

# Prevalence and attributes of work-related musculoskeletal disorders among Egyptian office workers

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**Abstract :**Office workers are known to be prone to work related musculoskeletal disorder but its prevalence among office workers in Egypt has not been reported. Purpose of study was to study the prevalence of work related musculoskeletal disorders and to investigate relationship between physical risk factors and musculoskeletal disorders among Egyptian office workers in the previous 12 month. 400 office workers, volunteers with ethical approval and informed consent as a random sample were recruited from some general hospitals to assess musculoskeletal disorder due to work in the last 12 months. The participants were asked to answer Nordic musculoskeletal questionnaire. Reported 12 months prevalence of work related musculoskeletal disorders among Egyptian office workers, the lower back pain disorders with a percentage of 79% was the most commonly affected part. Elbow pain with percentage 19% was the least commonly affected part. Working prolonged periods in the same posture and sitting for long period were significantly related to lower back and neck pain. In Conclusion, The coping strategies and work factors of work related musculoskeletal disorders among Egyptian office workers are mostly similar to those of their counterparts elsewhere. The prevalence of work related musculoskeletal disorders among office workers in Egypt is higher than most values reported for their counterparts in other countries.

**Key words:** work related musculoskeletal disorder, office workers, and Nordic musculoskeletal questionnaire.

## 1. INTRODUCTION

Work related musculoskeletal disorders have been described as the most notorious and common causes of severe long term pain and physical disability that affect hundreds of millions of people across the world [1-2] and it is an umbrella term for which repetitive strain injury, repetitive trauma disorder and cumulative trauma disorder are all used interchangeably [3]. It represents a major economic burden on society in terms of decreased productivity and personal suffering [4]. The work related musculoskeletal disorders were specifically defined as "disorders of the muscles, nerves, tendons, ligaments, joints, cartilage,

blood vessels or spinal disks in the neck, back, shoulder, elbow, forearm, wrist, hand, abdomen (hernia only), knee, ankle and foot associated with exposure to risk factors"[5]. Pain is the most common symptom associated with work related musculoskeletal disorders. In some cases there may be joint stiffness, muscle tightness, redness and swelling of the affected area. Some workers may also experience sensations of "pins and needles", numbness, skin color changes, and decreased sweating of the hand [6].

Office workers may have an effect on constant musculoskeletal medical issues. Office work speaks to a complex physical workplace, with associations among the different components of the workstation, gear and occupation content [7]. The vast majority of literature utilized the overview technique to discover the work related medical issues and hazard factors inside a populace. A self-administered questionnaire is a valid and relatively inexpensive way to establish baseline risk identification information for an occupational group[8-9]. Standardized Nordic Musculoskeletal Questionnaire that is a valid and reliable questionnaire[10-11] was developed from a project funded by the Nordic Council of Ministers, because they needed standardized questionnaire methodology allowing comparison of low back, neck, shoulder and general complaints for use in epidemiological studies[10-13]. Documentation of the musculoskeletal disorders associated with office workers allows the prediction of musculoskeletal disorders related to office workers so paves the way to prevention and intervention strategies, and to improve performance of office workers. In spite of the prevalence of musculoskeletal disorders among office workers all over the world is well documented as in china [14], news land[15], Iran[16] and Kuwait [17] and it shows great difference from country to another, the prevalence of work related musculoskeletal disorders among Egyptian office workers is not documented yet. So, the purposes of the study were to study the prevalence of work related musculoskeletal disorders among Egyptian office workers, and to investigate the relationship between physical risk factors and musculoskeletal disorders among them in the previous 12 month. This documentation provides data about job tasks which may increase the risk of work related musculoskeletal disorders. It also provides data about effect of specific risk factors.

## **2. MATERIAL AND METHODS**

### **Subjects' selection**

This study was approved by the Ethical Committee of the Faculty of Physical Therapy; Cairo University. Four hundred (228 male and 172 female) office workers participated in the study. They were selected by using random sampling technique from general hospitals in Cairo, Egypt. Subjects were included if their age ranged between 21 and 50, working in Cairo, Egypt, and their experience from 1 to 20 years. The exclusion criteria for participants were musculoskeletal abnormalities due to other causes than work related (i.e. congenital, traumatic) or previous operation in locomotors system.

