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Work-Related Physical Activities Associated with Musculoskeletal Disorders

¹Abue AD, ¹Rimamtsab J, ¹Umana UE, ²Ujaddughe OM, ¹Aniah JA

¹Faculty of Basic Medical Science, University of Abuja, Abuja - Nigeria.

²Faculty of Basic Medical Sciences, Ambrose Alli University, Ekpoma - Nigeria.

Corresponding Author: Ujaddughe OM

Email: ujaddughemoses@aauekpoma.edu.ng; +2347031093532

ABSTRACT

Musculoskeletal disorders (MSDs) are injury or pain affecting the musculoskeletal system. According to previous studies, MSD decrease productivity at work due to sick leave, absenteeism and early retirement, and are also costly in terms of treatment. This study assessed work-related physical activities with MSDs. The sample included 398 public school teacher selected randomly. A cross sectional study design and simple random sampling was used to select nine out of twenty eight public secondary schools. A total of 398 participants were selected randomly. Data were collected using a questionnaire. The results showed a relationship between physical activities and MSD. This study has shown that younger teachers have also been found to experience MSDs and work-related physical activities can be associated with the development of musculoskeletal disorder.

Keywords: Work-related, Physical activities, Musculoskeletal Disorders, Teachers

INTRODUCTION

Musculoskeletal disorders (MSDs) are injuries or pain affecting the human musculoskeletal system including the muscles, joints, tendons, ligaments, nerves, bones and the localised blood circulation system, that may be caused by or aggravated by work tasks and by the effects of the immediate environment in which work is carried out¹. MSDs are also referred to as Cumulative Traumatic Disorders (CTDs), Occupational Overuse Syndrome (OOS), or Repetitive Strain Injuries (RSIs). MSDs have various definitions. Some of the definitions rely on subjects reported frequency, duration or intensity of pain², while others define subjects as any report of pain that causes changes in functioning³. MSDs are common across social class boundaries and are therefore viewed as a major, most common and most expensive occupational health problem, both in developed and developing countries^{4,5}. Non-neutral body postures, forceful exertions, vibration, rapid work pace and repetitive motion are the physical ergonomic features of work considered to be risk factors for MSDs^{6,1,7}. In the teaching profession work-related musculoskeletal disorder (WRMSDs) is caused by repetitive movements, continuous static awkward postures, age, gender and number of years in practice⁸. While physical factors are important predictors in developing WRMSDs for teachers, psychological factors may also be involved. These factors include; mental stress due to excess workload, less support from colleagues and short duration of break time during working hours⁹. Hence, this study aimed to assess work-related physical activities with MSD among school teachers in Gwagwalada, Abuja.

MATERIALS AND METHODS

A cross-sectional study was conducted among secondary school teachers in randomly selected public schools in Gwagwalada area council, Abuja from July to September 2018.

Nine schools were randomly selected from a list of 28 public secondary schools obtained from FCT Secondary Education Board. All teachers employed in the selected schools (approximately 44 teachers per school) were invited to participate in the study. A total of 400 self-administered questionnaires were distributed.

The questionnaire was constructed and adapted from the Nordic Musculoskeletal Questionnaire. Demographic variables, teaching history, and information on MSD (with possible associated occupational risk factors), formed the basis of the questionnaire.

Ethical considerations: Ethical clearance from the University of Abuja Teaching Hospital was obtained prior to conducting the study. Permission to conduct research within schools was obtained from the FCT Secondary Education Board and from the principals of the selected schools. The teachers consent was obtained verbally and was assured of confidentiality.

Statistical analysis: Data were analyzed using the SPSS statistical package (version 20), with statistical significance set at $p = 0.05$. Descriptive analyses were performed on categorical variables (summarized as

frequencies and percentages) and continuous variables (summarized as means and standard deviations). Associations of factors with MSD were assessed using bivariate analyses (chi squared tests and independent t-tests), where appropriate.

RESULTS

Table 1. Socio-demographic characteristic of the school teachers with musculoskeletal disorder (MSD)

Variables	Frequency	Percentage (%)
Gender		
Male	231	58
Female	167	42
Total	398	100
Age		
20-30	98	24.6
31-35	134	33.7
36-44	99	24.9
45-50	38	9.5
51-60	29	7.3
Total	398	100

