

Work-Related Musculoskeletal Disorders Among the Surgeons in Bangladesh: A Cross-Sectional Study

Puja Kundu¹, Faruq Ahmed^{2*}, Md Mazharul Islam³, Md Kutub Uddin⁴, Sojib Karmaker¹, Parijat Karmaker Antor⁴, Afzal Hossain Fahim⁴ and Md Nazmul Haq²

¹Department of Physiotherapy and Rehabilitation, Movement Solutions BD, Gulshan, Dhaka-1212, Bangladesh

²Department of Physiotherapy, Centre for the Rehabilitation of the Paralysed (CRP), Savar, Dhaka-1343, Bangladesh

³Department of Anesthesia and ICU, Enam Medical College and Hospital (EMCH), Savar, Dhaka-1340, Bangladesh

⁴Department of Physiotherapy, Saic College of Medical Science and Technology (SCMST), Mirpur, Dhaka-1216, Bangladesh

*Corresponding author

Faruq Ahmed, Junior Consultant Physiotherapist, Department of Physiotherapy, Centre for the Rehabilitation of the Paralysed (CRP), Savar, Dhaka-1343, Bangladesh; E-mail: physiofaruq2020@gmail.com

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ABSTRACT

Background: Musculoskeletal pain is common among the surgeon's communities. Prolonged physical activity, longer working hours, repetitive movements, and awkward positions during surgery are associated with MSK pain.

Objectives: The purpose of the study was to determine the occupation-related musculoskeletal disorders among the surgeons working in Bangladesh.

Methods: The cross-sectional study was carried out from May to July of 2023. The purposive sampling technique was used to collect data from 159 surgeons who were working at different hospitals. The Nordic Musculoskeletal Questionnaire (NMQ) and the Numeric Pain Rating Scale (NPRS) were used to collect data. The Statistical Package for Social Sciences (SPSS) version 25.0 was used for analysis.

Results: The mean age $\pm$ SD of the surgeons was 35.82 ± 6.95 . The majority of the surgeons (65.4%) were in the age range of 26 to 35 years. Out of 159 respondents, the majority (76.1%) were males, 64.2% were overweight, whereas 42.8% of respondent's worked daily from 6 to 8 hours. The majority of respondents (78.6%) working position was standing, and 39.6% of them had no chance to take rest at work place. The maximum participants (57.90%) had lower back pain, while 25.8% of participants had been prevented from doing their normal work due to pain. There was no association found among the severity of pain with BMI ($p = 0.184$) and working hours ($p = 0.188$) of the surgeons.

Conclusion: The results of the study revealed that the majority of the surgeons had moderate musculoskeletal pain. It becomes apparent that MSK pain is prevalent among Bangladeshi surgeons.

Keywords: Musculoskeletal Pain, Musculoskeletal Disorder, Surgeons, Bangladesh

Introduction

Work-related musculoskeletal (MSK) pain is frequently experienced by health professionals, especially in surgeon's communities [1,2]. MSK pain among surgeons is attributed to physiological and ergonomic factors. Surgeons have a high risk for MSK pain because of their long workdays and physically

demanding jobs involving repetitive motion, static and awkward postures, and forceful exertion during surgery [2,3]. Such predictors commonly affect the back, neck, and upper limbs [1,4].

The rate of MSK pain has been reported to be as high as 84% among physicians and surgeons compared to 22-26% in the general population [5]. According to the Paediatric Orthopedic Society of North America 67% have MSK pain at the workplace

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[1]. Surgeons are more prone to MSK pain during their practice [6]. It revealed that practice-related MSK pain affects 66% of arthroplasty surgeons and 67% of orthopaedic surgeons [7,8]. Nevertheless, the prevalence of MSK pain among healthcare providers in Saudi Arabia ranged between 48% and 85% [9,10].

In the United States, more than 90% of oncologic surgeons reported that they had experienced at least one work-related symptom, and 28% of them reported work related injury [11]. In another study, 100% of laparoscopic surgeons in a United States sample and almost 80% of laparoscopic surgeons in a European sample reported having experienced work-related symptoms [12,13].

Among the Australian surgeons, 329 (16%) respondents had musculoskeletal disorders, with 137 (42%) surgeons reporting shoulder, neck, or upper back pain [14]. Vaghela where the prevalence of musculoskeletal disorders among surgeons in Gujarat is 83.70% [15]. Davis revealed that 22% of injured surgeons missed work due to occupational injuries [16]. Musculoskeletal disorders are the leading cause of work absenteeism or disability in the United States, Canada, Finland, Sweden, and England [17].