### **Design of the study**

The cross - sectional study design was used to study the prevalence of work related musculoskeletal disorders among Egyptian office workers and to investigate relationship physical risk factors and musculoskeletal disorders. The sample size was estimated after conducting power analysis based on the results of the previous studies [18].

## **3. METHODS**

Nordic Musculoskeletal Questionnaire (NMQ) checklist printed [8-9] to be filled by the office workers and statistical software was installed for later on statistical analyses during the

study. The office workers participant received NMQ and they were full informed by the whole following procedures. The gathered data included personal information such as their ages, gender, years of employment and the number of shifts per weeks. The NMQ and an increasingly ninety gritty body-part-explicit survey with more specific body zones details were used. The general NMQ delineates a body outlines into nine anatomic parts and gets some information about the scale of physical problems including pain, complain and distress within a year ago and in all of the body regions. Other collected data was observed and NMQ checklist as follow age “years”, gender “M or F”, weight “Kg”, height “cm”, and work duration per “day”, Body Mass Index calculated by dividing the weight in kilograms (kg) by the height in meters (m) and then divide the answer by the height again to get the BMI. The BMI is a simple index calculated from a person’s weight and height. It provides a reliable indicator of underweight, overweight and obesity for most adults and is used to screen for weight categories that may lead to health problems. The calculation and reporting of the BMI is required for all clients 18 years of age and over. The BMI is calculated using the following formula: weight (kg) / [height (m) x height (m)]. The BMI number may be an indicator of potential health risk(s) associated with increased weight as Normal weight (18.5 – 25 kg/m<sup>2</sup>), Underweight < 18.5 kg/m<sup>2</sup>, Overweight (25 – 30 kg/m<sup>2</sup>) and Obese > 30 kg/m<sup>2</sup> according to the World Health Organization's (WHO) recommendations based on BMI values for both men and women adults, age 18 or older.

**Procedure**

The study was conducted between 15 March 2019 to 20 August 2019. Four hundred copies of the questionnaire were given to the participant office workers whom work in general hospitals in Cairo, Egypt. They were asked to answer the questionnaire honestly. Participants were asked whether they have or have had troubles in the indicated areas during the preceding 12 months.

**Data analysis and statistical design**

The SPSS (version 17) statistical software package was used for all analyses. Descriptive statistics was used to estimate the prevalence of work related musculoskeletal disorders and demographic characteristics and physical risk factors. Frequencies and cross-tabulations were used to compare musculoskeletal disorders prevalence and demographics, work history and physical risk factors. Chi-square tests were used to assess the relationship between work related musculoskeletal disorders and physiotherapists characteristic and between musculoskeletal disorders and physical risk factors of work. The Level of significance was set at P > 0.05.

**Office worker's characteristics**

There were 172 (43%) male and 228 (57%) female office workers participated in this study. Their age ranged between 21 and 50 years. The office workers’ characteristics (age groups, education level, experiences, working load, body mass index, and exercise) of the participant were summarized in table (1).

Table 1: Characteristics description of participants.

| item       | No  |   | %   |   | P value | significance |
|------------|-----|---|-----|---|---------|--------------|
| <b>Sex</b> |     |   |     |   |         |              |
| -males     | 172 |   | 43% |   | 0.285   | NS           |
| -females   | 228 |   | 57% |   |         |              |
| <b>Age</b> | M   | F | M   | F |         |              |

