard deviation or median and interquartile ranges were used to describe the continues variables as appropriate for their distribution type. Chi-square test, independent t test and Mann-Whitney test were used to examine for the bivariate association between the study variables and lower limb pain. the level of significance was p of less than 0.05. Variables that showed significand or nearly significant ($p<0.25$) bivariate association with lower limb pain were considered in the multivariate analysis using logistic regression.

RESULTS

Only 241 teachers met the inclusion criteria and participated in the study, which yields a response rate of 65.4%. Table 1 summarizes the age, medical and work-related characteristic of the study sample. The age ranged from 19 to 62 years old, with a mean of 40.5 (SD=8.5) years. Middle-aged adults group constituted 66.8% of the sample. Overweight and obesity category was considerable (65.3%). Only 14.5% reported having at least one chronic morbidity, with hypertension and diabetes were the two most common morbidities. Concerning work-related characteristics, the mean work duration of the subjects was 15.3 (SD=9.6) years. The majority of the study subjects work only for one to six hours per week, (81.6%), and around two-thirds of them work during the morning shift (75.9%). Self-reported Lower limb pain was prevalent (80.1%).

Table 1 Age, medical and work-related characteristic of the respondents (n=241)

Variables	f	(%)	Range
Age (mean±SD)	40.5	±8.5	19-62
Young adult (19-35 yrs)	69	(28.6)	
Middle-aged adults (36-55yrs)	161	(66.8)	
Older adults >55 yrs	11	(4.6)	
BMI (mean±SD), (n=222)	28.0	±4.9	16.7-41.6
Under weight	3	(1.4)	
Normal	74	(33.3)	
Overweight and Obese	145	(65.3)	
Presence of ≥ 1 chronic disease			
No	206	(85.5)	
Yes	35	14.5	
Chronic diseases Profile*			
Hypertension	9	(3.7)	
Diabetes Mellitus	7	(2.9)	
Asthma	4	(1.6)	
Sinusitis	2	(0.8)	
Hypothyroidism	1	(0.4)	
Hepatitis	1	(0.4)	
IBS	1	(0.4)	
Allergy	1	(0.4)	
UTI	1	(0.4)	
Not specified	10	(4.1)	
Long-term medications			
No	213	(88.3)	
Yes	28	(11.6)	
Work duration (years) (mean±SD) (n=232)	15.3	±9.6	1-37
1-10	89	(38.4)	
11-20	85	(36.6)	
≥ 21	58	25.0	
Working Hours per week (n=212) (Mdn, IQR)	4	(3-5)	1-14
1-6	173	(81.6)	
7-12	37	(17.5)	
≥13	2	(0.9)	
Shift work system (n=238)			
Morning	183	75.9	
After noon	42	17.4	
Morning and after noon	13	5.4	
Pre-employment examination (n=72)			
Yes	61	(84.7)	
No	11	(15.3)	
Periodic health examination (n=72)			
Yes	16	(22.5)	
No	55	(77.5)	
Lower Limb Pain			
Yes	193	(80.1)	
No	48	(19.9)	

** Total chronic diseases > 35 as some respondents reported having more than one disease*

Table 2 describes the profile of lower limb pain among those who have lower limb pain. The most prevalent pain site was the bilateral legs pain (81.3%). In over the half of the subjects, the pain onset was gradual (64.8%), and in about half of them it had an interrupted course (50.3%). The median duration of pain in this teacher's cohort was 3 years (IQR=4).

Prolonged standing showed to be a more important pain provoker compared to walking, and was reported by 51.3% of the subjects. Consistently, standing was on top of the aggravating factors, and was reported by 80.3% of the subjects. Around half of the subjects reported rest as their pain alleviator. Lower limb oedema was associated with the lower limb pain in 36.8% of the subjects.

