ISSN: 2476-5279; International Journal of Musculoskeletal Pain Prevention. 2022;7(2): 695-701.

Assessing of posture behavior and playing-related musculoskeletal pain among music students: A cross-sectional study

ARTICLEINFO

Article Type
Original Article

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How to cite this article

Akbari-Chehrehbargh Z., Tavafian SS., Akhshabi A., Moeini Badi F. Assessing of posture behavior and playing-related musculoskeletal pain among music students: A cross-sectional study. IJMPP. 2022; 7(2): 695-701.

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Article History
Received: Oct 14, 2021
Accepted: Nov 4,2021
ePublished: Apr 20, 2022

ABSTRACT

AIM: Music students are more at risk for musculoskeletal pain than their peers. Improper posture during playing is a key factor causing musculoskeletal pain in propose group. The aims of study were to assess musculoskeletal pain and postural behavior, and to obtain the related factors with the presence of musculoskeletal pain among music students.

Method and Materials: A conservatory-based cross-sectional study was performed from October 2021 to November 2021 through convenience method. Data (demographic characteristics and pain level) were collected using a self-report questionnaire, Numeric Pain Rating (NPR) scale and Nordic Musculoskeletal Questionnaire (NMQ) respectively. Music students' postures were assessed using the Rapid Entire Body Assessment (REBA) method. Data was analyzed using SPSS, version 24.0. Descriptive statistics were used to explore the data. Correlation and chi-square tests were applied to investigate the relationship between the prevalence of musculoskeletal pain and study variables. The significant level was considered at <0.05.

Findings: The results showed that 150 (56.2%) participants presented at least one symptomatic region in the last seven days. The most frequent areas of pain were the neck, shoulders, lower back and wrists/hands. Female students have reported musculoskeletal pain (P=0.047) and pain intensity (P=0.006) more than male students. Students who played more times per week (P<0.001) or had improper posture behavior (P=0.019), have reported musculoskeletal pain significantly. There was no significant relationship between history of playing, types of instruments, and age with pain.

Conclusion: Finding showed that musculoskeletal pain was a major health problem among music students. This study highlights the need to provide strategies to prevent playing-related musculoskeletal pain among music students.

Keywords: Musculoskeletal Pain, Postural Behavior, Music Conservatories, Related Factors

Introduction

Musculoskeletal pain is common among young musicians and students [1] and music students are more at risk than their peers [2, 3]. In addition, musculoskeletal pain in this group is often chronic and results from repetitive movements, poor posture, and heavy musical instruments [2]. Of course, acute pain is sometimes observed due to a sudden increase in the duration of training with instruments [4]. The prevalence of musculoskeletal pain in musicians is reported to be between 41% and 93% and the neck, shoulders and wrists are more affected than other organs [5, 6]. In the study of Kazemi et al. [7], 53% of Daf and Setar students suffered from musculoskeletal pain. The findings of Sadeghi et al.'s study also showed that 53% of musicians suffered from musculoskeletal pain due to repetitive movements and overuse, which was higher than the number reported in novice musicians in Western countries [8]. The results of Mehrparvar et al. (2012) study on the prevalence of musculoskeletal problems among traditional and western musicians showed that 44.4% of the participants had experienced this type of problems and its prevalence was significantly higher in women

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[DOR: 20.1001.1.24765279.2022.7.2.4.5]
[DOI: 10.52547/ijmpp.7.2.695]

than men [9].

Currently, music students experience more musculoskeletal pain than other students of the same age [10]. These pains lead to a decrease in the quality of life [11] and a significant inability of students to practice [6, 11, 12] and pose a serious threat to their quality of performance [11]. Improper physical posture while playing and muscle fatigue and weakness are key factors in causing musculoskeletal pain in musicians [13-15]. In the Stanhope (2018) study, 100% of participants believed that poor posture was a very important risk factor for musculoskeletal pain, and they believed that maintaining a good posture was very important for a good musician [16]. Researchers also believe that behaviors that prevent musculoskeletal pain are less common among music students [17, 18]. Individual habits and behaviors while practicing music have a significant impact on students' health [19].

Culturally, reporting and discussing pain between students and music teachers is prohibited [18, 19]. In addition, pain affects their work situation and competence; this makes students feel insecure about talking about pain and do not look for opportunities to solve the problem and improve the pain [18]. Despite recent scientific studies on the health of musicians, the prevalence of musculoskeletal pain and its related factors among music students, especially in Iran, has been less studied. Given that music students are at high risk from this perspective, so research in this area seems necessary. To the best of our knowledge, no recent research has been conducted on this subject. Therefore, the aim of this study was to evaluate the prevalence of musculoskeletal pain and body posture behavior; it was also a factor in determining the incidence of musculoskeletal pain in music students.