|                           |          |          |          |          |        |    |
|---------------------------|----------|----------|----------|----------|--------|----|
| < 30 years                | 88       | 136      | 22%      | 34%      | 0.104  | NS |
| 30-34 years               | 20       | 28       | 5%       | 7%       | 0.285  | NS |
| 35-40 years               | 28       | 8        | 7%       | 2%       | 0.369  | NS |
| > 40 years                | 36       | 56       | 9%       | 14%      | 0.142  | NS |
| <b>Level of education</b> | <b>M</b> | <b>F</b> | <b>M</b> | <b>F</b> |        |    |
| B.Sc                      | 136      | 208      | 34%      | 52%      | 0.062  | NS |
| M.Sc                      | 20       | 12       | 5%       | 3%       | 0.249  | NS |
| Ph.D                      | 16       | 8        | 4%       | 2%       | 0.396  | NS |
| <b>WORK LOAD</b>          | <b>M</b> | <b>F</b> | <b>M</b> | <b>F</b> |        |    |
| < 10 hour                 | 8        | 44       | 2%       | 11%      | 0.0001 | S  |
| 10-19 hour                | 16       | 36       | 4%       | 9%       | 0.0001 | S  |
| 20-29 hour                | 16       | 16       | 4%       | 4%       | 1.000  | NS |
| 30-39 hour                | 28       | 52       | 7%       | 13%      | 0.0001 | S  |
| > 40 hour                 | 104      | 80       | 26%      | 20%      | 0.012  | S  |
| <b>Experience</b>         | <b>M</b> | <b>F</b> | <b>M</b> | <b>F</b> |        |    |
| < 5 years                 | 92       | 172      | 23%      | 43%      |        |    |
| 6-10 year                 | 16       | 20       | 4%       | 5%       |        |    |
| 11-15 year                | 20       | 16       | 5%       | 4%       |        |    |
| >16 year                  | 44       | 20       | 11%      | 5%       |        |    |
| <b>EXERCISE</b>           | <b>M</b> | <b>F</b> | <b>M</b> | <b>F</b> |        |    |
| YES                       | 86       | 114      | 21.5%    | 28.5%    | 0      | S  |
| NO                        | 86       | 114      | 21.5%    | 28.5%    | 0      | S  |
| <b>Body mass index</b>    | <b>M</b> | <b>F</b> | <b>M</b> | <b>F</b> |        |    |
| Normal wt.                | 72       | 128      | 18%      | 32%      |        |    |
| Over wt.                  | 64       | 64       | 16%      | 16%      |        |    |
| Obesity                   | 36       | 36       | 9%       | 9%       |        |    |

**Prevalence of Work Related Musculoskeletal Disorder among Egyptian office workers:**

**4. THE PREVALENCE OF MSD ON PHYSICAL THERAPISTS**

The results of prevalence pain throw the participant whole bodies during the last 12 months indicated that lower back and neck pain represented the dominant prevalence pain with 79% and 73% respectively, followed by shoulder pain (56%), one/both knees (56%), upper back pain (52%), one/both legs (48%), hips/buttocks (37%), wrist/hands with rates about (34%), and also elbow pain were the lowest one with 19% as shown in Table (2) and Figure (1).

Table2: Prevalence of MSD in different office workers body regions during the last 12 months (between male and female)

| Pain in different body parts (n=56) | Female  |        | Male    |        | P-value |
|-------------------------------------|---------|--------|---------|--------|---------|
|                                     | Yes (%) | No (%) | Yes (%) | No (%) |         |
|                                     |         |        |         |        |         |

|                  |       |           |           |           |           |       |
|------------------|-------|-----------|-----------|-----------|-----------|-------|
| Neck pain        |       | 172 (43%) | 56 (14%)  | 120 (30%) | 52 (13%)  | 0.728 |
| Shoulders pain   | Right | 28 (7%)   |           | 36 (9%)   |           | 0.852 |
|                  | Left  | 16 (4%)   | 104 (26%) | 8 (2%)    | 72 (18%)  |       |
|                  | Both  | 80 (20%)  |           | 56 (14%)  |           |       |
| Elbows pain      | Right | 28 (7%)   |           | 8 (2%)    |           | 0.563 |
|                  | Left  | 8 (2%)    | 176(44%)  | 0 (0%)    | 148 (37%) |       |
|                  | Both  | 16 (4%)   |           | 16(4%)    |           |       |
| Wrists/<br>Hands | Right | 20 (5%)   |           | 52(13%)   |           | 0.270 |
|                  | Left  | 20 (5%)   | 168 (42%) | 16 (4%)   | 96 (24%)  |       |
|                  | Both  | 20 (5%)   |           | 8 (2%)    |           |       |
| Upper back       |       | 100 (25%) | 128 (32%) | 108 (27%) | 64 (16%)  | 0.165 |
| Lower back       |       | 180 (45%) | 48(12%)   | 136 (34%) | 36 (9%)   | 0.925 |
| Hips/buttocks    |       | 84 (21%)  | 144 (36%) | 64 (16%)  | 108 (27%) | 0.989 |
| One/both knees   |       | 144 (36%) | 84 (21%)  | 80 (20%)  | 92 (23%)  | 0.214 |
| One/both legs    |       | 92 (23%)  | 136 (34%) | 100 (25%) | 72 (18%)  | 0.189 |

