



Unique Journal of Medical and Dental Sciences

Available online: www.ujconline.net

Research Article

STUDY OF PREVALENCE, INTENSITY AND DISTRIBUTION OF MUSCULOSKELETAL DISORDERS AMONG POSTGRADUATE STUDENTS OF RURAL DENTAL COLLEGE, LONI, AHMEDNAGAR, MAHARASHTRA, INDIA

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Received: 21-09-2014; Revised: 16-10-2014; Accepted: 10-11-2014

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ABSTRACT

Objectives: To evaluate the intensity and location of musculoskeletal pain suffered by post graduate students from different postgraduate faculties of the Rural Dental College Loni (Pravara Institute Of Medical Sciences, Maharashtra, India) to identify the variables related to the occurrence of symptoms and signs of musculoskeletal disorders, and to establish possible preventive measures for such disorders.

Materials and Methods: A cross-sectional study was made among students from different postgraduate courses of the Rural Dental College, Loni between July and Aug 2014. A total of 40 dentists completed an anonymous questionnaire containing 10 questions. The variables were divided into following groups: personal information, position and working time and location and intensity of pain, and preventive measures arising from professional practice.

Results: When the study was carried out it was observed that every postgraduate student has complained of some kind of musculoskeletal pain. This study showed that duration of pain is directly proportional to the intensity. And when comparison was done between males and females, males are more prone for shoulder pain while females are more prone for back pain.

Conclusion: As the incidence is higher in young age group, it is necessary to have some kind of preventive measures to improve the quality of work and longevity of the carrier.

Keywords: Musculoskeletal Disorders, Ergonomics, Preventive Measures, Dentists.

INTRODUCTION

Musculoskeletal disorders are characterized by the presence of discomfort, or persistent pain in the joints, muscles, tendons and other soft parts, caused due to repeated movements and prolonged awkward positions during working hours. Dentists are usually included among the professionals with a higher incidence of musculoskeletal diseases in the course of their professional life¹. Important advances in the field of ergonomics in dentistry have been increased in recent years. These advances have focused on designing the working environment, though preventive measures related to the dental professional have not been adopted. The main risk factors involved must be identified in order to design adequate prevention strategies². The objectives of this study were to assess the intensity and location of musculoskeletal pain suffered by postgraduate students from different graduate courses (Oral Surgery, Pedodontics, Periodontics,

Prosthodontics, Endodontics, oral pathology, oral diagnosis and Orthodontics) of the Rural Dental College, Loni, PIMS; to find out variables associated with the onset of symptoms and signs of musculoskeletal disorders; and to establish possible preventive measures.

MATERIALS AND METHODS

A cross-sectional study was conducted between July and Aug 2014 among 40 postgraduate students (22 females and 18 males) and from various postgraduate courses of the Rural Dental College, Loni. Participant perceptions of symptoms were established with a questionnaire containing 10 questions that had been used in a study. The study variables were divided into following groups and a set of closed or semi-closed questions was added for assessing the following points

1. Personal information

- Age and gender, duration and type of professional Practice

- Dominant limbs, weight and height
- 2. **Position and working time**
 - Working hours in the sitting position.
 - Others: activity between successive visiting patients
 - Work with or without an assistant
- 3. **Location and intensity resulting from professional practice**
 - Locations of pain
 - The quantification of pain
 - Workload (days and hours of work per week)

- Number of patients done per week
- 4. **Preventive measures**
 - Preventive or mitigating measures: physiotherapy, swimming, others
 - Consequences of pain: sick leaves, need for analgesics
 - Chi -Square test for the statistical analysis was used

RESULTS

Table 1: Age and sex wise distribution

Age in years	Male	Female	Total
<25	6(27.27%)	16(72.23%)	22(55%)
25-30	12(66.66%)	6(33.34%)	18(45%)
Total	18(45%)	22(55%)	40

