

# Relationship between personality types and musculoskeletal disorders among office staff

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**KEY WORDS:** Musculoskeletal disorders; office employees; personality type; psychological factors

**PAROLE CHIAVE:** Disturbi muscoloscheletrici; impiegati; tipo di personalità; fattori psicologici

## SUMMARY

**Background:** Musculoskeletal disorders (MSDs) have been recognized as common health-related problems in the workplace. Accordingly, poorly-designed workstations and assigned tasks can lead to exposure to risk factors inducing MSDs among office staff. Accompanied by physical risk factors, psychological ones in working environments can also contribute to MSDs occurrence. Thus, the purpose of this study was to examine the relationship between personality types as a psychological factor and MSDs occurrence among office staff. **Methods:** This cross-sectional study was carried out on office staff working at Shiraz University of Medical Sciences (SUMS) in 2016. The participants included 339 employees recruited using multi-stage simple random sampling method. The required data were likewise collected via a demographic characteristics information checklist, the Personality Pattern Questionnaire (PPQ), as well as the standardized Nordic Musculoskeletal Questionnaire (NMQ). **Results:** The findings revealed that the participants' mean±standard deviation (SD) age were 36.4±7.8 years. As well, the most prevalent MSDs complaints were reported in lower back, knee, and neck regions with relative frequencies of 35%, 30%, and 25% respectively. Moreover, the results demonstrated that 0.6% of the participants were determined as individuals having a strong tendency for type A personality, 26.8% of them showed tendency for type A personality, 63.1% of these employees were categorized into those having a tendency for type B personality, and 9.4% of them were identified as participants who showed a strong tendency for type B personality. Additionally, statistically significant relationships were observed between personality types and MSDs occurrence ( $p=0.023$ ). Furthermore, musculoskeletal symptoms were reported more prevalent among individuals having tendency for type A personality. **Conclusion:** Personality types and MSDs occurrence seemed to be associated. It was thus suggested to take account of psychological factors (e.g., personality types) in macro policy-making, employee selection, and professional staff training programs.

## RIASSUNTO

«**Relazione tra tipi di personalità e disturbi muscoloscheletrici negli impiegati**». **Introduzione:** I disturbi muscoloscheletrici (DMS) sono riconosciuti come uno dei più comuni problemi di salute lavoro-correlati. Postazioni di lavoro mal progettate e richieste lavorative possono esporre a fattori di rischio, provocando DMS tra gli impiegati. Accanto ai fattori di rischio fisico, anche i fattori di rischio psicologico possono contribuire all'insorgenza di DMS.

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**Obiettivi:** Analizzare la relazione tra il tipo di personalità, considerato come un fattore psicosociale, e la presenza di DMS in chi svolge lavoro d'ufficio. **Metodi:** Questo studio trasversale è stato condotto sugli impiegati della Shiraz University of Medical Sciences (SUMS) nel 2016. I 339 partecipanti sono stati reclutati sulla base di un campionamento casuale. Per ciascun soggetto arruolato sono state raccolte dettagliate informazioni demografiche, e sono stati somministrati il questionario sul modello di personalità e il questionario standardizzato Nordic per la rilevazione di disturbi muscoloscheletrici. **Risultati:** L'età media dei partecipanti è di  $36.4 \pm 8$  anni. I DMS più comuni sono risultati nel tratto lombare, al ginocchio e al collo con una frequenza, rispettivamente, del 35%, 30% e 25%. Dal punto di vista dei tratti di personalità, lo 0.6% dei partecipanti è risultato con una tendenza forte verso una personalità di tipo A, il 26.8% mostrava una tendenza verso la personalità di tipo A, il 63.1% ricadeva nella categoria con una tendenza verso la personalità di tipo B e il 9.4% mostrava una marcata tendenza verso la personalità di tipo B. Relazioni statisticamente rilevanti sono state osservate tra tipo di personalità e presenza di DMS ( $p=0.023$ ). La prevalenza di sintomi muscoloscheletrici è stata maggiormente rilevata tra individui con una personalità tendente al tipo A. **Conclusioni:** Tipo di personalità e presenza di DMS sembrano essere associati. Si suggerisce di prendere in considerazione i fattori psicosociali (per esempio, il tipo di personalità) in sede di processi decisionali e programmi di formazione professionale.

