Musculoskeletal Symptoms Among Surgeons at a Tertiary Care Center: a Survey Based Study

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ABSTRACT

Introduction: Musculoskeletal (MSK) manifestations represent a common work-related physical complication that affects surgeons and impacts their life and the healthcare service negatively. Aim: The aim of this study was to determine the prevalence of work related MSK manifestations among surgeons in a tertiary care hospital and to identify the possible associated risk factors. Methods: A Web-based self-administered cross-sectional survey was conducted. This study targeted all surgeons regardless of their nationalities, ages, genders, and marital statuses. The questionnaire assessed the participants’ demographic data as well as musculoskeletal manifestations. Results: Most respondents (80%) suffered from MSK manifestations that were related to performing surgeries. Back and neck areas represented the most affected body parts (71.1% and 59.8%, respectively). A significantly higher percentage of those with musculoskeletal manifestations practiced for 5-10 years (28.9%) (p = 0.006). Conclusion: MSK pain is common among Saudi surgeons in different specialties. More attention should be directed to improving the physical environments in which the surgeons are operating. Moreover, surgeons should be educated about the recommended ergonomic positions that can prevent or decrease their work related MSK manifestations.

Keywords: surgeon, musculoskeletal symptoms, discomfort, pain, survey.

1. INTRODUCTION

One of the common work-related physical complications that face surgeons is musculoskeletal (MSK) manifestations, which can negatively affect their life in particular and the healthcare system in general by accelerating surgeons’ retirement. These manifestations will affect different anatomical components including muscles, nerves, and tendons. From a physiological point of view local hypoperfusion and increased intramuscular pressure resulting from excessive stationary contractions may appear as MSK fatigue and pain. Regarding workplace-related morbidities in the United Kingdom, the Health and Safety Executive report (2011) showed a cost of 13.8 billion Euros among ratepayers, with MSK complications being the most frequent. Several studies were conducted on different professions such as bus drivers, cleaners, office workers, and healthcare providers especially surgeons due to the nature of their jobs that require intensive focusing, error-free manoeuvres, and accurate decision makings (1-5).

Although the incidence of MSK complications among general surgeons is high, it is much higher in orthopedic surgeons, predominantly affecting the upper extremity, neck, and back regions, probably to the struggle and duration spent on keeping suitable ergonomic poses (6). The National Institute for Occupational Safety and Health suggests evading static loads, minimizing stationary working pose, and maintaining frontal neck position less than 15°. Despite these suggestions, poses that have been reported are mainly influenced by surgeons’ training and one’s own desire not to follow these suggestions (7).

Although MSK discomfort represents a common work-related physical complication that affects surgeons and impacts their life negatively, few studies have been carried out in Saudi Arabia to investigate this phenomenon, mainly among dentists (8-10)Saudi Arabia, using random cluster sampling. 224 surveys were distributed among dentists with a 91.1% response rate (101 women and 103 men; while the studies that ex-
explored MSK pain among surgical team members focused principally on nurses and technicians, rather than the surgeons (11-14)characteristics, and risk factors of low back pain among Operating room (OR).

2. AIM

The aim of the current study was to determine the prevalence of work-related musculoskeletal symptoms in surgeons working at a tertiary care center in Jeddah, Saudi Arabia, and to identify the possible risk factors.

3. METHODS

This is cross-sectional study. Our target population was all practicing surgeons at King Abdulaziz University Hospital in Jeddah, regardless of their nationalities, ages, genders, or marital status. The sub specialties that were included are general surgery, orthopedic, urology, cardiology, head and neck, neurosurgery, plastic, pediatrics, vascular, ophthalmic, and obstetrics and gynecology. Participants with incomplete data were excluded from the study. The total sample size was 196 participants, with a response rate of 61.73%.