A number of studies have been done on these musculoskeletal issues in various occupational groups, including office employees, bus drivers, nurses, garment workers, and patient care staff in the medical field. But it has been that no research is done in Bangladesh on musculoskeletal problems of surgeons. However, to our knowledge, no study has shown the prevalence, consequences, and risk factors of MSK pain among surgeons in Bangladesh. The aim of the study was to determine the occupation-related musculoskeletal disorders among the surgeons working in Bangladesh.

Methodology

Study Designs

The purpose of this cross-sectional study was to examine the occupation related musculoskeletal disorders among the surgeons working in Bangladesh. The purposive sampling technique was used to collect data from 159 participants. Surgeons working in different medical college hospitals, clinics, and other government and non-government hospitals constituted the study population for the present study.

Study populations

The research was carried out from May to July of 2023. In this study, the researcher also considered eligibility criteria, which helped the researcher select suitable and appropriate participants for this study. Surgeons of both gender who had an age greater than 26 years willingly participated in this study and met the inclusion criteria. The participants who had physical instability were excluded from the study and who refused to participate in the study.

Outcome Measurements

Data was collected by using a structural-type questionnaire. The survey was designed taking into account the characteristics and goals of the current investigation. The questionnaire had two basic sections. The first part contained questions on socio-demographic information. There was a questionnaire

for acquiring the participant's demographic and work-related information, including age, sex, working hours, working position, rest at the workplace, feelings of participants at the workplace, and professional working experience as a surgeon. The researcher collected data through an individual interviewing process in a calm environment.

In the second part the Nordic Musculoskeletal Questionnaire (NMQ) was used to collect information on musculoskeletal problems of the surgeons, and the numeric pain rating scale (NPRS) scale was used to collect data about the severity of musculoskeletal pain of the participants.

Practitioners in the medical, surgical, and dental fields frequently experience work-related musculoskeletal (MSK) discomfort [1,2]. Surgeons were asked whether they had experienced musculoskeletal pain lasting for more than 1 day during the previous 12 months, causing interference with daily activities, and musculoskeletal pain during the previous 7 days. Additionally, individuals were surveyed on how many sick leaves they had taken during the preceding 12 months due to their pain [18,19]. The individual's level of pain was measured using the NPRS. It was used to ask patients to rate the severity of their present level of pain with an 11-point scale, with 0 representing no pain and 10 representing the greatest suffering possible [20].

Data analysis

The collected data were inputted into a computer and analyzed using Statistical Package for Social Sciences (SPSS) version 25.0 and Microsoft Office Excel 2013. Categorical variables were presented as percentages and frequencies, and continuous variables as mean and standard deviation (SD), and the chi-square test was used to determine the level of significance between two or more variables. The null hypothesis was ruled out at the $p < 0.05$ threshold for analysis. Before participating, patients got complete information about the research objectives and protocol and provided signed informed consent.

Design and Ethics

The ethical requirements of the World Health Organization (WHO) and medical research council were adhered to. Prior to participation, patients were informed about the research aims and protocol and provided signed informed consent. Administrative entities of the ethics committee and the Ethical Review Board (ERB) authorized the study.

Results

In this observational study, one hundred fifty-nine surgeons completed the survey. The study consists of almost all the information needed for the study. Table 1 represents the distribution of the participant's socio-demographic characteristics. The mean age $\pm$ SD of the participants was 35.82 ± 6.95 . The majority of the participants, 65.4% were in the age range of 26 to 35 years.

Out of 159 respondents, the majority respondents (76.1%) were males, and 23.9% were females. The mean BMI $\pm$ SD of the participants was 26.24 ± 3.41 . The maximum respondents (64.2%) were overweight, and the maximum 42.8% of respondent's worked daily from 6 to 8 hours. The majority of

respondents (78.6%) working position was standing, and 39.6% of the respondents had no chance to take rest at work place. The majority of the respondents (65.4%) professional year of experience were less than 10 years.