Table 2: Association between Intensity and frequency

Intensity	Frequency				Total
	Daily	2-3/week	Weekly	Monthly	
Mild	0	6(25%)	12(50%)	6(25%)	24(60%)
Moderate	4(25%)	8(50%)	4(25%)	0	16(40%)
Total	4(10%)	14(35%)	16(40%)	6(15%)	40

Value of $\chi^2 = 13.214$, $p < 0.01$, significant

By applying Chi-square test there is a significant association between intensity and duration of frequency ($p < 0.01$)

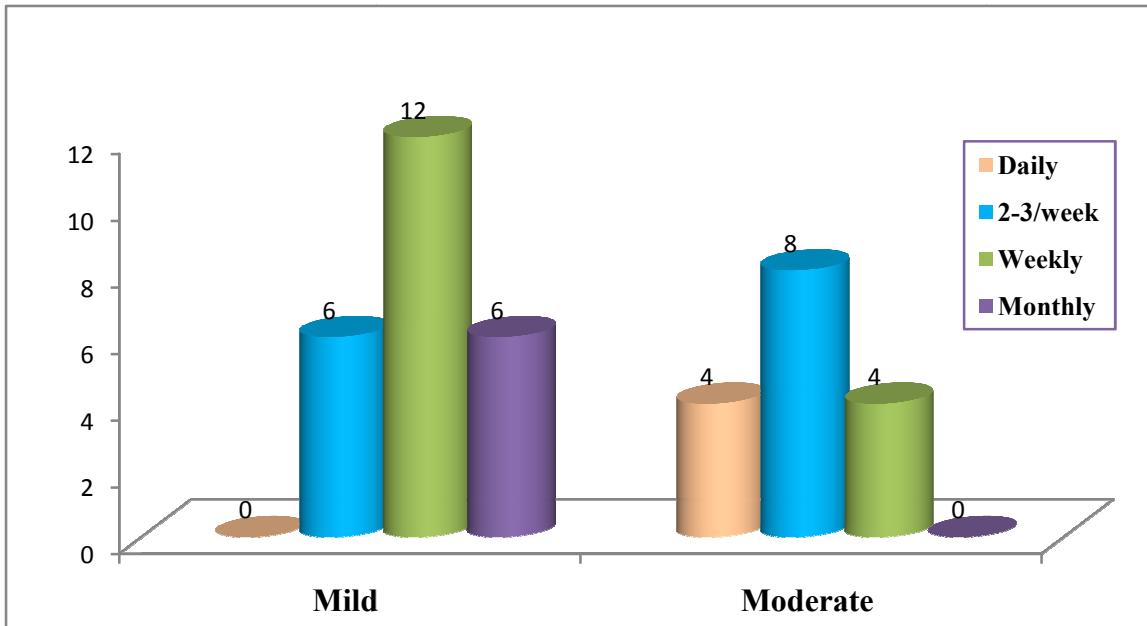


Figure 1: Association between intensity and duration of frequency

Table 3: Association between Intensity and consequences

Intensity	Consequences					Total
	Nil	Medicine	Ointment	Ointment/hot packs	Taking leave	
Mild	7(29.17%)	5(20.83%)	9(37.5%)	2(8.33)	1(4.17%)	24(60%)
Moderate	3(18.75%)	4(25%)	5(31.25%)	0	4(10%)	16(40%)
Total	10(25%)	9(22.5%)	14(35%)	2(5%)	5(12.5%)	40

Value of $\chi^2 = 5.265$, $p > 0.05$, not significant

By applying Chi-square test there is no significant association between intensity and consequences ($p > 0.05$)

Table 4: Association between Intensity and preventive measures

Intensity	Preventive measures					Total
	Exercise	Pharmacotherapy	Physiotherapy	Sports	Yoga	
Mild	12(50%)	2(8.33%)	5(20.83%)	2(8.33%)	3(12.5%)	24(60%)
Moderate	6(37.5%)	2(12.5%)	0	4(25%)	6(37.5%)	16(40%)
Total	18(45%)	4(10%)	5(12.5%)	4(10%)	9(22.5%)	40