## INTRODUCTION

Over recent years, musculoskeletal disorders (MSDs) have been characterized as one of the most common health-related problems in the workplace all over the world. In this respect, non-ergonomic working conditions along with poorly-designed workstations have exposed employees to risk factors inducing MSDs (11, 13). Work-related musculoskeletal disorders (WMSDs) affecting employees psychosocially and physiologically in an adverse manner are also on a rising trend (5). Accordingly, economic loss due to MSDs encompasses both direct (e.g., diagnostic tests and medications) and indirect (lack of productivity or sickness absence) costs and may consequently affect not only individuals but also workplaces and the whole society as well (41). For instance, the total annual costs of low back pain in the United States is estimated to be \$119-238 billion (36).

Moreover, such economic issues have been augmented by the fact that WMSDs occurrence is common in adulthood, during the most economically useful age (i.e., between 35 and 50 years of age) (16). It is noteworthy that a number of models have also delineated the multifactorial nature of MSDs development caused by physical and psychosocial workplace risk factors (e.g., National Research Council) (31); however, most of the given models have not been established in developing countries wherein

preventive programs for eliminating or minimizing MSDs risks are generally insufficient (37).

Thus, contribution of physical and psychosocial factors to WMSDs occurrence has been highly acknowledged in view of the large number of previous studies conducted in this domain (51). Furthermore, interactions between physical and psychosocial factors have demonstrated an increase in the probability of WMSDs occurrence (51, 52).

Individuals' personality types are also considered as substantially important psychosocial factors affecting working conditions and contributing to MSDs development. Totally; a personality type has been defined as a collection of personality traits, assumed to occur consistently together, that uniquely adapt individuals to their surroundings (28). In this regard; two personality types, type A and type B, have been identified by Friedman and Rosenman and a remarkable attention has been directed to the characteristics of individuals with type A personality (21).

Type A personality traits include restlessness, aggressiveness, frustration, anxiety, hyperactivity, and competitiveness. Thus, employees with type A personality make attempts to manage all aspects of their lives, even uncontrollable ones, and are absolutely anxious and active. These individuals become aggressive and frustrated if they do not feel like in control of their conditions (8). In contrast, those with type B personality place more value on their quality of lives. They are likewise organized,

lenient, conservative, less ambitious, and more self-controlled; compared with individuals with type A personality (18). Some studies have also reported people with type A personality to be prone to perceive more psychological stress (39).

Moreover; it has been pointed out that distinguishing individuals' personality traits may enable ergonomists to design workplaces appropriately according to employees' capabilities and limitations. Additionally, the effect of psychosocial factors on MSDs occurrence has been confirmed in previous research studies (12). For instance, using Job Demands-Control Model (30), Barzideh et al. (2014), concluded that inappropriate psychosocial factors including high levels of job stress might contribute to MSDs development among employees (5). Some other studies have been also conducted in terms of examining relationships between workplace-related psychosocial factors and WMSDs occurrence (4, 5, 14, 19, 27). However, a few investigations have shed light on the relationship between personality types as an effective psychosocial factor and MSDs occurrence particularly among office staff (45). In majority of these research studies, psychological and psychosocial aspects (i.e., personality type, job stress, and job satisfaction) had been considered as the main factors influencing MSDs occurrence (34). For instance, Jenkins et al. (1971) mentioned that individuals with type A personality were more vigilant, restless, and also susceptible to urgent motor movements which might lead to MSDs (26). In addition, Sood et al. found that people with type A personality could be associated with high competitiveness, aggressiveness, restlessness, extreme ambition, time pressure, and high-performance standards. These traits might also add to the risks of MSDs occurrence among different working groups (47).

However, since MSDs are common causes of employees' health-related complaints in the workplace (49) as well as the main reason behind work-induced sickness and early retirement globally (9); a question that needs to be addressed is whether MSDs occurrence is directly affected by individuals' personality types or not. Therefore, the purpose of this study was to examine the relationship between individuals' personality types and MSDs occurrence among office staff.

