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Work-related musculoskeletal symptoms among employees with different tasks: Ahlia University case study.

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Abstract

Background: Work-related Musculoskeletal disorders (MSDs) are accountable for the morbidity in majority of the working population and is a known occupational problem that is characterized as multifactorial. The aim of the study was to investigate the prevalence MSDs and to determine the relationship between MSDs and BMI among the AU workers.

Methods: 200 subjects both male and female from AU employees with the age ranging from 22-56 years old were included in the study. Demographic data were collected such as the age, nationality, gender, marital status, occupation, height, weight and BMI. All participants were given Nordic musculoskeletal questionnaire.

Results: The results revealed that 45% have low back pain while 40% have also neck pain during the 1 year period of work. It is consistent in our study that majority of our participants have low back pain during the last 12 months (32%) and last 7 days (31%). The most commonly correlated with MSDs is the occupation followed by number of years in the job. BMI scores had a negative correlation with a) neck; wrist/hands; knees. All other body parts had positive correlation with their respective BMI scores.

Conclusion: Work place influences the development of MSDs among Ahlia University employees and are positively related to complaints in the different body parts particularly the lower back and neck. MSDs have high relationship between occupation, number of years in the job and age. There is no significant relationship between BMI and specific body parts MSDs.

Keywords: Musculoskeletal disorders, Body mass index, Pain, Nordic questionnaire, Occupation, Daily living activity, Obesity, Work, Tasks.

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Introduction

Musculoskeletal disorders (MSDs) is defined as connective tissue or musculoskeletal diseases that causes muscles pain or injuries from sudden or sustained contact to repetitive motion, force, vibration or wrong postural movement. MSDs involve injuries or disorders to the muscles, joints, tendons, cartilage, nerves and spinal area of the upper limbs (UL) and lower limbs (LL), neck and lower back [1,2].

The most common MSDs are muscle soreness, strain, carpal tunnel syndrome (CTS), low back pain (LBP) sprain and connective tissue injury caused by force or trauma 2. MSDs are the largest occupational problem that account to about 1/3 of all the registered occupational diseases and they are also considered the most common work-related health problem in Europe, United States of America and Asia [3].

Work-related MSDs among hospital nurses were studied in Ajman, UAE. Their study showed that 39% of the nurses have work-related MSDs. After one year of study, it has been documented that 38% has MSDs in any part of the body. The most common area was the lower back (29%) followed by ankle (20%) [4]. Worldwide, MSDs are the second most common reason for the disability with LBP as the frequently complained by the patients [5].

Yasobant and Rajkumar reported that work-related MSDs are accountable for the morbidity in majority of the working population and is a known occupational problem that is characterized as multifactorial. They reported that work-related MSDs account for 215 billion dollars in the USA in 1995, 38 billion Euros in Germany in 2002 and 26 billion Canadian dollars in Canada in 1998 [6]. MSDs when left untreated can develop into a more serious and inflammatory conditions which can have negative impact on the workers on their ADL [7].

MSD's are more prevalent in employees that are working with a computer and complaints such as the shoulders, neck, UL and low back. It is a contributing factor for the development of MSD's but also the Body mass index (BMI) [8]. Risk factors are important indicators for the development of MSDs such as age, sex, occupation, smoking, work stress, heavy weight lifting [9]. Workplace psychosocial factors can be a contributing factor for the development of MSD's [8]. The

development of MSDs is prevalent in workers that cause chronic disability that affects the ADL of an individual [10].

However, MSD's are commonly neglected due to the demand of work and the need for an individual to complete the daily task in order to keep up with their current job. The progression of MSD's depends on the occupation of the person where symptoms of MSD's are more evident. Employees in Ahlia University (AU) are prone for the development of MSD's like any other employees in any other organization.

Therefore, the aim of the present study was to investigate the prevalence of MSDs among the AU workers and to determine the relationship between MSDs and BMI, type of job, age, gender, nationality, marital status, and number of years on the job.

Material and Methods

Subjects

The study sample was convientient one included 200 subjects both male and female from AU employees with the age ranging from 22-56 years old. Demographic data was collected such as the age, nationality, gender, marital status, occupation, height, weight and BMI. All study subjects that meet the inclusion criteria were given informed consent form.