Table 2 Clinical Profile of Lower limb pain among the respondents(n=193)

Variables	f	(%)
Site		
Both legs	157	(81.3)
One leg	14	(7.3)
knee	8	(4.1)
Not specified	14	(7.3)
Onset		
Sudden	51	(26.4)
Gradual	125	(64.8)
Not specified	17	8.8
Duration (years) (Med, IQR)	3	1-5
1-6 years	94	(48.7)
≥7 year	20	(10.3)
Not specified	79	(40.9)
Nature*		
Crumbs	78	(40.4)
Heaviness	70	(36.2)
Discomfort	92	(47.6)
Not specified	77	(39.8)
Pain Course		
Continuous	70	(36.3)
Interrupted	97	(50.3)
Not specified	26	(13.5)
Provoking factors		
Prolonged standing only	99	(51.3)
Walking only yes	9	(4.6)
Both, prolonged walking and walking	71	(36.8)
Not specified	14	(7.3)
Aggravating factors		
Standing	155	(80.3)
Stairs	3	(1.6)
Seat for long time	4	(2.1)
Walk	4	(2.1)
Rest	1	(0.5)
Driving	1	(0.5)
Home work	1	(0.5)
Sport	1	(0.5)
Not specified	23	(11.9)
Relieving factors		
Massage ~~and~~ with topical medicine	26	(13.5)
Having rest	98	(50.8)
Walking	4	(2.1)
Sleeping	4	(2.1)
Wearing special Socks	2	(1.0)

Sitting	33	(17.1)
Not specified	26	(13.5)
Association with lower Limb swelling	71	(36.8)

** total >193 as some respondents reported more than one pain nature,*

Table 3 showed the bivariate association between selected demographic, medical and work-related characteristics with lower limb pain. Only the presence of chronic disease showed a significant association with lower limb pain (p=0.011), with a higher proportion of lower limb pain reporters among those who have at least one chronic disease (97.1%) than in chronic disease-free subjects (77.1%).

Table 3: Bivariate association between lower limb pain and selected demographic, medical and work-related characteristics (n=241)

Variables	**Lower Limb Pain**				**P**
	Yes (n=193)		**No (n=48)**		
	f	**(%)**	**f**	**(%)**	
Age	40.2	±8.2	40.7	±9.0	0.670[a]
BMI	27.6	±5.0	27.5	±4.4	.948 [a]
Presence of ≥ 1 chronic disease					
No	158	(77.1)	47	(22.9)	0.011 [b] *
Yes	34	(97.1)	1	(2.9)	
Work duration (years)	14.4	±9.4	15.5	±9.8	0.491 [a]
Working Hours per week	4.0	(3-6)	5.0	(3-6)	0.304 [c]
Shift work system					
Morning	143	(78.1)	40	(21.9)	0.190 [b]
After noon	37	(88.1)	5	(11.9)	
Morning and after noon	12	(92.3)	1	(7.7)	

** p<0.05, a based on independent t test, b based on Chi-square test, c based on Mann-**Whitney test***

The variables that showed significant and nearly significant bivariate association with lower limb pain in the bivariate analysis were entered into a multiple logistic regression model. The model showed that only the presence of at least one chronic disease contributes significantly to lower limb pain, whereby female teachers who have at least one chronic morbidity are almost ten times more likely to have lower limb pain than those who do not have any chronic diseases (OR=9.647, 95% CI= 1. 279-72.784). Nevertheless, as the odds ratio confidence interval is broad, this should be interpreted with causation. The nearly significant contribution of shift work time to lower limb pain disappeared in the controlled analysis (Table 4).

Table 4: Logistic regression Model of Lower limb pain predictors in Libyan female teachers

Variables	**B**	**Wald**	**P**	**Adj. Odds**	**95%CI**
-Presence of ≥ 1 chronic disease: Yes vs No	-2.267	4.833	.028*	9.647	(1.279-72.784)
-Shift work		2.624	.269		
Afternoon vs Morning	-.545	1.099	.295	1.724	(0.495- 31.176)
Morning and afternoon vs Morning	-1.368	1.676	.195	3.928	(1.279- 72.784)
-Constant	-1.117	37.037	0.000	3.055	

DISCUSSION

Self-reported lower limb pain found to be a common problem among Libyan female teachers. The reported prevalence in this study was considerable, and even higher than that reported among female teachers in some other Arab settings like Saudi Arabia [15,21]. Unlike other studies that reported knees as the most common site for lower limb pain [15,21], in our study, legs were the most prominent site. The pain is mainly provoked and aggravated by prolonged standing, alleviated with rest and usually associated with lower limb oedema. This pattern may reflect having underlying venous insufficiency problems, which are common in professions characterized by long static standing [22]. Research has reported that static standing increases the risk of developing varicose veins [23], and is associated with increase in leg volume [24], and venous oedema [25]. In line with this view, a study that compared health problems between teachers and workers in other employments found that the prevalence of varicose veins is significantly higher in female teachers compared to non-teachers [26]. These findings alert to the need for developing and implanting preventive measures directed to minimize the ergometric risks of prolonged static standings, including pain. Examples include increasing awareness among teachers about the adverse impacts of static standing and promoting healthy habits like practicing dynamic standing.