## METHODS

This cross-sectional study was carried out on office staff working at Shiraz University of Medical Sciences (SUMS), Shiraz, Iran, in 2016.

### Participants

Totally, 1662 full-time employees working in the central administration office of SUMS were recruited; among them, 350 individuals with at least one year of job tenure were randomly selected. The participants reluctant to continue the study were also excluded without any restrictions.

### Data Collection Instruments

The required data were collected via three anonymous self-administered questionnaires including:

a. *Demographic Characteristics Information Checklist*: This form contained items about age, gender, marital status, level of education, job tenure, average monthly income, as well as average daily/weekly working hours.

b. *Nordic Musculoskeletal Questionnaire (NMQ)*: Participants' musculoskeletal complaints about different body regions were surveyed by the Persian version of the NMQ (33). Participants also reported whether they have experienced pain in their body regions both at the time of study and during the last 12 months prior to the study or not.

c. *Personality Pattern Questionnaire (PPQ)*: Participants' personality types were evaluated using the PPQ comprised of 25 yes/no questions developed by Rosenman and Friedman (1974) (21). The number of "yes" answers was considered for scoring this questionnaire. In order to achieve more precise results, the participants were categorized into four groups i.e. the scores greater than 20 represented a strong tendency for type A personality, those between 13 and 20 characterized a tendency for type A personality, the scores less than 13 and more than 5 indicated a tendency for type B personality, and finally, those less than 5 denoted a strong tendency for type B personality (40). In most studies conducted to validate this scale, coefficients above 70% had been obtained (42). For instance, in the study

by Shakerinia et al. (2010), Cronbach's alpha coefficient of the given questionnaire was reported by 89% (46). The reliability of this questionnaire was also examined through measuring correlation coefficients via test-retest method ( $r=0.77$ ) and confirmed by a group of professional experts in 2013 (1).

### Data Analysis and Statistical Procedures

The data were statistically analyzed using SPSS Statistics software (version 20). Independent sample t-test, Chi-square test, logistic regression analysis, and Mann-Whitney U test were thus utilized to examine the relationship between personality types and MSDs occurrence. The level of significance was also set at 0.5. It should be noted that the ethics committee of SUMS reviewed and approved the study protocol.

### RESULTS

To investigate the relationship between personality types and MSDs occurrence, the present study was carried out on 350 office staff working at SUMS. Totally, data from 339 participants were analyzed as 11 employees were excluded from the study because of incomplete data records. The participants' mean $\pm$ SD age was 36 $\pm$ 7.9 years within a range of 22-62 years. The majority of the statistical population was also female (59.9 %) and married (67.3%). The socio-demographic characteristics of the participants based on MSDs frequency were presented in table 1, and the results of MSDs frequency obtained from the NMQ in terms of body regions were outlined in table 2. The results of PPQ showed that 0.6% of the participants were determined as individuals with a strong tendency for

**Table 1** - Socio-demographic characteristics of the study population in terms of MSDs frequency

Characteristics	Total (n=339)	MSDs in the last 12 months		$\chi^2$ test p-value
		Not reported (n =270)	Reported (n=65)	
<b>Age (year)</b>	36.4 $\pm$ 7.9	36.1 $\pm$ 7.8	37.7 $\pm$ 7.4	0.142*
<b>Gender; Female/Male</b>	203/136	173 /97	27 /38	0.001 <sup>†</sup>
<b>BMI (kg/m<sup>2</sup>)</b>	25.3 $\pm$ 9.2	24.2 [22.3-27.1]	24.6 [21.8-27.2]	0.982 <sup>††</sup>
<b>Daily working time (hour)</b>	8.5 $\pm$ 1.7	8.4 $\pm$ 1.6	8.9 $\pm$ 2.0	0.055*
<b>Left-handedness</b>	35 (10.4)	28 (10.4)	6 (9.4)	0.799 <sup>†</sup>
<b>Marital status</b>				0.219 <sup>†</sup>
Single	95 (28.3)	78 (29.2)	15 (23.1)	
Married	226 (67.3)	175 (65.5)	49 (75.4)	
Widowed/divorced	15 (4.4)	14 (5.2)	1 (1.5)	
<b>Level of education</b>				0.270 <sup>†</sup>
Diploma	44 (13)	32 (11.9)	10 (15.6)	
Associate's degree	25 (7.4)	23 (8.6)	2 (3.1)	
Bachelor's degree and higher	268 (79.1)	214 (79.6)	52 (81.3)	
<b>Personality types</b>				0.023 <sup>†</sup>
Strong tendency for type B	32 (9.4)	30 (9.1)	1 (0.3)	
Tendency for type B	214 (63.1)	168 (49.6)	45 (13.6)	
Tendency for type A	91 (26.8)	71 (20.9)	18 (5.9)	
Strong tendency for type A	2 (0.6)	1 (0.3)	1 (0.3)	