Inclusion and exclusion criteria

Inclusion criteria included the subjects with Full time employee of AU for more than 1 year, Male and Female ages 22-56 years old and Working for more than 7 hours a day.

Participants with the following previous trauma or injures, underwent surgery, history of psychological problem, sever physical disability which causing a pain and any medical condition causing pain were excluded from the study. The study was approved by the Ethical and Research Subcommittee from the Academic Research and Intellectual Contribution Committee, Ahlia University. The study design used in this study is a descriptive cross-sectional that investigate the prevalence incidence of MSDs among Ahlia University employees and determine the relationship of MSDs with BMI.

All participants were given a questionnaire included two parts, the demographic data and the Nordic Musculoskeletal Questionnaire (NMQ) then Weight and Height were measured and computed for the BMI. The demographic data for the study subjects which includes name, age, gender, nationality, marital status, occupation, number of years in the job, weight, height and BMI.

Nordic Musculoskeletal Questionnaire was used to assess any locomotive problems in the body. There are two sections for the Nordic questionnaire; one with general questions which including 40 forced choice items regarding the areas of the body that causes MSDs symptoms or problems. There are nine symptom sites which include the neck, shoulders, elbows, wrists/hands, upper back, lower back, hips/thighs, knees and ankles/feet. All the participants will be asked if they had MSDs symptoms in the last twelve months and last seven days which may have caused them any problem while doing their work. The second section is the additional if the answer was YES. Twenty-five forced choice questions about factors that may produce injury or accidents in the affected area. It can have functional impact at work, house or both. It will also assess the duration of the symptom or problem and if they had any consultation from a health care professional within the last seven days. This standardized questionnaire was used because it has been used for any research regarding MSDs due to its validity and reliability [11,12]. Moreover, Nordic musculoskeletal questionnaire can also detect or screen any MSDs problem. Some participants may not know that they had MSDs and may not have consulted any health care professional. This type of questionnaire is useful in assessing MSDs.

The BMI was computed by getting the weight and height of each participant. According to the World Health Organization (WHO), BMI Classification is a simple way to classify underweight, overweight and obese person which is weight-for-height. It is defined as weight in kilograms divided by the height in meters square (kg/m^2). BMI values are according to the age for both male and female.

All information collected from the participants are strictly confidential without using any form of social media, all study participants had the right to withdraw at any time from participating in this study.

Statistical analysis

All questionnaires that have been completed were included in the statistical analysis. Statistical Package for social sciences (SPSS) version 23 was used to analyze the mean, standard deviation and percentage of age, nationality, gender, occupation, number of years in job, marital status and BMI. Furthermore, the percentage of the most common sites for MSDs and which is the highest was analysed. To identify factors contributing to the MSDs development, Pearson's Correlation was used to test the correlation between MSDs and the subject demographic characteristics.

Results

A total of 200 participants, 106 (53%) males and 94 (47%) females were included in this study. Majority of the participants were in the age group of 32-36 years old. The least number was at the age group between 47-51 years old as showed in Table 1. The results showed that most of the participants were married 123 (61.5%) while only 4 (2%) participants were divorced. Majority of the participants in this study were office worker (51.5%) while only 0.5% was office boy or working in the management. The results showed that (45.5%) were working from 1-5 years only while only 9% were working for more than 15 years. The mean of the number of years in the job is 50 with a standard deviation of 84.60.

Regarding the BMI, the results showed that (47.5%) were in the normal BMI range of 18.5-24.9 while only 1% was in the

obese class III. The mean of the BMI is 24.8 with a standard deviation of 4.5, as presented in Table 1. The majority of the participants that were working in Ahlia University were Bahraini with 69% while only 0.5% where from Gambian, Srilankan, Lebanese, Nigerian, Chinese, Saudia, North American and Kenyan, as showed in Table 2.

The 12-month prevalence of MSDs was found to be (44.5%) with low back pain while only 16% have one or both hips/thigh. Most of the participants have low back pain during the last 12 months that have been prevented them from doing normal work while only 6% have elbow pain. Majority of the participants (31.5%) have low back pain followed by neck (23.5%) during the last 7 days while only 5.5% have elbow pain, as presented in Table 3.