While several studies have identified age as an important musculoskeletal pain predictor both in teachers in general (12), and in female teachers [15,21], none of the demographic characteristics shown to contribute to lower limb pain in our study. Though, the research evidences on the contribution of age to self-reported pain among female teachers are mixed, and like in our study, age was not an associated factor with pain in some other Arab studies [10,27].

More than half of the participants had BMI corresponds to overweight and obesity. However, the findings did not support the association between lower limb pain and BMI. Similar finding was reported in a Saudi study among a comparable sample, where BMI was only associated with heel pain, but not with pain at hips, knees or ankles [27]. Such findings were against expectations, and inconsistent with several other research results research [10.15].

Likewise, none of the studied work-related factors found to determine lower limb pain. Although prolonged standing was reported by half of the respondents as their pain trigger, the vast majority of them work only for 6 hours and less per week, and work hours variable was not a significant determinant of lower limb pain. Like in our study, Abdulmonem and colleagues' study among female teachers found no association between teaching hours and self-reported pain at any anatomical site [27].

Additionally, teaching years was not a determinant of lower limb pain, which was consistent with some research among female and male teachers [10,27]. However, many other studies among female teachers found a relationship between teaching years and experiencing pain [15,21]. The lack of association between the work-related factors and reporting lower limb in our study could has been occurred due to issues like lack of enough sample power to detect the association.

Less than one fifth of the respondents reported having at least one chronic disease, and none of the reported morbidities was a musculoskeletal condition. Though, we found that co-morbidity is a predictor of lower limb pain. Consistent finding was reported in a Saudi study among female school teachers, where the presence of chronic illness was association with the severity of the musculoskeletal pain, particular in lower limb segments like hips, knees and heels [27]. In the same context, another study among kindergarten and school teachers in Brazil reported an association between their general health and well-being, and having musculoskeletal pain, including lower limb pain (28). The contribution of chronic morbidities to lower limb pain may has occurred because of some latent factors that were not covered in this study. One possible factor is the neglection of seeking care for the pain, as research has found that having comorbidity is associated with poorer pain care [29]. Moreover, the subjectivity of self-reporting of the presence of chronic morbidities, as well as the possibility of recall bias should be considered in the interpretation of this finding. Furthermore, some statistical considerations should also be taken into account. The confidence interval of the associated odds was quite broad that the true strength of the contribution remains uncertain. particularly with lack of research that support such contribution.

STUDY LIMITATION

Several limitations should be considered in the interpretation of the above findings. The subjective nature of self-reporting of lower limb pain might have affected its measurement accuracy. Besides, the study used a single-item for lower limb pain measurement, which is known to underperform multi-item measures in terms of psychometric properties [30]. However, the use of a single question was deemed appropriate in this study for its practical advantages. Another pitiful of this study was the use of a non-probability sample, which limits the generalizability of its findings.

CONCLUSION

The present study revealed that lower limb pain is a considerable problem among female teachers in Libya. Although the study did not find a significant impact of the studied work-related factors on the reported pain, it defined its pattern as being mainly experienced in legs and provoked and aggravated by prolonged standing. As teaching demands relatively long-standing periods, the workplace as well as work policies and programs should be structured to improve work-conditions of teachers to minimize standing time and consequently its associated health risks.

Programs directed to increase awareness among teachers about the impacts of static standing and promote practicing dynamic standing are also recommended. Attention should be paid to chronic disease among teachers as through the implementation of prevention strategies and structing health insurance programs to maintain their health, and working ability and productivity. Further research is needed to identify other predictors of lower limb pain using a larger random sample.

Disclaimer

The article has not been previously presented or published, and is not part of a thesis project.

Conflict of Interest

There are no financial, personal, or professional conflicts of interest to declare.

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