- The data are presented as mean $\pm$ SD, number, number (%), and median [interquartile range: IQR].
- In some variables, numbers do not add up to totals because of missing data.
- P-values calculated by \*independent sample t-test, <sup>†</sup>Chi-square test, and <sup>††</sup>Mann-Whitney U Test.
- MSDs, Musculoskeletal Disorders; M, Male; F, Female; BMI, Body Mass Index.

**Table 2** - Frequency of multisite MSDs symptoms in participants' different body regions and their correlations (n=339)

Body regions	Neck	Shoulder(s)	Elbow(s)	Wrist (s)/ hand (s)	Upper back	Lower back	Hips/ thigh(s)	Knee(s)	Ankle(s)/ feet
<b>Neck</b>									
Pearson correlation	1	.521**	.292**	.234**	.265**	.224**	.124*	.269**	.187**
Frequency (Percent)		86 (26.1%)	27 (8.3%)	57 (17.4%)	63 (19.3%)	75 (22.9%)	26 (8.0%)	66 (20.2%)	51 (15.5%)
N	330	329	325	328	327	328	326	327	329
<b>Shoulder(s)</b>									
Pearson correlation		1	.275**	.266**	.379**	.271**	.183**	.224**	.285**
Frequency (Percent)	-		28 (8.6%)	63 (19.1%)	76 (23.2%)	84 (25.5%)	31 (9.5%)	67 (20.4%)	62 (18.8%)
N		331	327	329	328	329	326	328	330
<b>Elbow(s)</b>									
Pearson correlation			1	.308**	.175**	.199**	.173**	.163**	.171**
Frequency (Percent)	-	-		28 (8.6%)	22 (6.8%)	28 (8.6%)	13 (3.7%)	23 (7.1%)	20 (6.1%)
N			328	328	325	325	324	326	327
<b>Wrist(s) /hand(s)</b>									
Pearson correlation				1	.211**	.248**	.128*	.197**	.249**
Frequency (Percent)	-	-	-		56 (17.1%)	74 (22.5%)	25 (7.7%)	59 (17.9%)	54 (16.3%)
N				332	328	329	326	329	331
<b>Upper back</b>									
Pearson correlation					1	.401**	.253**	.284**	.350**
Frequency (Percent)	-	-	-	-		89 (27.2%)	33 (10.2%)	68 (20.8%)	63 (19.2%)
N					329	327	325	327	328
<b>Lower back</b>									
Pearson correlation						1	.323**	.414**	.366**
Frequency (Percent)	-	-	-	-	-		44 (13.5%)	96 (29.2%)	79 (23.9%)
N						334	325	329	330
<b>Hips/thigh(s)</b>									
Pearson correlation							1	.296**	.428**
Frequency (Percent)		-	-	-	-	-		37 (11.4%)	40 (12.3%)
N							327	325	326
<b>Knee(s)</b>									
Pearson correlation								1	.342**
Frequency (Percent)		-	-	-	-	-	-		66 (20.1%)
N								333	329
<b>Ankle(s)/feet</b>									
Pearson correlation									1
Frequency (Percent)	-	-	-	-	-	-	-	-	
N									333

\*\*Correlation is significant at the 0.01 level (2-tailed).

\*Correlation is significant at the 0.05 level (2-tailed).

type A personality, 26.8% of them had a tendency for type A personality, 63.1% of these individuals were categorized into those showing a tendency for type B personality, and 9.4% of the participants were identified as individuals with a strong tendency for type B personality.