Table 1: Socio-demographic and work-related information of the respondents (n=159)

Demographic	%(n)	Demographic	%(n)	Demographic	%(n)
Age		BMI		Working Hours	
mean $\pm$ SD	35.82 $\pm$ 6.95	mean $\pm$ SD	26.24 $\pm$ 3.41	mean $\pm$ SD	10.31 $\pm$ 2.3
26-35 years	65.4% (104)	Under Weight	1.3% (2)	6-8 hours	42.8% (64)
36-45 years	27.0% (43)	Normal Weight	34.6% (55)	8-12 hours	41.5% (66)
46-55 years	7.5% (12)	Over Weight	64.2% (102)	> 12 hours	15.7% (25)
Working Position		Professional experience		Feelings of Participants	
Standing	78.6% (125)	1 -10 years	65.4% (104)	Exhausted	36.5% (58)
Sitting	17.6% (28)	11 -20 years	22.0% (35)	Weak	10.7% (17)
Bending	3.8% (6)	21 -30 years	12.6% (20)	Irritated	8.2% (13)
Gender		Rest at workplace		None	44.7% (71)
Male	76.1% (121)	Took rest	60.4% (96)		
Female	23.9% (38)	No rest	39.6% (63)		

Regarding frequency distribution of the participants by pain during last 12 months, it was found that the maximum 92 (57.90%) participants had lower back pain. It was also found that 52.80% (84) subjects had neck pain. It was reported by 27.7% respondents had suffered from upper back pain (Figure 1).

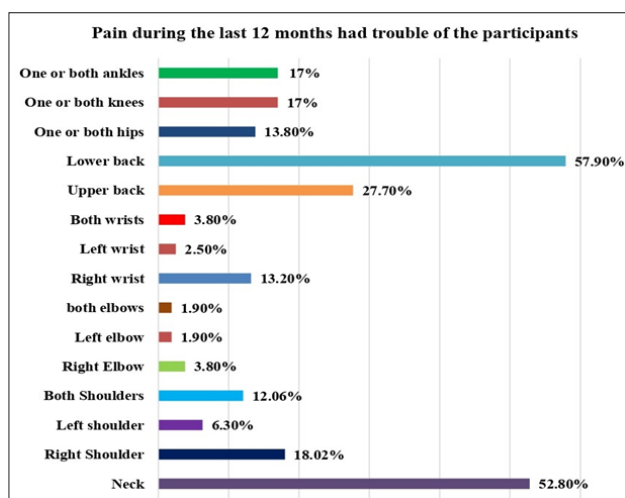


Figure 1: Pain during the last 12 months of the participants

In this study, it was revealed that 23.9% of participants had been prevented from doing their normal work due to neck pain during the last 12 months. The study further showed that 25.8% of surgeons could not do their work due to lower back pain. Shoulder pain prevented 15.1% of study subjects from doing normal activities in the last 12 months (Figure 2).

Regarding pain during the last 7 days of the participants, it was found that the majority 38 (23.9%) of participants suffered from lower back pain. It was also revealed that 34 (21.4%) respondents talked about their sufferings from neck pain. The study showed that 23 (14.5%) suffered from upper back pain, 20 (12.6%) persons suffered from shoulder pain, 10 (6.3%) subjects suffered from one or both knee pain, and 12 (7.5%) participants suffered from both ankle and feet pain, respectively.