There were no significant different between age, gender, occupation, number of years in the job and MSDs while there were significant difference between nationality, marital status and age as showed in Table 4.

The summarized results of the correlation analysis between BMI with symptoms during the last twelve months are illustrated in Table 5. Overall, the correlations between BMI with symptoms felt by the respondents in all of the body parts covered by the survey were insignificant ($p>0.05$). Despite BMI scores had a negative correlation with neck, wrist /hand, knee ($p=0.60$, $r=-0.053$; $p=0.52$, $r=-0.065$; $p=0.49$, $r=-0.071$) and positive correlation with the other body parts, but all those correlations did not reach the significant level as p values were >0.05.

The results of the correlation analysis between BMI and MSDs with symptoms encountered during the past twelve months with avoidance of work in body parts were insignificant ($p> 0.05$).

When BMI scores were correlated with variables of symptoms felt during the past 7 days, results were similar to those earlier cited in the two previous correlations were insignificant ($p> 0.05$).

Table 1. *The demographic data.*

Characteristics	Frequency
Gender	
Male	106 (53%)
Female	94 (47%)
Age (years)	
22-26	51 (25.5%)
27-31	39 (19.5%)
32%)	60 (30%)
37-41	14 (7%)
42-46	21 (10.5%)
47-51	7 (3.5%)
52-56	8 (4%)
BMI	
Underweight	7 (3.5%)
Normal	95 (47.5%)
Overweight	69 (34.5%)
Obese	29 (14.5%)
Marital Status	
Married	123 (61.5%)
Single	73 (63.5%)
Divorced	4 (2%)
Occupation	
Cleaner	14 (7%)
IT	3 (1.5%)
Management	1 (0.5%)
Office Boy	1 (0.5%)
Office Worker	103 (51.5%)
Security	27 (13.5%)
Teacher	51 (25.5%)

Table 2. *Nationality distribution of the participants.*

Nationality	Number	Percentage
Bahraini	138	69
Indian	23	11.5
Filipino	7	3.5
Pakistani	4	2
Bangladeshi	9	4.5
Kenyan	1	0.5
Iraqi	2	1
Egyptian	2	1
Gambian	1	0.5
Srilankan	1	0.5
Lebanese	1	0.5
Nigerian	1	0.5
Chinese	1	0.5
Saudia	1	0.5
Nepali	5	2.5
North American	1	0.5

Tunisian	2	1

Table 3. The prevalence of MSDs among Ahlia University employees.

Characteristics	%	Neck	Shoulder	Elbow	Wrist/hand	Upper back	Lower back	hip	knee	Ankle/ feet
12 months period prevalence	%	40%	29%	9%	24.5%	27.5%	44.5%	16%	24.5%	17.5%
	N	80	58	18	49	55	89	32	49	35
Severity of MSDs to affect ADL	%	23.5%	22%	6%	18%	21%	32%	10.5%	17%	11.5%
	N	47	44	12	36	42	64	21	34	23
7 days point prevalence	%	23.5%	20%	5.5%	20.5%	19%	31.5%	10.5%	15.5%	13.%
	N	47	40	11	41	38	63	21	31	27

Table 4. Pearson's correlation between MSD with age, gender, nationality, marital status, occupation, number of years in the job.

Variables		Age	Gender	Nationality	Marital status	Occupation	Number of years in job
MSDs	r	0.46	0.61	0.18	0.32	0.79	0.86
	P-value	0.043	0.064	0.011	0.044	0.082	0.073

Table 5. The relationship between BMI and MSDs.

Body parts	12 months period prevalence		Severity of MSDs to affect ADL		7 days point prevalence	
	r	P	r	P	r	P
Neck	-0.053	0.60	-0.067	0.51	-0.094	0.35
Shoulders	0.095	0.35	0.144	0.15	0.072	0.47
Elbow	0.044	0.67	0.089	0.38	0.044	0.66
Wrist/Hands	-0.065	0.52	-0.019	0.85	-0.078	0.44
Upper back	0.018	0.86	0.021	0.83	0.013	0.90
Lower back	0.031	0.76	0.026	0.80	-0.148	0.14
Hips	0.018	0.86	-0.039	0.70	0.030	0.77
Knees	-0.071	0.49	0.030	0.76	0.051	0.62
Ankles/Feet	0.039	0.70	0.056	0.58	0.048	0.64

Discussion

The present study was the first to investigate the prevalence incidence of MSDs among the AU workers and to determine the relationship between MSDs and BMI, type of job, age, gender, nationality, marital status and number of years on the job. Therefore, there is no data with which to directly compare it.