As illustrated in table 1, there was no significant difference between age and body mass index (BMI) among the participants with and without complaints about MSDs. On the contrary, a significant difference was observed between personality types and MSDs occurrence ( $p=0.038$ ); such that the prevalence rate of MSDs was reported higher among participants having a tendency for type A personality. As well, female participants significantly reported more MSDs complaints compared with males ( $p=0.001$ ). Likewise, there was no significant relationship between daily working time and reported MSDs complaints during the last 12 months. Moreover, no significant difference was observed between MSDs and handedness, level of education, as well as marital status ( $p>0.05$ ).

The most prevalent reported problem was related to lower back region over the last 12 months prior to the study (49.1%). Approximately, 81% of the participants had MSDs complaints at least in one region of the body within the last 12 months while the prevalence rate of MSDs complaints at least in

one region of the body was nearly 60%. Multisite MSDs complaints among the participants as well as correlations between different body regions were described in table 2. As can be seen, the highest number of reported multisite MSDs complaints was observed among participants with the experience of MSDs in both lower back/hip(s) and knee(s) ( $n=96$ ) with the Pearson correlation coefficient of 0.414 ( $p=0.01$ ). In addition, 27.2% of the participants had multisite MSDs complaints in both regions of upper back and lower back/hip(s) with the Pearson correlation coefficient of 0.401 ( $p=0.01$ ). Moreover, neck-related MSDs were highly associated with those in shoulder(s) among 86 individuals in the study group ( $p=0.01$ ).

Based on the results of multivariate logistic regression analysis, gender and personality types were identified as the major factors significantly associated with MSDs (table 3). In this respect, the results showed that MSDs were more likely to occur among participants with type A personality ( $p=0.023$ ) than in those with type B personality as well as in female participants ( $P=0.010$ ) than in males.

In this respect, the significant factors associated with MSDs in all participants in terms of different body regions were displayed in table 4. The results of univariate analyses also revealed that gender was significantly associated with reported MSDs com-

**Table 3** - Logistic regression analysis of factors associated with self-reported MSDs over the last 12 months among office staff ( $n=339$ )

Independent variables	B	SE	OR (95% CI)	p-value
Age (year)	-0.014	.021	0.99 (0.95-1.03)	0.500
Gender; Male			1	
Female	0.793	.309	2.21 (1.21-4.05)	0.010
BMI (kg/m <sup>2</sup> )	0.036	.036	1.04 (0.97-1.11)	0.313
level of Education; Diploma			1	
Associate's degree	0.661	.869	1.94 (0.35-10.63)	0.447
Bachelor's degree and higher	-0.232	.476	0.79 (0.31-2.02)	0.626
Weekly working time (hour)	-0.015	.012	0.98 (0.96-1.01)	0.204
Personality type; Type B			1	
Type A	0.810	.357	2.25 (1.12-4.52)	0.023
Constant	1.238	1.359	3.448	0.362

Note: The dependent variable in this analysis was "presence of MSDs over the last 12 months" coded so that 0=negative and 1=positive.

OR, Odds Ratio; CI, confidence interval; SE, standard error; BMI, Body Mass Index.

**Table 4** - Independent risk factors for MSDs in various regions of the body (n=339)

Body region	Characteristics	OR	p-value
Neck	Gender (f)	3.236	0.001
Shoulders	Gender (f)	2.194	0.027
Elbows	Gender (f)	3.022	0.040
Upper back	Gender (f)	4.026	<0.0001
	Tendency to personality type (A)	1.944	0.033
Lower back	Gender (f)	1.163	0.001
	Tendency to personality type (A)	1.803	0.007
Thighs	Gender (f)	3.659	0.017
	Tendency to personality type (A)	2.051	0.018
Knees	Gender (f)	2.105	0.019
Legs	Gender (f)	2.202	0.030
	Level of education (BSc. and higher)	0.319	0.022

Notes: OR, Odds Ratio; CI, Confidence Interval; BSc., Bachelor of Science

plaints about all body regions included in the model. However, these findings were more highlighted in upper back (OR=4.0,  $p<0.0001$ ) than in other regions of the body. Furthermore, personality types were significantly associated with reported MSDs complaints. The results of this analysis revealed that MSDs complaints were more likely to be reported in participants with type A personality respectively in regions such as thigh(s) (odds ratio: OR=2.9,  $p=0.018$ ), lower back (OR=2.1,  $p=0.007$ ), and upper back (OR=1.9,  $p=0.033$ ), than in those with type B personality.

