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Correlation Between Anthropometric Indices and Musculoskeletal Disorder Among Teachers in Gwagwalada, Abuja

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ABSTRACT

Musculoskeletal disorders (MSDs) are very common amongst teachers. 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 investigated the correlation between Anthropometric indices and MSDs. The sample included 398 public school teachers selected randomly. A cross sectional study design and simple random sampling was used to select nine out of twenty-eight public secondary schools. Data were collected using a questionnaire. Weight was measured with a Weighing Scale and height by using stadiometer. The results showed a significant association between MSD with height, age and pulse ($p<0.05$). MSDs are related to the height, age and pulse of teachers. This indicate that the high height, pulse and age, the more of MSDs.

Keywords: *Anthropometric Indices, Musculoskeletal Disorders, Teachers*

INTRODUCTION

Musculoskeletal disorder is defined as wide range of pathological states including inflammatory and degenerative conditions perceived to be related to the musculoskeletal system. Such conditions result in over-exertion of bones, ligaments and muscles, and typically manifest as musculoskeletal disorder[1]. Musculoskeletal disorder represents one of the most common and health-related occupational health disorders in developed and developing countries[2].

Most work-related MSDs develop over time and are caused either by the work itself or by the employees' working environment. Health problems range from discomfort, minor aches, and pains, to more serious medical conditions requiring time off work and even medical treatment. In more chronic cases, treatment and recovery are often unsatisfactory, and the result could be permanent disability and loss of employment[3].

Many studies conducted among school teachers have reported high prevalence of musculoskeletal pain disorders[4,5]. School teachers, in general, have been demonstrated relative to other occupational groups, to report a high prevalence of musculoskeletal disorders[6]. Among different populations studied, it was clear that teachers are at higher risk of developing musculoskeletal pain although prevalence among them was not uniform and ranged between 23.7% and 95.1%[7,6,8].

The work of a teacher involves not only teaching students, but also preparing lessons, assessing students' work. These activities may cause teachers to suffer adverse mental and physical health issues due to their unique and wide variety of job functions[9].

If there is no enough time for recovery, pain symptoms that account for the high levels of absenteeism due to health conditions in this group of workers are triggered or prompted. Thus, teaching leads to stress, with consequences to physical and mental health and with an impact on professional performance[10].

The work tasks of school teachers often involve significant use of a 'head down' posture, such as frequent reading, marking of assignments, and writing on a blackboard[11].

Musculoskeletal complaints, especially of the lower back, neck and shoulders, are also common among teachers due to prolonged desk work, prolonged standing in class and repetitive overhead writing on the board, prolonged sitting resulting from frequent reading, preparation of lessons and marking of assignments, and working on a computer[12].
MSD decrease productivity at work due to sick leave, absenteeism and early retirement, and are also costly in terms of treatment and individual suffering[11].

This study aimed to evaluate the correlation of anthropometric indices and MSD among school teachers in Gwagwalada, Abuja

METHODS

Anthropometric measurement: Anthropometry or the measurement of body's dimensions is a subcategory of physical anthropology and it is related to the different parts of body's dimensions, body's movements and the strength of muscles[13]. The measurements taken were height, weight, Blood pressure and pulse rate. The participants' Blood pressure, weight and height were measured using the Digital sphygmomanometer, weighing scale and Stadiometer respectively, with light clothing but shoes and socks removed.

A cross-sectional study was conducted among secondary school teachers in randomly selected public schools in Gwagwalada area council, Abuja 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. Prior to the administration of the questionnaire, participants' weight, height and blood pressure were obtained. A total of 400 self-administered questionnaires were distributed.

The developed questionnaire has some aspects borrowed from the standardized Nordic questionnaire[14]. 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 were assured of confidentiality.

Statistical analysis: Data were analysed using the SPSS statistical package (version 21), with statistical significance set at $p \leq 0.05$. Descriptive analyses were performed on categorical variables (summarised 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 shows higher frequency in male 231 (58%) than females 167 (42%) which indicates that teaching profession is dominated by males (Mean=1.42; SD=0.494) and most of the respondents irrespective of gender were youth, aged between 31-35 years.

Independent-samples t-test for sexual dimorphism in Height, Weight, Blood Pressure and Pulse Rate (Table 2) shows statistically significant gender difference in Weight and Pulse rate ($p< 0.05$) but no significant gender difference in Height, Body Mass Index, Systolic and Diastolic blood pressure ($p> 0.05$) respectively.
The mean weight of the participants was 66.28kg (SD= 8.18), ranging between 48 kg and 90 kg with a mean Body Mass Index (BMI) of 24.18 (SD= 4.09) and 61.81% were classified as having normal weight, 36.43% as overweight, and 1.76% as underweight.

Table 3 shows statistically significant relationship between Height, Age, and Pulse with MSDs respectively. While weight, BMI, Systole and Diastole Pressure shows insignificant relationship with WRMSDs ($r = -0.02, p > 0.05$).