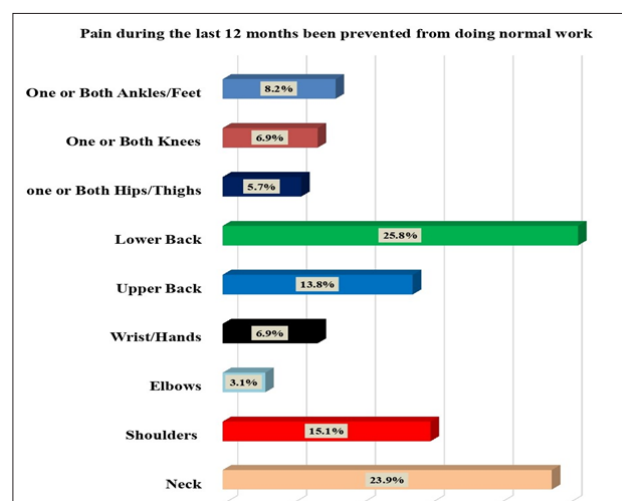


Figure 2: Pain during last 12 months been prevented from doing your normal work

Table 2 represents the association between the participants by working hour and severity of pain. The study showed that, out of 159 surgeons, 68 (42.8%) participants had to work for 6-8 hours per day. Among them, 30 (44.1%) participants suffered from no pain, 37 (54.4%) suffered from moderate pain, and 1.5% suffered from severe pain. It was found that 66 (41.5%) participants worked for 8-12 hours. Among them, 27 (40.9%) surgeons had no pain, 37 (56.1%) complained of moderate pain, and 3.0% of participants had severe pain. In the case of surgeons working more than 12 hours, 8 (32.0%) out of 25 (15.7%) surgeons had no pain, 14 (56.0%) subjects had moderate pain, and 3 (12.0%) suffered from severe pain. The study showed that the association between working hours of the surgeons and severity of pain was found not statistically significant ($\chi^2 = 6.2$, $df = 5$, and $p = 0.184$).

Table 3 represents the association between the participant's body mass index (BMI) and severity of pain. About frequency distribution of the respondents by BMI and severity of pain, it was found that 55 (34.6%) surgeons had normal weight. Among

them, 28 (50.9%) participants had no pain and 27 (49.09%) participants had moderate pain. The study also revealed that 102 (64.2%) surgeons were overweight. Among them, 36 (35.29%) had no pain, 60 (58.82%) had moderate pain and 3.77% respondents had severe pain. The association between BMI of the participants and the severity of pain was found not statistically significant ($\chi^2 = 6.12$, $df = 4$, and $p = 0.188$).

Table 2: Frequency distribution of the participants by working hour and severity of pain

Working hour of the participants	Severity of pain n (%)				χ^2	df	P value
	No pain	Moderate	Severe	Total			
6-8 hours	30 (44.1%)	37 (54.4%)	1 (1.5%)	68 (42.8%)	6.23	5	0.184
8-12 hours	27 (40.9%)	37 (56.1%)	2 (3.0%)	66 (41.5%)			
>12 hours	8 (32.0%)	14 (56.0%)	3 (12.0%)	25 (15.7%)			

(*Significant at 95% confidence level)

Table 3: Frequency distribution of the respondents by BMI and severity of pain

BMI of the participants	Severity of pain n (%)				χ^2	df	P value
	No pain	Moderate	Severe	Total			
Under Weight (18.50 kg)	1 (50.0%)	1 (50.0%)	0 (0%)	2 (1.3%)	6.123	5	0.188
Normal Weight (18.50-24.99 kg)	28 (50.9%)	27 (49.1%)	0 (0%)	55(34.6%)			
Over Weight (25.00 kg)	36 (35.3%)	60 (58.8%)	6 (5.9%)	102 (64.2%)			

(*Significant at 95% confidence level)

Discussion

The descriptive cross-sectional study's aim was to determine the occupation-related musculoskeletal disorders among the surgeons working in Bangladesh. The relevant data were collected from a sample of 159 surgeons working in different hospitals in Dhaka city. In the current study, the mean age $\pm$ SD of the respondents was 35.82 ± 6.95 . It revealed that 65.4% of surgeons belonged to the age group of 28 to 37 years, and 27.0% of participants were in the age group of 38 to 47 years. In a similar study in India, it was found that the mean age of the surgeons was 42.07 years and SD was 12.35 [15].

This study showed that 76.1% of participants were male and 23.9% of surgeons were female. A study conducted by Young revealed that 47.3% of participants were females and 52.7% were males [20]. This study revealed that 64.2% of surgeons were overweight and 34.6% had a normal body weight. The mean BMI $\pm$ SD of the surgeons was 26.24 ± 3.41 . In a study in Saudi Arabia, it was found that the mean BMI of the Saudi orthopedic surgeons was 27.8 [1].

The present study found that the majority of the respondents (65.4%) professional year of experience were less than 10 years. It is indicated that the majority surgeons were young. The study also showed that the maximum 42.8% of surgeons worked daily from 6 to 8 hours. The mean working period was 10.31 hours and SD was 2.3. A study conducted by Vaghela showed that the mean working years of the surgeons were 15.14 years with a mean working period of 8 hours daily [15].