Value of $\chi^2 = 6.667$, $p > 0.05$, not significant

By applying Chi-square test there is no significant association between intensity and preventive measures ($p > 0.05$)

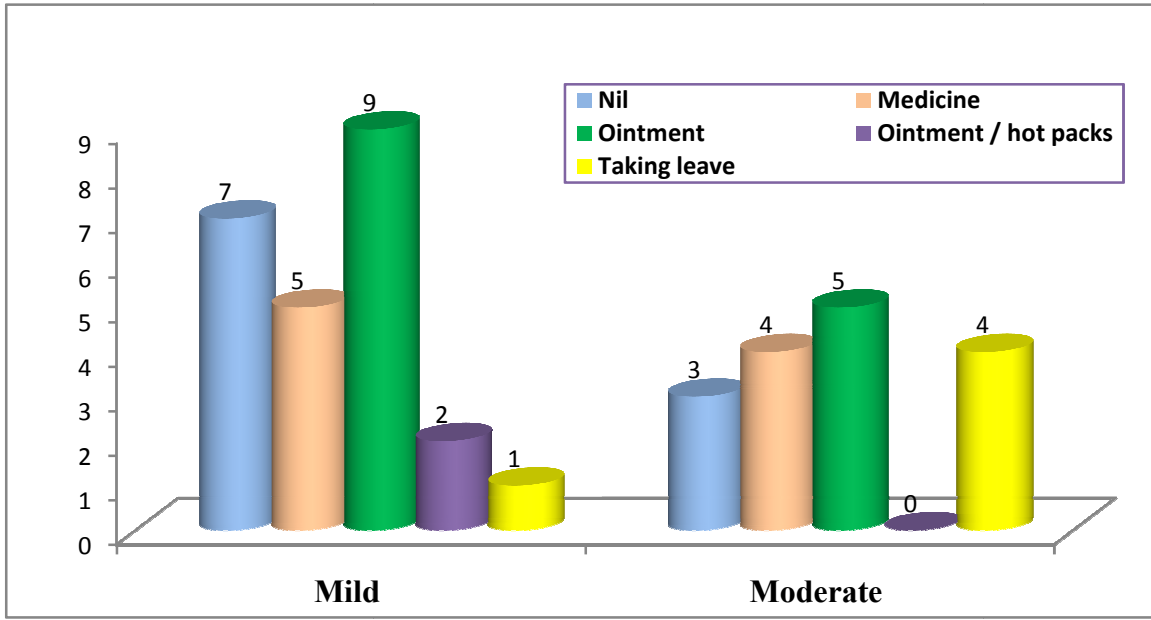


Figure 2: Association between intensity and consequences

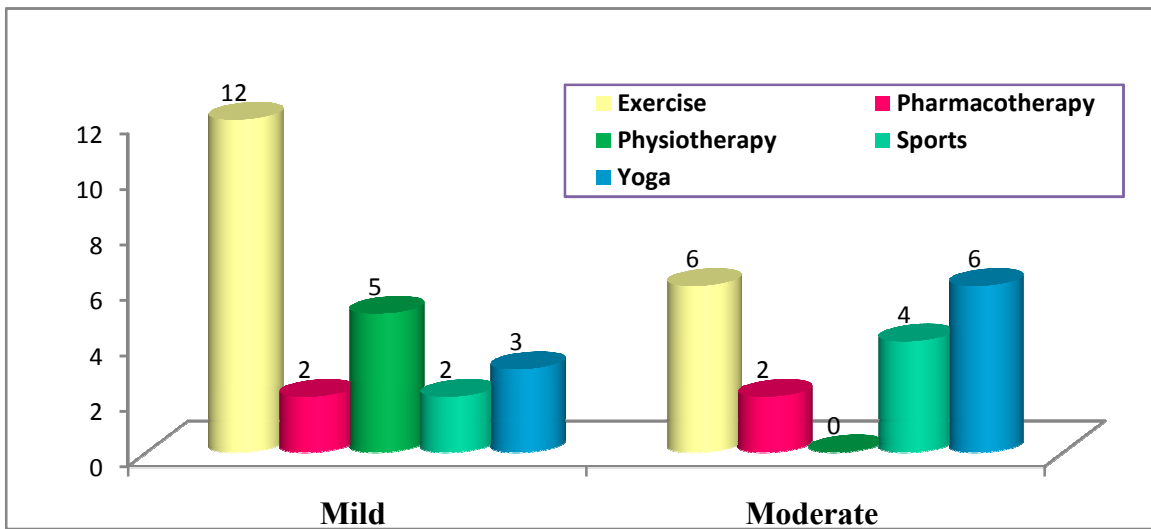


Figure 3: Association Figure- 3 Association between Intensity and preventive measure

Table 5: Association between Intensity and location of pain

Intensity	Location of pain				Total
	Back	Neck	Shoulder	Wrist	
Mild	12(50%)	6(25%)	4(16.66%)	2(8.33)	24(60%)
Moderate	9(56.25%)	2(12.5%)	5(31.25%)	0	16(40%)
Total	21(52.5%)	8(20%)	9(22.5%)	2(5%)	40

Value of $\chi^2 = 3.062$, $p > 0.05$, not significant

By applying Chi-square test there is no significant association between intensity and location of pain ($p > 0.05$)

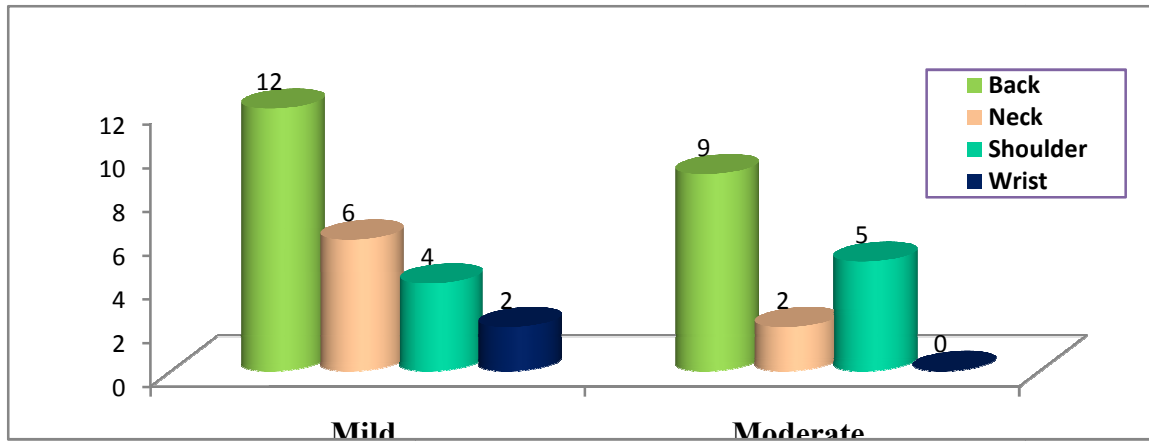


Figure 4: Association between Intensity and preventive measures

Table 6: Association between Intensity and working hours

Intensity	Working hours				Total
	4	5	6	7	
Mild	2(8.33%)	4(1.66%)	7(29.16%)	11(45.83%)	24(60%)
Moderate	0	0	8(50%)	8(50%)	16(40%)
Total	2(5%)	4(10%)	15(37.5%)	19(47.5%)	40

Value of $\chi^2 = 5.146, p > 0.05$, not significant

By applying Chi-square test there is no significant association between intensity and working hours ($p > 0.05$)

Table 7: Association between Intensity and location of pain with sex

Intensity	Sex and Location of pain								Total	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
	Back		Neck		Shoulder		Wrist			
Mild	5	7	2	4	4	0	0	2	11 (61.11%)	13 (59.09%)
Moderate	4	5	0	2	3	2	0	0	7 (38.89%)	9 (40.91%)
Total	9 (50%)	12 (54.45%)	2 (11.11%)	6 (27.27%)	7 (38.88%)	2 (9.09%)	0	2 (9.09%)	18(45%)	22(55%)