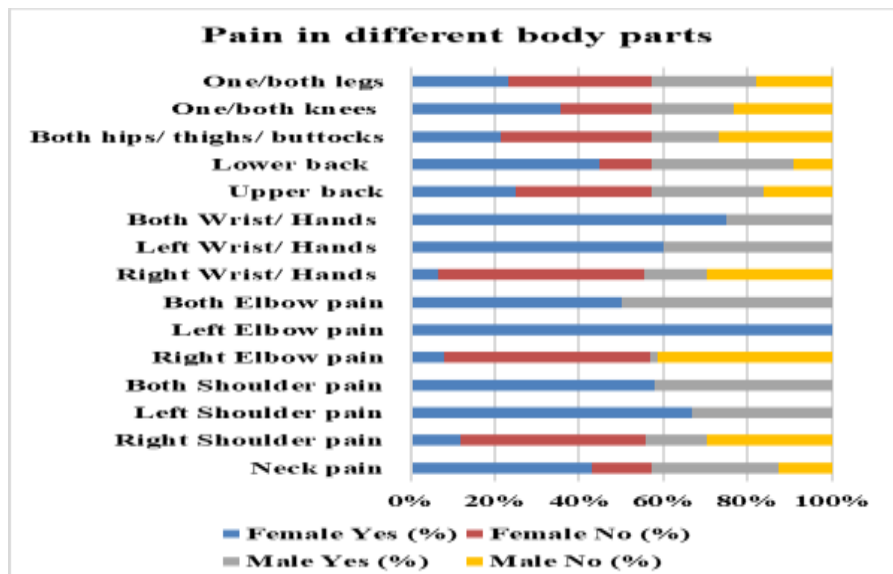


Fig. 1: Prevalence pain in different body regions in last 12 months in female and male.

### Neck Pain

Statistical results for neck pain, 73% of the office workers had experienced troubles in their necks - most of them were female with total percent 43% and around 30% male participants - compared to 27% participant who disagreed that they had not troubles in their necks as shown in Table (2).

### **Shoulder pain**

Regarding to shoulders pain, the results showed that 55% of the participants agreed that they had elbow problems while 45% denied having troubles in their both shoulders (Table 9). Those who feel pain are divided into 7% female who feel pain in right shoulder, 4% female who feel pain in left shoulder, 20% female who feel pain in both shoulder, 9% male who feel pain in right shoulder, 2% male who feel pain in left shoulder and 14% male who feel pain in both shoulder as shown in Table (2).

### **Elbow pain**

Additionally, statistical results for elbow pain showed that only 19% of the participants had pains in one or both elbows, specifically 13% female and 6% male that had such pains in right or left elbow. Those who feel pain in the right elbow was observed more than the who feel pain in left elbow with percentage of 7% female, 2% male, 1% female and 0% male respectively as shown in Table (2).

### **Wrist pain**

Concerning to wrist and hand troubles, participants who stated that they had pain in one or both of their wrists and hands were 34% while 66% of the participants denied having troubles in their wrists and hands as shown in Table (2).

### **Hand pain**

Moreover, the results showed that 7% of the participants had pains in both wrists or hands, also the right wrist/hands were observed more than the left wrist/hands specifically around of 5% female, 13% male who feel pain in right hands and furthermore 5% female and 4% male of whole participants respectively who feel pain in left hands or wrists as shown in Table (2).

### **Upper Back pain**

Regarding to the upper back pain, 52% of the participant office workers in this study assumed that they had troubles in their upper back while 48% denied having such troubles (Table 9). Since, office workers do most of their duties with twisted movement and not very well posture doing it again and again, and this is the main source of UBPA as shown in Table (2).

### **Lower Back pain**

From this study, 78% of the office workers admitted that they had experienced lower back pain while 22% denied having lower back pain as shown in Table (2).