Table 1. Socio-demographic Characteristic of School Teachers in Gwagwalada

Variables	Male n (%)	Female n (%)	Total (%)
Age			
20-30	58 (14.6)	40 (10.1)	98 (24.6)
31-35	72(18.1)	62 (15.6)	134 (33.7)
36-44	59 (14.8)	40 (10.1)	99 (24.9)
45-50	31 (7.8)	7 (1.8)	38 (9.5)
51-60	11 (2.8)	18 (4.5)	29 (7.3)
Total	231 (58)	167 (42)	398 (100)

Table 2. Sexual Dimorphism in Anthropometric indices of School Teacher in Gwagwalada

Variable	Male	Female	P-value
Mean Height (m)	1.7008	1.6427	0.075
Mean Weight (kg)	65.65	67.16	0.000
Mean BMI (kg/m^2)	23.54	25.07	0.534
Mean Pulse rate	73.9	75.2	0.046
Mean Systolic	116.40	116.41	0.573
Mean Diastolic	75.15	75.20	0.655
BMI categories			
Underweight	4	3	0.000
Normal	178	68	0.000
Overweight	49	96	0.000

P<0.05

Table 3. Correlation between Anthropometric indices and MSD

	Variables	Mean	SD	1	2	3	4	5	6	7	8
1	Age	2.41	1.169	1							
2	Height	1.68	0.068	-0.073	1						
				0.148							
3	Weight	66.28	8.18	0.197**	0.134**	1					
				0.000	0.007						
4	BMI	24.18	4.10	0.096	-0.412**	0.594**	1				
				0.056	0.000	0.000					
5	Systolic	116.4	9.43	-0.035	-0.007	-0.079	0.011	1			
				0.483	0.883	0.114	0.834				
6	Diastolic	75.17	6.00	-0.042	0.013	-0.081	-0.063	0.367**	1		
				0.408	0.802	0.106	0.207	0.000			
7	Pulse	74.42	9.17	0.103*	0.061	0.094	0.072	-0.023	0.011	1	
				0.041	0.223	0.062	0.149	0.642	0.833		
8	WRMSD	1.32	0.468	-0.162**	-0.111*	-0.021	-0.053	-0.008	0.015	0.137**	1
				0.001	0.028	0.678	0.299	0.877	0.765	0.007	

Statistically significant differences (**0.01, *0.05) are marked in bold.

DISCUSSION

The study aimed to explore some anthropometric indices as well as correlating with musculoskeletal disorder of teachers. 398 secondary school teachers participated in the study (table 1), males were 231 (58%), and whiles females were 167 (42%). This agrees with[4] Chong and Chan, who showed a significant difference between males and females in reporting MSD. However, these findings were not consistent with the study done by [11]Erick, et al., who detected that the prevalence of MSD is positively associated with female gender as they found a significant higher prevalence of WRMSDs among females compared to males between school teachers in Botswana [15]. Also, in a study done by Jefferson, et al., they found that the prevalence of MSDSs in Poland was higher among females then males.[10]

The result of our study showed that work related musculoskeletal disorders had a significant relationship with age. The age range of the participants with the highest frequency for both male and female was between 31 -35years. The concern is that younger teachers seems to be having pain early. 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 [16]. Also, a study done by Jefferson et al., showed that younger workers face greater work demands, being exposed to risk factors, as they take over more activities and tasks in the beginning of the career.[10]

The result of the present study indicates that MSD increase with increase in height, age and pulse; While weight, BMI, systolic and diastolic blood pressure did not. This supports previous studies conducted in Amol, Iran[17] and Nigeria[18] where no significant relationship was found between MSD and BMI.

The majority of respondents in this study (61.8%) had a normal BMI category, according to the Centers for Disease Control and Prevention classification of the BMI[19]. Only 1.8% of the secondary school teachers, of which 42.9% were female and 57.1% male, were categorised as underweight. The mean BMI of the respondents in the current study was 23.54 (normal

BMI). This finding is slightly lower to the mean BMI of 24.6 of German school teachers[20] and much lower than the mean BMI of 27.6 of school teachers from Saudi Arabia[21].

The present study showed that there were no significant association between MSDs and BMI, the prevalence of MSDs among teachers who were normal was significantly higher than obese and underweight teachers. Similar findings have been demonstrated in the previous literature[22, 23, 24].

CONCLUSION

It is therefore concluded that anthropometric indices such as the height, age and pulse of teachers are related to MSD. Hence, high height, age and pulse increase the probability of MSDs. Teachers should be encouraged on regular exercise and ensure a healthy living in order to prevent MSDs.

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

Authors' Contribution: The 1st, 2nd and 3rd author conceptualized the research, 1st and 4th author collected analysed the data, 1st and 5th author prepared draft of manuscript, while the 2nd and 3rd author supervised the research, data analysis and edited draft of manuscript. 1st and 5th author edited final manuscript.

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