This study revealed that the majority of respondents (78.6%) working position was standing and 17.6% respondents position was sitting. In contrast, the Saudi Arabian research showed that the working position of the majority of the participants was sitting (79%) and 16% of participants' working position was standing [21]. About rest at the workplace, it was found that

60.4% of participants took rest during their work time and 39.6% participants did not take rest during work. It was revealed that 36.5% of study subjects felt exhausted, and 10.7% of respondents said they felt weak during the workplace. A study in Gujarat showed that 41.86% of surgeons said their work schedule is very unpredictable, and 34.87% of surgeons said they don't have time for breaks because of everything that requires to be completed daily. It was revealed that 34.88% of respondents said they were physically exhausted, and 25% of participants said they put a lot of pressure on themselves [15].

This study showed that during the last 12 months, 57.90% of participants had lower back pain, 52.80% had neck pain, and 27.7% had upper back pain. It was also found that 23.9% of surgeons had been prevented from doing their normal work due to neck pain during the last 12 months. Shoulder pain (15.1%), elbow pain (3.1%), wrist-hand pain (6.1%), hip-thighs pain (5.1%), knee joint pain (6.9%), and ankle-feet pain (8.2%) prevented the surgeons from doing their normal activities in the last 12 months.

A study in Gujarat, it was found that 30.2% of surgeons suffered from neck pain, 23.3% suffered shoulder pain, 6.98% of participants were affected by knee pain, and 2.32% surgeons had ankle, elbow, and wrist pain [15]. In another study, it was also found 26.7% orthopedic surgeons were suffering from low back pain, 17.4% surgeons had wrist or forearm tendinitis, 15.1% surgeons had elbow lateral epicondylitis, 14.0% surgeons had plantar fasciitis, 12.8% subjects had carpal tunnel syndrome, 12.8% participants had shoulder pain or tendinitis, and 9.3% surgeons had knee osteoarthritis [22]. In a study conducted by Al-Mohrej it was showed that 74.0% of trauma surgeons had lower back pain, the second highest reported prevalence was neck pain (58.2%) [1]. It was found that 40.4% of surgeons complained of having shoulder pain or elbow pain. Hand or wrist pain was prevalent among 32.2% of respondents, while

knee pain and foot pain or ankle pain composed 27.4%, 21.2%, and 11.6% of the respondent's experienced hip or thigh pain [1].

About pain during the last 7 days, it was found that 23.9% of respondents suffered from low back pain and 21.4% of respondents had neck pain. It was also found that 14.5% of participants suffered from upper back pain, 12.6% of surgeons suffered from shoulder pain, 16.3% of study subjects suffered from one or both knee pain, and 7.5% of participants suffered from both ankle-foot pain, respectively. The result indicated that the majority of the surgeons had low back pain.

It was very common among the surgeons worldwide. The study showed that 55.3% of participants had moderate pain. It was also found that 3.8% of participants suffered from severe pain. It was evident from the study that more than half of the participants had moderate pain. Only a few suffered from severe pain. The result also indicated that a good percentage (40.9%) of surgeons had no pain.

In this study, it was revealed that out of 159 surgeons, 44.1% had no pain, 37 (54.4%) had moderate pain, and 1.5% had severe pain. The study showed that the association between working hours of the surgeons and severity pain was found not statistically significant ($\chi^2 = 6.2$ and $p = 0.184$). The result also indicated that the association between BMI of the participants and the severity of pain was found not statistically significant ($\chi^2 = 6.12$ and $p = 0.188$). showed that the relationship between rising BMI levels and the onset of knee, foot, or ankle pain was statistically significant ($p = 0.03$) [1].

The present research is expected to shed light on the musculoskeletal problems of the surgeons in Bangladesh. The findings of the study will be able to inform the surgeons about musculoskeletal disorders and their ways of preventing these ailments. The study will help the policymakers in reorienting the working environment in order to combat the risk factors of musculoskeletal disorders among the surgeons.

Limitation

The tiny sample size and shorter study duration are the drawbacks of the study. Hence, it is highly advised to raise the number of samples throughout Bangladesh. The study's findings may not be generalizable to the entire population of Bangladesh, particularly considering short duration of study and geographical biases.

Conclusion

The results of the study revealed that the majority of the surgeons (55.3%) had moderate musculoskeletal pain. It became apparent that musculoskeletal pain was prevalent among Bangladeshi surgeons. Nevertheless, ergonomics instruction during operational training might be useful in adapting routines and lessening the symptoms of musculoskeletal discomfort. Besides, the surgeons should focus on physical awareness regarding the care of their neck, back, and extremities as well.

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