## DISCUSSION

MSDs symptoms were reported by 81% of the participants implying high rate of occurrence. The highest prevalence rate of MSDs reports among the participants was related to lower back (49.1%) while the lowest one was for elbow(s) (11.6%). This meant that nearly half of the participants were suffering from pain or discomfort in their lower back that could be due to sedentary sitting postures for long working times among office staff. Based on the reports released by the World Health Organization (WHO), MSDs are taken into account as the second largest factor leading to disabilities worldwide, with low back pain being the single contributor of disability globally; so that between one in three and

one in five people are living with a painful and disabling MSDs (35). In a study by Hoboubi et al. in 2017, also low back pain was ranked as the highest in terms of disabilities (25) that was in line with the findings of the study by Choobineh et al. as well (11).

Moreover, multisite MSDs analysis indicated a higher correlation between neck and shoulder(s) compared with other body regions which could be due to long sitting hours during the participants' working times. Nearly similar results were obtained for multisite MSDs complaints related to lower back/hip(s) and knee(s) as well as upper back and lower back/hip(s) that all seemed to be indicative of awkward sitting postures among some office staff. Recently, some researchers have also focused on the analysis of multisite MSDs and related etiological factors. As an example, Neupane et al. performed a longitudinal study on workers of a Finnish food company and found a high prevalence of multisite pain in the study group; so that only 35.6% of the participants had no (or only ignorable) pain, more than four out of five, among the other participants, had at least reported pain once at two or more of the four anatomical sites examined (hands or upper extremities, neck or shoulders, lower back, and feet or lower extremities) (44). Although the inherent features of working conditions in the present study were different from those considered in the investi-

gation by Neupane et al., the findings of both studies demonstrated similar trends with respect to low percentage of people with no MSDs reports or pain complaints about only one region of the body.

There was also a significant relationship between personality types and MSDs occurrence among the participants. According to the findings, the rate of MSDs occurrence was higher among office staff having a tendency for type A personality compared with that in other three personality type categories. These findings were consistent with the results reported in the study by Habibi et al. (2015)(23). Besides, in a cross-sectional study on nurses by Freimann et al. (2016), psychological characteristics of the participants were assumed as risk factors affecting MSDs occurrence (20). However, contrary to the findings of a survey by Fransson-hall (1995) on a group of workers in an automobile assembly industry using a researcher-made questionnaire, a significant relationship between type A personality and MSDs occurrence was confirmed. In a study performed by Malchaire et al., type A personality was also determined using a questionnaire developed by Bortner et al., with two variables of time urgency and competitiveness, but no relationship was observed between type A personality and wrist/hand MSDs among female workers of different companies. This discrepancy might be due to different research instruments utilized for measuring MSDs and personality types among the participants in their studies (38). It is noteworthy that, extraversion and time urgency were two main traits of type A personality that were likely to induce MSDs symptoms in some studies (22, 47). Accordingly, Sparacino (1979) indicated that individuals with type A personality could show tense hyperactive movements (48). In addition, Allread et al. used the Myers-Briggs Type Indicator to assess personality types in three different companies and confirmed more back pain reports in those with type A personality than other personality type groups (3). Accordingly, personality type deserves attention since it has effects on approaches adopted by individuals to do their tasks, which may contribute to varieties in muscle involvement patterns as well as activity levels among them (47).

In the present study, a higher rate of MSDs occurrence among female participants was observed

compared with that of male ones that were in agreement with the results of some previous investigations such as the study by Bruce et al. (1996) and Esmaeelzade et al. (2014) in which women reported more MSDs complaints (7, 17).