Methods and Materials

The present study was descriptive-analytical and cross-sectional. The research environment was public music conservatories in District 11 of Tehran. It should be noted that only two vocational schools (boys and girls) are operating under the supervision of Tehran Education. Inclusion criteria included: informed parental consent, students' voluntary participation, ability to participate in reading and familiarity with the Internet. Exclusion criteria also included: any report of injury or disorder in the musculoskeletal system of the student by him, parents, school parents or physiotherapist, having any underlying disease and withdrawal of the student in any of the research stages. Finally, 267 ninth to twelfth grade students - according to the inclusion and exclusion criteria - who wanted to participate in the study were selected and entered into the study using the easy and accessible sampling method. Ethical considerations of studying, obtaining the code of ethics, license and letter of introduction from the relevant authorities; Explain the purpose and implementation of the project to participants, parents and conservatory officials; It was not to impose material, physical, psychological and spiritual costs on the participants and to keep their information confidential. Written consent was obtained from the students' parents to participate in the study.

Data collection tools included: questionnaire of demographic information of participants (age, sex, educational level, specialized type instrument, playing history and training duration per week); Numerical Pain Rating (NPR) scale was 0-10 scale and standard Nordic Musculoskeletal Questionnaire). Rapid Entire Body Assessment (REBA) method was used to assess students' physical condition behavior. This method was used in 1995 by Mc. Anarney and Higentt. Its strengths are easy to use in a variety of contexts and in the worst or most frequent case, the person did the assessment. The final score is between 1 and 15, which is

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divided into five levels in terms of risk: 1 = negligible; 2-3 = low; 4-7 = moderate; 8 -10 = high and 11-15 = very high. In this method, first by combining the scores of the neck, torso and legs and adding it with the force / load score, a score of A is obtained. The arm and wrist and the sum of it are obtained by the pairing point, in the next step, by combining the points A and B, the point C is obtained, and by adding the point C, the point F is obtained. Excellence is the final score of the REBA method (Figure 1) [20]. An electronic questionnaire link was sent to participants through WhatsApp and data was collected. Students' physical behavior while practicing music was

Table 1) Mean (SD) and frequency distribution of demographic characteristics, physical condition behavior and pain of participants (267 people)

Quantitative variables	**Mean (SD)**
Age (Yrs)	15.9 (1.72)
Playing history (Yrs)	6.20 (2.66)
Period of training per week (Hours)	12.84 (10.29)
Pain intensity (0-10)	2.31 (2.55)
Physical condition behavior through Final score REBA(1 -15)	7.09 (2.93)
Qualitative variables	**N (%)**
Gender	
Girl	243 (63.4)
Boy	140 (36.6)
Occurrence of pain during the last week	
No	117 (43.8)
Yes	150 (56.2)
The place of pain	
Neck	74 (27.7)
Shoulder	54 (20.2)
Elbow	11 (4.1)
Wrist	47 (17.6)
Upper back	19 (7.1)
Waist	54 (20.2)
Thighs and pelvis	9 (3.4)
Knee	22 (8.2)
Ankle	10 (3.7)
Type of musical instrument	
Piano	37 (13.9)
Violin	51 (19.1)
Tar and Setar	33 (12.4)
Other	146 (54.7)

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observed and recorded through a happy system with the help of a trained person. - Data were analyzed using SPSS software version 24. Descriptive statistics; like frequency and percentage distributions, mean and standard deviation were used to describe the data. Correlation and chi-square tests were used to determine the relationship between demographic variables and body posture behavior with the prevalence and severity of pain. Significance level was determined to be less than 0.05.

Findings

In total, 267 music students entered the study. The mean and standard deviation of the age of students was 15.9 (1.72). Of all the participants, 133 (49.8%) were girls and 134 (50.2%) were boys. In total, 150 students (56.2%) reported musculoskeletal pain over the past week. Table 1 shows the mean and frequency of demographic characteristics of participants and other variables. The mean and standard deviation of the scores of physical condition behavior and pain intensity were: 7.09 ±2.93 and 2.31 ±2.55, respectively. The most common sites of pain were neck (27.7%), shoulders (20.2%), back (20.2%) and wrists (17.6%) (Table 1). Girls behaved better than boys. There was a significant relationship between gender (p = 0.047), duration of exercise (p <0.001) and postural behavior (p= 0.019) with the prevalence of pain. Female students reported more prevalence (61.7% vs. 50.7%) and severity (2.47± 2.73 vs. 1.89±2.28) more pain than male students. No significant relationship was found between playing history (p = 0.48), type of musical instrument (p = 0.22) and age (p = 0.44) with musculoskeletal pain. The only factor of sex was significantly associated with the severity of musculoskeletal pain (P = 0.006). Tables 2 also show the relationship between demographic characteristics and physical condition behavior with the incidence of pain.