### **Hip and buttocks pain**

With respect to, Hips or Buttocks pain, 37% of the office workers assumed that they had troubles of their hips or buttocks while 63% denied of having troubles at these regions of their bodies as shown in Table (2). Sitting on ineffectively designed seats may be the main source of having hips or buttocks troubles.

### **Knee pain**

Office workers who stated that they had pain in both of their knees were 48% while 52% of the participants disagreed having such pains as shown in Table (2). Also, the prevalence one/both knees pain in last 12 months within female were 36% of all participants denied had such pain. On the other hand, the prevalence one/both knees pain in last 12 months within male were about 23% of all male participants denied had such pain as shown in Table (2).

### **Leg pain**

Office workers who stated that they had pain in both of their legs were 48% while 52% of the participants disagreed having such pains as shown in Table (2). Office workers complete many of their tasks standing for long time and thus this might be a contributing reason for ankles, legs and feet pains. Also, the prevalence one/both legs pain in last 12 months within female were 23% of all participants denied had such pain. On the other hand, the prevalence one/both legs pain in last 12 months within male were about 25% of all male participants denied had such pain as shown in Table (2).

Prevalence and relationship between Work Related Musculoskeletal Disorders and Physical Risk Factors among Egyptian office workers.

MSDs survey conducted with NMQ questionnaire showed that the majority of the participant office worker had pain on most of their duties. Table (3) illustrate the physical risk factors correlated to the office workers conditions for whole data (male and female). The results showed that 27% of the office workers always stand for long periods, 21% often stand for long periods, 43% sometimes stand for long periods and only 9% who never stand for long times (Table 3 and Figure 2).

The office workers who always sit for long times were 25%, 20% often sit for long times, 43% sometimes sit for long times and around 13% who never sit for long times. The results also indicated that around 34% of all participants assumed that they never work for long periods of video display unit, 32% sometimes work for long periods of video display unit, 11% often work for long periods of video display unit and 23% always work for long periods of video display unit. The results also showed that about 38% of all participants stated that they never or sometimes walk for long periods during their duties, 18% often walk for long periods and only 7% always walk for long periods during their duties (Table 3 and Figure 2).

On the other hands, about 54% of all participants assumed that they never and 34% sometimes working for long times kneeling, 5% of all participants stated that they often working for long times kneeling and 7% only always work kneeling for long time. Furthermore, about 34% of the participants confirmed that they never and 48% sometimes working with their hands above shoulder height and about 13% confirmed that they often and 5% always working with their hands above shoulder height (Table 3 and Figure 2).

The statistical results also showed that 55% of the office workers never worked with their hands below knee height, 32% sometimes worked with their hands below knee height and 9% confirmed that they often and 2% always worked with their hands below knee height. Moreover, about 25% of all participants confirmed that they never and 48% sometimes reaching far stuffs during their duties, 16% always, and 11% often reaching far stuffs during their duties (Table 3 and Figure 2).

Regarding to carrying loads, the results showed that 21% of the participants agreed that they always lifting or carrying loads below 5 Kg, 18% of the participants often and 23% sometimes lifting or carrying loads below 5 Kg and only 38% of the participants never lifting or carrying loads below 5 Kg. Also, the results showed that 21% of the participants agreed that they always and 18% often lifting or carrying loads over 5 Kg and about 38% of the participants never and 23% sometimes lifting or carrying loads over 5 Kg (10). The statistical results also showed that 27% of the participants stated that they always and 11% often pushing or pulling loads over 5 Kg and about 32% of the participants never and 30% sometimes pushing or pulling loads over 5 Kg (Table 3 and Figure 2).

Additionally, statistical results for slipping or falling during transport of loads showed that only 16% of the participants sometimes slept or fall during transport of loads and 61% who never slept or fall during transport of loads. About 32% participants were always and 21%

often regularly applying force with hands or arms and only 34% who assumed that they sometimes regularly applying force with hands or arms (Table 3 and Figure 2).

Concerning to working with vibrating hand tools such as massage machine, about 27% participants were always and 4% often worked with vibrating hand tools and the majority of them with 20 % assumed that they sometimes and 50% never worked with vibrating hand tools. Moreover, the results showed that 52% of the participants never drive in vehicles, 14% sometimes drive in vehicles, 11% often, and 23% always drive in vehicles (Table 3 and Figure 2).