Value of $\chi^2 = 11.656, p < 0.05$, significant

By applying Chi-square test there is a significant association between intensity and location of pain with sex ($p < 0.05$)

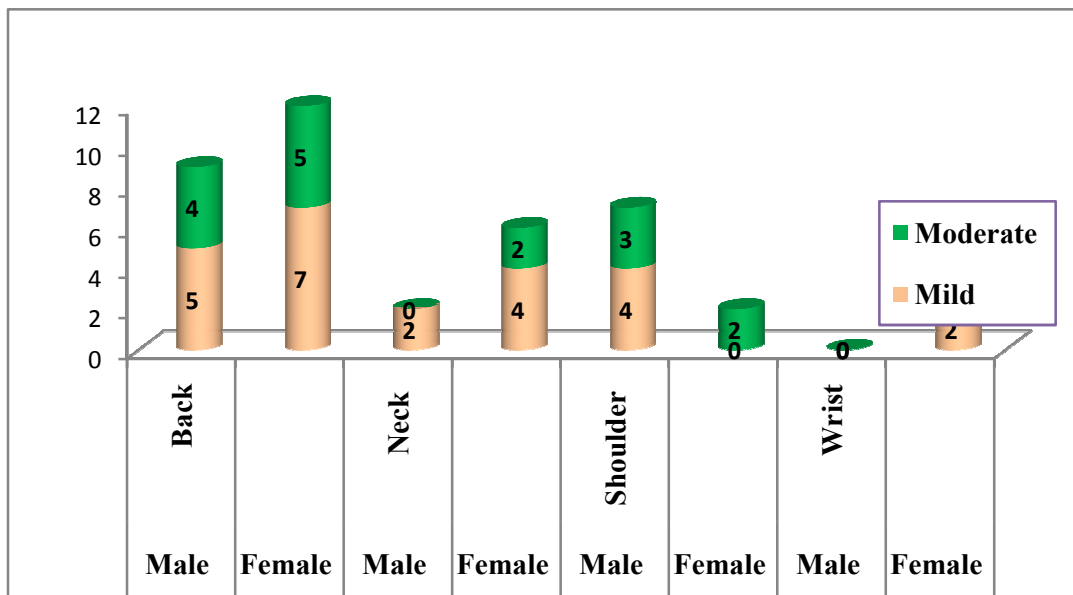


Figure 5: Association between Intensity and Location of pain with sex

DISCUSSION

Ergonomics and musculoskeletal pain in dentists are useful for identifying the prevalence of a musculoskeletal pain, determining the workload of patients, and for adopting possible preventive strategies. Dentists are normally included within the group of professionals at risk of suffering from musculoskeletal disorders, due to prolonged awkward or forced positions at work and failure to adopt preventive measures⁽²⁾. Our study found that most professionals referred some kind of musculoskeletal pain in the last 6 months, as seen in most studies in the past. In most of the studies, the region most commonly affected by pain was the neck, followed the lumbar zone⁽²⁾. It is important to note that the great majority of the participants had mild symptoms, and that only a small percentage suffered moderate or severe pain. Lalumandier et al³ reported that all dental specialties show a high occurrence of musculoskeletal disorders, but with variations in frequency and order in different locations. Ratzon et al.⁴ found musculoskeletal discomfort to be more frequent in the oral surgeon than in other dental specialists, and this is due to increased workload. It has been observed that the wrist pain in oral surgeons could be explained by specific activities of this specialty, such as suturing. Most authors find that females are more susceptible to pain, but the reason is unclear. Some authors relate this difference to a lesser muscle tone and a higher incidence of osteoporosis among women⁵. Some authors found that discomfort is greater in young dentists. This could be due to incorrect working postures.