Table 2. Characteristics of work of the secondary school teachers

Variable	Male	Female	Total (%)	χ^2	p
Number of class per day					
1-2	79	71	150 (37.7)	10.217	0.006
3-4	145	82	227 (57)		
5-6	7	14	21 (5.3)		
Number of class per week					
1-5	60	35	95 (23.9)	1.796	0.407
6-10	75	63	138 (34.7)		
11-15	96	69	165 (41.5)		
Number of students per class					
40-45	41	27	68 (17.1)	9.829	0.007
46-50	58	22	80 (20.1)		
51 & above	132	118	250 (62.8)		
Do you take break between classes?	188	133	321 (80.7)	0.189	0.664
Duration of break					
10-20	94	26	120 (37.4)	31.685	0.000
21-30	32	43	75 (23.4)		
31-40	62	64	126 (39.3)		
Year of experience					
1-5	114	65	179 (45)	8.972	0.175
6-10	66	59	125 (31.4)		
11-15	30	27	57 (14.3)		
16-20	3	3	6 (1.5)		
21-25	7	4	11 (2.8)		
26-30	7	9	16 (4)		
31-35	4	0	4 (1)		

P<0.05

Table 3: Work-related physical activities contributing to the development of musculoskeletal disorders

Variable	No problem (%)	Minimal to moderate problem (%)	Major problem (%)	χ^2	p
Same task over and over	169(45.6)	174(46.9)	28(7.5)	9.521	0.007
Standing for long	70(18.9)	241(65)	60(16.2)	13.870	0.000
Sitting for long	64(17.3)	254(68.5)	53(14.3)	4.667	0.889
Head down posture	108(29.1)	182(49.1)	81(21.8)	20.090	0.010
Awkward posture	106(28.6)	187(50.4)	78(21)	34.719	0.007
Bending & twisting	106(28.6)	170(45.8)	95(25.6)	21.071	0.062
Hand above the shoulder	92(24.8)	188(50.7)	91(24.5)	11.621	0.061
Hand under the shoulder	159(42.9)	193(52)	19(5.1)	4.511	0.182
Repeat same movement	100(27)	223(60.1)	48(13)	1.153	0.005
Reaching with arms	102(27.5)	248(66.8)	18(4.9)	18.971	0.588
Not enough break	81(21.8)	237(63.9)	53(14.3)	0.173	0.000
Using computer	141(38)	199(53.6)	31(8.4)	13.354	0.008
Inappropriate furniture	50(14.3)	228(61.5)	93(25.1)	30.354	0.000
Lifting with one hand	101(27.2)	205(55.3)	65(17.5)	33.841	0.000
Lifting with uncomfortable	103(27.8)	180(48.5)	88(23.7)	9.898	0.000

P<0.05

DISCUSSION

A total of 398 participate in the study (table 1), males were 231 (58%), and while females were 167 (42%). This agrees with Chong and Chan (2010), who showed a significant difference between males and females in reporting MSD. The age range of the participants with the highest frequency for both male and female is between 31 -35years. This has been evidenced in the results of a Chinese study where the age group with the highest prevalence of musculoskeletal pain was 31– 35 years^{10,11}.

In this study the variables relating to work characteristics that could contribute to work-related musculoskeletal disorders (table 2) showed that most of the teachers 179 (45%) have a working experience of between 1-5 years. Over 80.7% take break between classes, while 126 (39.3%) enjoyed about 40 minutes breaks during working hour. 62.8% taught more than 50 students per class. Also, 165 (41.5%) have 11-15 classes per week, while 227 (57%) had 3-4 class per day. Some studies reported a positive correlation between years of experience and prevalence of MSD in teachers^{12,5}.

Data from the present study does not show any statistical significant with years of experience, number of class per week and if they take break between class. Results of the work-related physical activities contributing to MSD as indicated in table 3 also indicate that more than sixty five percent (n=241; 65%) and 68.5% of the teachers had minimal to moderate problem when performing daily activities in a standing and sitting position respectively. Only twenty eight participants (7.5%) experienced major problem while performing the same task over and over, while less than thirty per cent (n = 106) of the teachers experienced no problem in an Awkward, bending and twisting posture.

In addition, two hundred and thirty seven (63.9%) of the teachers experienced moderate problem without

enough break at work also one hundred and ninety nine of the participants (53.6%) reported moderate problem while using computer daily. Less than thirty per cent (24.5%) reported a major problem while working with hand above shoulder. This agrees with previous studies which also found that some work-related activities such as prolonged sitting, prolonged standing, long working hours in teaching and correcting examination papers were associated with increased risk of developing MSD among teachers^{13,12,14,15,16}. Garg an Moore also in their study reported heavy physical work, lifting and forceful movements, bending and twisting (awkward postures), whole-body vibration and static work postures to be associated with musculoskeletal disorder².

CONCLUSION

This study has shown that younger teachers have also been found to experience MSDs and work-related physical activities can be associated with the development of musculoskeletal disorder.

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Conflict of Interest: The authors declare that there is no conflict of interests

Authors' Contribution: The 1st and 2nd authors conceptualized the research, 1st, 2nd and 3rd authors collected and analyzed the data, 1st and 2nd authors prepared draft of manuscript, while the 2nd, 3rd and 4th authors supervised the research, data analysis and edited draft of manuscript. 3rd and 4th authors edited final manuscript.

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