The current study revealed no significant correlation between the BMI and MSDs development among workers. These results contradict with many studies [13-21] who stated the positive association between BMI and MSDs especially among office workers with physical workload. Furthermore, previous study by Tantawy et al. [22] showed a consistent result of non-significant correlation between MSDs and BMI among Ahlia University students in different disciplines. The current study findings can be attributed to the majorty of participant 48% had normal BMI and developed MSDs so, a high BMI not neseccary to be an indicator that this person may develop MSDs. There is no much difference among the participants with MSDs with normal BMI 48% versus overweight 35%, this only proves explanation mentioned earlier.

The majority of participants in the present study had low back pain during the last 12 months (44.5%) and last 7 days (31.5%). The participants had problems with these areas that caused them to have trouble while working. This is consistent with the study of Kaliniene et al. [8] who stated that majority of subjects had have low back pain (56.1%) and as Eastern Mediterranean region inhibitants have high risk to low back pain than other parts of the body [23]. This is supported with 50% reported low back pain among construction workers in Saudi Arabia [24] and 30.3% among bank workers in Kuwait [25].

The second most common affected site of the body was the neck which accounts to 40% and 23.5% of neck pain during the 12 months and last 7 days prevalence. This contradicts with Hayes et al. [26], their study has more prevalent on neck pain (64.3%) followed by 57.9% have also low back pain among dental hyagine students in Australia. Same with Abledu & Offei [27], their study has more common on the neck pain accounting for 28% while only 23.6% for low back pain among nursing students.

Regarding the age groups, the highest age group presnted with MSDs, was ages range 32-36 years old with incidence 30%. This is the majority age group of majority of the working population for both Kuwait and Bahrain [28]. This highlights an important issue as MSDs due to working environment may be developed at an early age.

In present study 53% of the participants were male and only 47% were female. This is in contradiction with different studies which stated that higher prevalence of MSD is found among women than in men either students or workers and in different parts of the world [28-30]. This contradiction can be attributed to gender presentation in their study, there were many female workers unlike in Bahrain, majority of workers are male.

The majority of participants reported MSDs were office worker 52% and this was supported with many studies [29-31], who concluded the same workplace to be a major contributor in MSDs development especially when dealing with computer for long time [8,31]. This is because of the prolonged sitting position and high risk of faulty postures and stressing over different body parts.

In comparison with [21,32], their studies involved health care professionals such as doctors and nurses. Because their job requires be standing most of the time or attending to their patients helping them and bending down for the patients, they can develop MSD throughout the period of time that they were working.

Nationality and marital status do not have much correlation with ($p=0.011$ and $p=0.044$) respectively. Even if majority is from Bahrain, other staff is also within the region or Asian countries. But regardless of their nationality, MSD can still develop. Same goes with marital status even if majorities are married; it does not show that MSD only develops among married individuals.

Conclusion

Possible explanation for the lack of correlation between the variables in any given part of the body may have been weight is not a significant factor in this study that may cause work-related musculoskeletal symptoms among the office workers. Likewise, the length of time office workers spend may be a possible factor why no association or relationship was noted in the study. It may indicate that office habits involving working for a prolonged period of time may not be a contributory factor in the MSDs development. It may also be due that office workers do other things such as taking frequent walks during their task period hence the occurrence of MSDs is not yet fully evident. Likewise, respondents may be taking frequent break periods during their work. Likewise, the length of time doing office works tasks can also be a contributory factor, This may indicate that majority of the workers have not worked continuously within a day unlike listed in other studies in the literature review. The nature of the tasks in the office is also contributory factor why associations were not linked. Office work tasks may be very light hence the developments of symptoms were not fully reported in different body parts.

Limitations of the study

The limitations of the study include the use of a self-reported questionnaire which is affected by the subject status of the employees and a recall bias. Moreover, physical activity level was not involved in the study and unequal number of females and males.

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Conflicts of Interest

The authors declare that they have no competing interests.

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