Results of the prevalence bending and/or twisting with your upper body many times per hour showed that 29% of whole participants stated they experienced always bending and/or twisting with your upper body many times per hour, about 21% assumed they often, 38% sometimes experienced bending and/or twisting with your upper body many times per hour and only 13% who never experienced that action. Regarding to the awkward postures, about 34% of the participants assumed they often, 38% sometimes worked in awkward postures and only 11% who never experienced working in awkward postures (Table 3 and Figure 2).

Concerning to, working prolonged periods in the same posture, 34% of the participants always, 25% often complained of working for long times in the same posture while 34% sometimes complained of working for long times in the same posture and only 7% never complained of that action. Also, 34% of the participants always, 30% often complained of repeating the same movement of your arms or hands many times per minute while 21% sometimes complained of repeating the same movement of your arms or hands many times per minute and only 14% never complained of repeating the same movement (Table 3 and Figure 2).

Table 3: Physical risk factors correlated to the office workers conditions for male and female.

| <b>Working conditions (n=400)</b>        | <b>Never</b> | <b>Sometimes</b> | <b>Often</b> | <b>Always</b> |
|--|--------------|------------------|--------------|---------------|
| Standing for long periods                | 36<br>(9%)   | 172<br>(43%)     | 84(21%)      | 108(27%)      |
| Sitting for long periods                 | 52<br>(13%)  | 172<br>(43%)     | 80<br>(20%)  | 100<br>(25%)  |
| Long periods of video display unit work  | 136<br>(34%) | 128<br>(32%)     | 44(11%)      | 92<br>(23%)   |
| Walking for long periods                 | 152<br>(38%) | 152<br>(38%)     | 72<br>(18%)  | 28<br>(7%)    |
| Working long periods squatting/kneeling  | 216<br>(54%) | 136(34%)         | 20<br>(5%)   | 28<br>(7%)    |
| Working with hands above shoulder height | 136<br>(34%) | 192<br>(48%)     | 52(13%)      | 20<br>(5%)    |
| Working with hands below knee height     | 220<br>(55%) | 128<br>(32%)     | 36<br>(9%)   | 16<br>(4%)    |
| Reaching far                             | 100<br>(25%) | 192<br>(48%)     | 64<br>(16%)  | 44(11%)       |
| Lifting or carrying loads (below 5 Kg)   | 152<br>(38%) | 92<br>(23%)      | 72<br>(18%)  | 84(21%)       |
| Lifting or carrying loads (over 5 Kg)    | 152<br>(38%) | 92<br>(23%)      | 72<br>(18%)  | 84<br>(21%)   |
| Pushing or pulling loads (over 5 Kg)     | 128          | 120              | 44(11%)      | 108           |



|  |       |       |       |       |
|--|-------|-------|-------|-------|
|  | (32%) | (30%) | (7%)  | (27%) |
| Slipping or falling during transport of loads                      | 244   | 64    | 28    | 64    |
|  | (61%) | (16%) | (7%)  | (16%) |
| Regularly applying force with hands or arms                        | 52    | 136   | 84    | 128   |
|  | (13%) | (34%) | (21%) | 32%   |
| Working with vibrating hand tools                                  | 200   | 80    | 16    | 108   |
|  | (50%) | (20%) | (4%)  | (27%) |
| Driving in vehicles  | 208   | 56    | 44    | 92    |
|  | (52%) | (14%) | (11%) | (23%) |
| Bending and/or twisting with upper body many times per hour        | 52    | 152   | 84    | 116   |
|  | (13%) | (38%) | (7%)  | 29%   |
| Working in awkward postures  | 44    | 152   | 136   | 72    |
|  | (1%)  | 8%)   | (34%) | 8%)   |
| Working prolonged periods in the same posture                      | 28    | 136   | 100   | 136   |
|  | (7%)  | (34%) | (25%) | (34%) |
| Repeating the same movement of arms or hands many times per minute | 56    | 84    | 120   | 136   |
|  | 4%)   | (%)   | (30%) | (34%) |