Data collection was done during period from June to July, 2018. A questionnaire formed by 17 questions was mailed to 14 pediatric surgeons, seven with a large experience in laparoscopy and seven in SILS. All surgeons completed the survey. The questionnaires were focused on the type of laparoscopic or SILS activity, location and type of pain, need for drugs and its physical consequences. Results were analyzed using Chi2 test. We used a web-based, self-administered, cross-sectional survey that was developed by authors of the current study. The survey was first tested in paper form on a pilot small sample of surgeons (who were not included later in study sample) to ensure its clarity and validity. Then, the survey was modified in response to the feedback given by the pilot sample. The final survey included two sections; a) demographic data of the participants and b) information regarding musculoskeletal manifestations and the possible subjective postoperative related symptoms. The questionnaires were filled subjectively by the participants via Google Docs that was sent to the participants’ emails, with a reminding email sent one week later to increase the response rate.

Statistical analysis

An excel spreadsheet was established for the entry of data. Data analysis was carried out using SPSS version 22. All numerical variables were checked for normality by Shapiro Wilk test. Categorical variables were summarized as frequencies and percentages and association between variables was tested using Pearson's Chi square or Fisher-Freeman-Halton Exact Tests as appropriate. A p-value of < 0.05 was considered statistically significant. Ethical Approval was obtained from Unit of Biomedical Ethics of King Abdulaziz University prior to the commencement of the study. Confidentiality of the collected data and participant’s privacy were assured and the data were used only for research purpose. The act of completing and submitting the survey by any participant implied his consent.

4. RESULTS

Surgeons who responded to the questionnaire were 121. The majority of the respondents (80%) suffered from musculoskeletal manifestations that were related to surgery. Table 1 summarizes the demographic data of the respondents. Most the respondents aged 24-30 years (52.1%), were men (61.2%), did not smoke (75.2%), and had no chronic diseases (83.5%). There was no statistically significant association between the presence of musculoskeletal manifestations and any of the aforementioned demographic data.

The occupational data of the respondents as shown in Table 2. More than half the respondents were residents (57%) who practiced surgery for less than 5 years (52.1%). The highest percentage of the surgeons were in the specialties of general surgery (27.3%) and obstetrics and gynecology (24%); and has not yet completed their fellowship program (67.8%). A significantly higher percentage of those with musculoskeletal manifestations practiced

Table 1. Demographic factors of the respondents (n = 121).
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The effects of musculoskeletal pain on the respondents and some of the probable risk factors are summed in Table 5. The majority of surgeons (94.8%) continued operating even when they felt the symptoms during the procedure; and did not take a day off from work (81.3%) or thought of early retirement (61.5%) as a result of the manifestations.

Regarding the methods used by the suffering surgeons to relieve the manifestations; among which medical (53.6%) and non-medical (58.8%) therapies were the most common. In 23.7% of cases, an unscientific and ergonomically-unfit working environment was at the root of the problem (70.1%). The surgeons often had to wear wrong or thoughtfully designed shoes (21.6%), which were uncomfortable or poorly suited to their feet (21.6% vs. 21.6%). In 23.7% of cases, the wrong and poorly adapted shoes were the cause of the symptoms.

5. DISCUSSION

In this study, 80% of the respondents suffered from MSK manifestations that were related to surgery. Surgeons are at higher risk for the development of musculoskeletal fatigue during both open and laparoscopic operations (15-17) the surgical team, and particularly the surgeon, have been further removed from direct interaction with the patient's tissues. A scientific and ergonom-
ic approach to the analysis of the operating room environment and the performance and workload characteristics of members of the modern surgical team can provide a rational basis for maximizing the efficiency and safety of our increasingly technology-dependent surgical procedures. This could be attributed to the working postures taken by surgeons while performing the procedures in the form of prolonged static head-bent and back-bent positions (18). In addition, surgeons are obliged to do frequent awkward repetitive movements of the upper extremities in the operating theatre (15). The rate of MSK symptoms in our study is comparable to rates reported by other previous studies. Park et al (19) investigated the association of demographics, ergonomics, and environment and equipment with physical symptoms reported by laparoscopic surgeons.