Unexpectedly, there was no significant relationship between average weekly working time and reported MSDs complaints, which might be attributable to the mean young age of the office staff recruited in this study. These findings were consistent with the results of the study by Akrouf et al. (2010) in Kuwait (2). However, in the investigations performed by Carter et al., Burdorf et al., and Kaminskas et al. (2010); the average weekly working time was found as a variable significantly affecting MSDs prevalence such that the more the average working time, the higher the rate of MSDs complaints (8, 10, 29). These discrepancies might be caused by ergonomically different designs in the workplace layouts and/or workstations contributing to varied working conditions in different settings and organizations (43).

In the present study, the relationship between BMI and MSDs occurrence was not statistically significant. Some studies had also found similar results in this respect (32). Although abundant research studies had already examined this relationship, there were some contradictions in this domain. For instance, in the studies by Baydur et al. (2016) and Da Costa et al. (2010), a significant relationship was observed between BMI and reported MSDs complaints (6, 15).

As well, the relationship between participants' age and MSDs prevalence was not statistically significant in this study. These findings might be due to the fact that the participants' mean age was below 37 years. Based on the report released by the WHO, MSDs are not just as a result of older age but they are important across the life course all over the world (35). However, according to Haghdoost et al., increasing individuals' age would be naturally followed by degeneration of physical capability and motional performance which might induce less flexibility and poorer working postures contributing to higher rate of MSDs occurrence (24).

Moreover, the results of univariate analyses revealed that MSDs complaints were associated with different variables including gender and type A per-



sonality which were significantly related to MSDs. However, the results of logistic regression analysis suggested that, after adjusting for potential confounders, gender in addition to personality type had been retained in the model; therefore, it was significantly associated with reported MSDs complaints. Furthermore, among the significant factors associated with MSDs in different body regions, the OR of MSDs complaints in thigh(s) among the office staff with type A personality was 2.25 times more likely to be observed than in those with type B personality. These findings could be the result of sedentary behaviors among individuals with type A personality due to their strong perseverance leading them to have continual sitting postures for a long time in order to perfectly complete their assigned tasks. These findings were in line with the results of some previous studies in which sedentary behaviors had been confirmed as a highly effective risk factor developing MSDs particularly in lower extremities such as lower back, knees, and thighs (13). Moreover, a significant relationship was found between level of education and MSDs complaints among the participants which could be due to presence of sedentary behaviors among those with higher levels of education working in high-level job positions (top managers, middle managers, etc.) requiring long-time sitting postures in the office. Previous studies with population-based samples had also reported that higher levels of education could be associated with higher rates of self-reported workplace sitting which might contribute to MSDs symptoms in different body regions especially lower extremities e.g., legs (50).

The findings of the present study should be interpreted with caution as the self-reporting methodology adopted might suffer from problems in terms of denial, recall, or deception. This drawback also existed for the data obtained by the PPQ, as the employees might have hesitated to report truthful statements. Since a cross-sectional design was used in this study, causation could not be inferred and its generalizability was also restricted. Further research, especially longitudinal ones can thus guarantee confidentiality and shed light on the relationship between MSDs complaints and personality types. Occupational activities as predictors of MSDs, not included in the present study, should be also consid-

ered in similar investigations in the future. It should be noted that the participants in the present study were office staff from SUMS. Therefore, the higher rate of MSDs prevalence might be due to their higher awareness of MSDs symptoms as they were working in a healthcare system. In addition; as some other psychological factors such as job stress, average income, and job satisfaction can be of importance in this context; it was suggested to take them into account as co-variables in future studies for better interpretation of the findings. Finally, as the questionnaire used in the present study seemed to be a nearly out-of-date and simple research instrument, it was suggested to recruit a novel one with more extended items in future studies with the same framework and objectives, so that more generalizable results would be achieved. The present study, however, seemed to be useful as it quantitatively examined the prevalence rate of MSDs occurrence and its relationship with personality types using standardized measures among SUMS office staff.

## CONCLUSION

The prevalence rate of MSDs was high among SUMS office staff. In this respect, individuals having a tendency for type A personality reported significantly higher rate of MSDs occurrence. In conclusion, a relationship was observed between personality types and MSDs occurrence among office staff working at SUMS. Based on these findings, some strategies and considerations should be adopted to eliminate ergonomic risk factors in the workplace and also to implement effective preventive interventions in this domain.

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