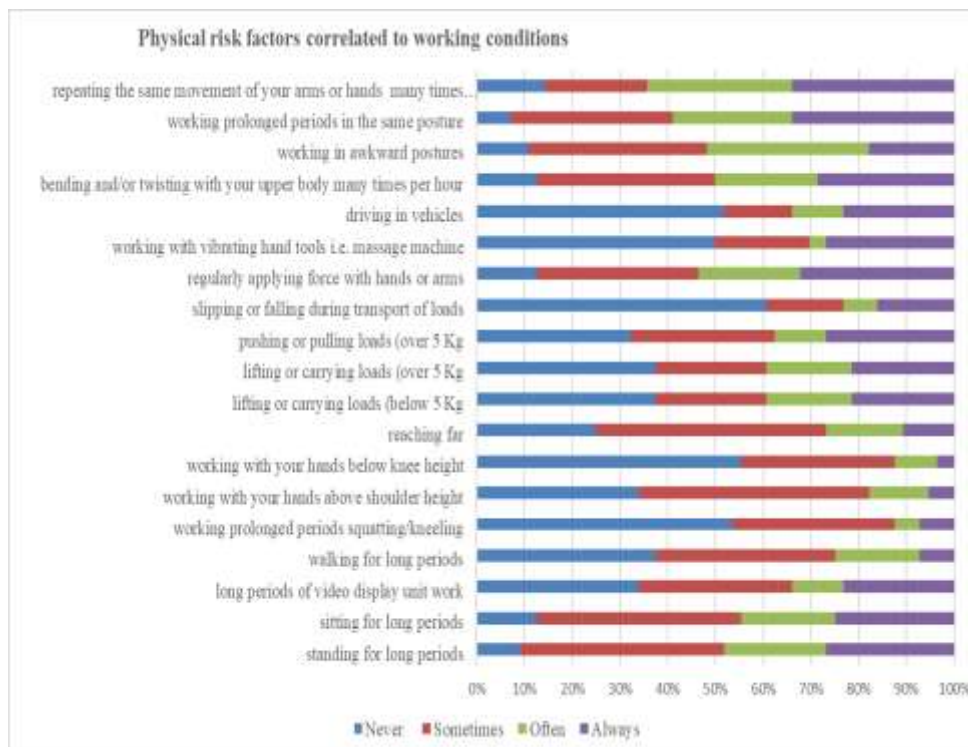


Fig.2: Physical risk factors correlated to the office workers conditions.

## 5. DISCUSSION

This study investigated the prevalence of musculoskeletal symptoms among Egyptian office workers and relationship between physical risk factors and musculoskeletal disorders among them in the previous 12 month. In our study, musculoskeletal symptoms were common among office workers in general hospital setting. This indicated that the prevalence of musculoskeletal symptoms is higher in the studied population in comparison to international studies [14, 19-24]. Office workers were most likely to report musculoskeletal symptoms in their low back (79%), neck (73%), shoulders (56%) knees (56%), upper back

(52%), leg (48%), hip/buttocks (37%), wrist/hand (56%) and elbow (19%). This is in line with the previous studies indicating the high prevalence of lower back pain and neck pain in office workers and pain in other regions of the body [25, 26].

Likewise the prevalence of back pain was in the range of 7.4% to 59.6% in previous studies [27-33] and upper extremity symptoms ranged from 18.6 to 62.7% [26, 34, and 35]. This wide range in different studies may be due to differences in the work settings and/or in the criteria used for ascertainment of symptoms.

In our study Office workers were most likely to report musculoskeletal symptoms in their spine. Workers experiencing such symptoms were more likely to rate their workstation ergonomics as poor. Office work is often associated with prolonged sitting and Working prolonged periods in the same posture which has been shown to be a risk factor for neck pain [36]. Prolonged sitting, particularly with poor workstation ergonomics, may cause prolonged static contraction of muscles; increased pressure on the intervertebral discs and tension on ligaments and muscles; decreased tissue flexibility; altered spinal curvature and weakened paravertebral muscles, and such changes may lead to, or increase the risk of, musculoskeletal injury in the spine [36-37].

## 6. CONCLUSION

The prevalence of work related musculoskeletal disorders among Egyptian office workers are high, with the lower back pain followed by neck pain with the elbow is less affected part.

## 7. CLINICAL IMPLEMENTATIONS

The findings of the current study provide weight into the prediction of work related musculoskeletal disorders among Egyptian office workers.

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