There were 317 surgeons identified as involved in laparoscopic practices who completed the online survey. Data collected from this comprehensive 23-question survey were analyzed using chi-square. There were 272 laparoscopic surgeons (86.9%) found that 87% of surgeons who performed laparoscopic procedures complained of physical discomfort related to their practice. Moreover, 62%–72% of surveyed otolaryngologists reported had back or neck pain associated with their surgical practice (7,20) related to microscope work and prolonged sitting. The importance of these findings has demonstrated the lack of awareness and adequate training to prevent long-term disability in ENT surgeons.

This study determined which types of laparoscopic instruments are most often used in Europe, why they are being used, and what problems exist while using the instruments. The handles were also evaluated according to ergonomic design criteria. A questionnaire was sent to 62 experienced surgeons in 19 countries. The laparoscopic instruments were divided into four groups: instruments with similar functionality and hand grip mod-
el were grouped together. Eight questions were asked for every group about the type of instrument (disposable, reusable, or semi-reusable; while in other studies a rate of 40% and 60% was found (23, 24) the Netherlands.

There was no statistically significant association between the presence of MSK symptoms and any of the demographic or lifestyle variables of our respondents. On the contrary, many studies have reported a higher prevalence of MSK disorders among women (21, 25, 26)indirect ophthalmoscopy. They explained this sex difference by the lower pain threshold in women (26-28); and also by the tendency of women to seek medical attention for pain than men (29) gender differences in work-related health conditions have received little research attention. This appears be the first study to examine why employed women are much more likely than men to experience upper body musculoskeletal disorders. A mailed self-report survey gathered data from 737 Australian Public Service employees (73% women. This discrepancy between our results and the other studies might be explained by the higher number of female surgeons in our study who specialized in obstetrics and gynaecology, while more male surgeons specialized in general surgery and orthopedics. There may be differences in the working postures and the duration of procedures among these specialties that confirmed the effect of gender.

We found that a significantly higher percentage of those with MSK manifestations have practiced for 5-10 years (28.9%), compared to those who had no symptoms. Older surgeons are usually expected to have a higher risk of developing MSK complaints. However, studies have revealed that younger workers had higher rates of MSK disorders due to their limited experience and job skills that resulted in inefficient practice (30-32). Older surgeons may be able to apply coping strategies with the work related physical stresses and their movements are less awkward due to their experience.

The most common manifestations - as reported by our respondents - were pain (82.5%) and fatigue (66%). Back and neck represented the most affected body parts (71.1% and 59.8%, respectively). On comparison between surgeons who performed open and laparoscopic procedures, we found that fatigue was the only symptom that was reported by a significantly higher frequency of laparoscopic surgeons and it was linked to surgery. Pain and shoulder symptoms were slightly higher in laparoscopic surgeons, though the results were not statistically significant. Moreover, a higher percentage of the laparoscopic surgeons discontinued during some procedures (7.3% versus 2.4%) and took a day off from work (20% versus 17.1%); however, no significant association was found. All these findings indicate a tendency towards a higher physical stress that affects surgeons negatively during laparoscopy. Many factors interact to cause musculoskeletal stress on the shoulder region during laparoscopy; including the height of operating table and the design of instruments. Our findings are consistent with many studies have reported that a higher number of surgeons complained of neck, back and shoulders stiffness after laparoscopic than after open surgery (17, 20, 33-36) trunk, shoulder, elbow, and wrist movements during the first hour of surgery. We also compared post procedural complaints of pain, par stiffness, or numbness between the two groups.

6. CONCLUSION

Musculoskeletal pain is common among Saudi surgeons as eighty percent suffered from musculoskeletal manifestations that were related to surgery in different specialties, probable risk factors were long operating duration, lifting body parts manually and shortage of staff. More attention should be directed to improving the physical environments in which the surgeons are operating. Moreover, surgeons should be educated about the recommended ergonomic positions that can prevent or decrease their work related MSK manifestations.

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