Discussion

The aim of this study was to investigate the prevalence of musculoskeletal pain in music students, as well as to determine the factors associated with it. In our opinion, this was the first study in Iran to evaluate

Table 2) Factors related to pain among studied participants

Qualitative Variable	Pain (Yes-No)		
	* Chi-square test	df	P
Gender	3.226	1	0.047
Grade	3.985	5	0.55
Type of musical instrument	4.458	3	0.22
Quantitative Variable	**Spearman coefficient**		**P**
Age	0.04		0.44
History of playing	0.02		0.48
Duration of training per week	0.25		<0.001
Physical posture behavior	0.143		0.019

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the physical condition behavior of music students during practice. The results of the study showed that 150 students (56.2%) had musculoskeletal pain, which is consistent with previous studies in this field [3, 5]. Therefore, our findings also confirm that musculoskeletal pain is the most important health problem among music students. Also, the most reported areas of pain were in the neck, shoulders, back, and wrists, which were similar to the findings of a study by Gomez et al. [6], which could be caused by unsafe carrying of musical instruments, muscle weakness, and repetitive movements (especially use frequent from of the upper limbs) [8]. The lowest reported pain was in the elbow, knee and ankle, which was consistent with the results of previous studies [5,6]. The results of the study showed that there is a significant relationship between the variables of gender, age, duration of exercise and physical condition behavior with the prevalence of pain. Female students showd more pain prevalence and more pain severity than what male reported that it was similar to the results of a study by Mehrparvar et al. [9]. The reason for the high prevalence in girls may be attributed to their precocious puberty and muscle weakness [21]. Boys may also be reluctant to report pain or be less concerned about it [22]. Therefore, it seems that designing educational interventions to prevent musculoskeletal pain in this vulnerable group is more necessary [23].The results of the present study showed that students who practice music for a long time per week are significantly more likely to suffer from musculoskeletal pain. Previous studies have also shown that students who exercise a lot daily or weekly (more than 33 hours per week) are more likely to see a specialist due to musculoskeletal problems [3,6,24]. This may be dependent on the amount of music practice. Findings of the study also showed that students who behaved inappropriately had significantly higher rates of pain in the past week. This result was also in line with previous studies [13-15]. The study by Kak et al. [5] did not report a significant relationship between the type of musical instrument and pain. In the present study, this relationship was not observed. However, a study by Lansdale et al. [25] showed that musicians who used brass instruments had fewer complaints and musculoskeletal pain. However, in this study, there was no significant relationship between playing history and musculoskeletal pain and no significant relationship was observed between age and the rate of musculoskeletal complaints. Of course, it seems that with age, the history of playing also increases, and this factor should also be effective in the prevalence of pain, but this was not the case in the study participants; That is, older students did not necessarily have more experience; In other words, a person may have a longer history but be younger in age or have a shorter workout per week.

The present study had strengths; including the use of an electronic questionnaire that facilitated access to participants. Since all questions had to be answered, there was no missing data. However, in the self-report questionnaire, only the prevalence of pain during the last week was examined to prevent recall bias. The use of standard observational checklists to evaluate posture was another strength of the study. However, the results were obtained from a cross-sectional study and in some part from a self-report questionnaire, so the cause-and-effect relationship could not be proven. In addition, it was the study was done in an environment of Tehran music conservatories, and the results may not be generalizable to populations (professional musicians), environments (free music schools), and other geographical locations. It was also better to investigate the relationship between other factors such

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as body mass index, psychological factors, etc. with musculoskeletal pain, which were not included in the present study due to operational limitations. It is suggested that the impact of these factors be investigated in future studies with a larger sample size. In this study, we wanted to show the relationship between research variables and musculoskeletal pain in music students. The results showed that female students and participants who had longer training time and more inappropriate posture were more likely to suffer from musculoskeletal pain. Given this issue, educational interventions should consider these factors and use appropriate strategies to prevent musculoskeletal pain in this vulnerable population.

Acknowledgments

We would like to thank the Vice Chancellor for Research of Tarbiat Modares University, Faculty of Medical Sciences, Education officials, Esteemed and compassionate principals and teachers of District 11 music conservatories, and the participating students.

Authors' Contribution: ZABCh (first author) was the main researcher, statistical analyst and author of the first manuscript version and approved the final version of the manuscript. SST (second and responsible author) supervised the whole research and directed it, and approved the final version of the manuscript. M Akh (third author) was scientific-artistic consultant of the project, checked the data analysis and interpretation and approved the final version of the manuscript.FMB(fourth author), cooperated in data collection and analysis and approved the final version of the manuscript.

Confilict of Interest: There is no confilit of interest for this study.

Ethical Permission: This article is a report of a postdoctoral research in the field of health education and health promotion of the first author, which has been registered as ID number of 99030667 and approved by Iran National Science Foundation (INSF). All ethical principals were condidered in this study.

Funding: This work is based upon research funded by Iran National Science Foundation (INSF) under project No "99030667".

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