The main preventive measures should be changing posture, taking breaks, and stretching between successive patients. According to some studies, improvement in the ergonomics of the dental equipment has not served to reduce the incidence of musculoskeletal disorders⁶. The aetiology of musculoskeletal disease is multifactorial, with the involvement of biomechanical, individual and psychosocial factors related to work. Consequently, the preventive strategy must be multifactorial and not only focused on ergonomics^{7,8,9}. Any useful study on musculoskeletal disorders among dentists should include an analysis of preventive measures. These measures in turn should focus on the following areas: ergonomics, breaks at work, general health, physical exercise and physiotherapy^{7,8,9}. The ergonomic factors to be taken into consideration could be summarized as supports of the upper limbs, the use of instruments with large handles, and working with a mechanically adjustable chair presenting an adjustable backrest. The use of indirect vision and correct patient positioning in the dental chair to avoid awkward or forced neck postures are also important. Proper lighting and the use of systems such as magnifiers and microscopes also help reduce fatigue and increase productivity⁸.

Repetitive movements and prolonged body postures can cause muscle and tendon damage, as well as ligament tear and joint injuries⁶. Proper work planning should be done which will allow a break for the alternating muscle groups in order to maintain productive work. The Applied Occupational and Environmental Hygiene guidelines recommend at least 6 minutes of rest every hour for professionals who perform repetitive movements^{4,8,9}.

The three types of breaks which are recommended for dentists would be the following:

- Frequent stops and shaking exercises (relaxing of the arms, shaking and dropping them for periods of 15 seconds).
- Breaks between successive patients (dentists should perform movements opposite to those done during work, for 2-3 minutes).
- Breaks to allow recovery (periods of 10-15 minutes every 2-3 hours).

General health is another major aspect to be taken into consideration for avoiding musculoskeletal diseases. It is essential to dedicate the necessary time to leisure activities, and to implement other measures for the control of mental stress. Lastly, the key role of physical exercise is to be taken into account. Dental professionals should learn to avoid the various risk factors – the ultimate objective being the definition of personalized rehabilitation exercises, stretching and regular aerobic activity¹⁰. Aerobic exercise has been shown to prevent or improve general pain, facilitate weight loss, and strengthen the torso. The stretching of the muscle and tendon structures in turn appears to be helpful in relieving back pain^{7,9}. It thus may be concluded that musculoskeletal pain is common among dentists, with a higher incidence in young women. The neck region is the most affected area. Among the different professionals surveyed, the oral surgeons showed a higher incidence of pain in the wrist. Regarding prevention, 66.2% of the respondents took no measures to avoid such problems, while 33.8% claimed to practice preventive activities, though these were generally performed incorrectly.

According to our study statistics the only significant association is seen with (a) Intensity of pain and Frequency of pain. (b) Intensity and Location with Sex.

Mild pain occurs weekly most and moderate occurs 2-3 times a week. Females were observed to be more affected with back as compared to males, whereas males are more affected with shoulder pain than females. Subjects with both mild and moderate pain use ointment mostly to get relieved from pain. When compared between Intensity and Preventive measures, subjects with mild and moderate pain do exercise and yoga most of the time and some use pharmacotherapy and physiotherapy. Working hours is directly proportional to the intensity of pain.

CONCLUSION

1. Every dentist should follow the ergonomic principles which will help to improve health and safety at workplace. So, undergraduate course itself should include knowledge based on ergonomics.
2. The dental clinic should be designed in such a way that it will enhance the quality of work and also the comfort level of the dentist.
3. Instrument and the dental chair should be arranged in the ergonomic fashion and four handed dentistry should be encouraged.
4. Breaks in between the patients and physical exercise should be performed in routine practice.

ACKNOWLEDGEMENT

We would like to thank Dr. P. P. Marawar, Head and Guide of Department of Periodontology and Implantology R.D.C. Loni, for their valuable guidance and support.

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Source of support: Nil, Conflict of interest: None Declared