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EVALUATION OF THE KNOWLEDGE AND LEVEL OF INFORMATION ABOUT EQUIPMENT ERGONOMICS IN INTERNS AND POSTGRADUATE STUDENTS OF K.M. SHAH DENTAL COLLEGE: A QUESTIONNAIRE STUDY.

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ABSTRACT

Introduction: Dentists are more prone to work associated injuries and illness, which lead to long-term disabilities. Most prevalent work related problems are the musculoskeletal injuries(MSI) so self-recognition by the dentists are the first critical steps to avoid these risk factors.

Materials and methods: Total of 180 postgraduate students and interns participated in the study to assess knowledge regarding equipment ergonomics using 21 questions. They were allotted to fill the printed questionnaire. The filled questionnaire was collected and analysed using chi square test.

Results: This study shows that postgraduate students were more aware regarding proper chair position, operatory light and hand instruments than the interns. Statistically significant differences found between postgraduates students and interns with p-value <0.05.

Conclusion: Knowledge of postgraduate students regarding equipment ergonomics is more than the interns but practical application of equipment ergonomics was found to be lacking.

INTRODUCTION

Nowadays, dentists are more prone to work associated injuries and illness, which reduces work proficiency.[1] Most prevalent among these work related problems are the musculoskeletal injuries (MSIs).[2]The musculoskeletal injury occurs due to the wrong position, uncontrolled movements and use of improper equipments for a longer period of time.[3] Due to MSI**,** it has been found that lower back pain problems are most commonly seen in dentists, followed by problems in hand, wrist, neck and shoulders movements which require medical care for MSIs and also now a days, hand paraesthesia is most common problem[4], due to which operators are taking extended leave from their practice.[5,6]

However, 'dentistry is a visually dependent occupation where the visual demands may require proper postures for longer period of time'.[7-9] Difficulties in direct visualization of the working area, non-ergonomic visual designs, specific clinical tasks demanding concentration, precision and repetitive tasks including hand grips act as sources of particular postural problems for oral health practitioner(OHP).[10]

Dental students work in the same environment and simulate the same work behaviors of dental professionals. However, unlike licensed practitioners, students usually perform dental procedures without an assistant. In a typical clinic scenario, students are observed sitting in the dental stool while reaching for instrument after bending and twisting their bodies in an attempt to get closer to the treatment site. With the student's limited coping skills and the addition of psychosocial stress endemic to the dental school environment.

To prevent the occurrence of MSI, self-recognition and identification by the dentists in relation to their own postures, practicing position, equipment usage pattern is the first critical step so as to avoid these risk factors.[11-16]

The modulating work related stress and ergonomically designed instruments play an important role to prevent musculoskeletal problems.[3] In spite of exponential advancement occurring in the dental equipment designs, numerous times the dentist are known to select instruments based on familiarity rather than the design characteristics and other ergonomic innovations.[15] The education of equipment ergonomics lead to high productivity and avoid injuries.

MATERIALS AND METHODS

The questionnaire study was conducted between October 2017 To March 2018. All the interns (batch 2017-2018) and postgraduate students (batch 2015-2018) studying in K. M. Shah Dental College and Hospital, sumandeep Vidhyapeeth, Vadodara were enrolled in the study.

The interns who participated in the study had completed 4 years of undergraduate dental education and were in the fifth clinical year of education. The students who were not ready to take part in the study were excluded.

Validation of questionnaire was done. Participants were evaluated by printed questionnaire. The questionnaire was formulated in English language in a close-ended format.The participants were explained about the study and asked to fill the questionnaire after obtaining informed consent.

A 21 questions in this study concern the following areas: (i) knowledge regarding equipment ergonomics; (ii) knowledge in relation to exercises and microbreaks.

The questionnaire Performa was handed over to the participants and collected on the same day. If participants were not available was contacted thrice. Once questionnaire has been filled by all the participants all data was entered in the Microsoft Excel and was subjected for statistical analysis.

RESULTS

The questionnaire was filled by a total of 180 participants which included 47.8% postgraduate students and 52.2% interns. This questionnaire sheds light on knowledge regarding dental chair and operator stool position, lighting system and instruments ergonomics.

Related to which equipment requires equipment ergonomics, the answer included dental chair position, operatory light position, dental handpiece, syringes, hand instruments, gloves. The minority responded that all the above mentioned instruments require equipment ergonomics. Mainstream responders claimed that dental chair ergonomics is necessary because it maximizes the accessibility and visibility for the dental procedures. Finding was that hips should be kept slightly above the knees. The muscular overload reduced by the use of lightweight instruments and also microbreaks are required during procedure to reduce muscle

fatigue. However, only minority affirmed that they have practiced daily chair side exercises in their clinical practice. The statistically significant differences found between postgraduates students and interns is that the knowledge of postgraduate students regarding equipment ergonomics is more than the interns ($p<0.05$).

DISCUSSION

The study was done to evaluate awareness regarding equipment ergonomics, exercise and microbreaks amongst interns and postgraduate students of K.M. Shah Dental College and Hospital, Sumandeep Vidyapeeth, Vadodara by a questionnaire.

Ergonomics is use to avoid occupational diseases, decrease mental and physical stress which is associated with dental practice. It also improve capacity and comfort of both the dentist and the patient.

Now a days, MSI is interest of topic in dentistry and found that it is increased day by day on routine curriculum so prevalence rate is remarkably high.[4]Improper equipment ergonomics responsible for longer leave from their practice due to MSI problems.[5]

To avert the situation or to decline the progression of MSI, the dentists need to be more aware to their own postures, operating chair position and equipment usage pattern is the first critical step. This awareness will avoid various risk factors which are responsible for the MSIs.[6]

This questionnaire study was done to assess interns and postgraduate dental students for their knowledge about equipment ergonomics. This particular student population was selected because they treat patients with good knowledge of the subject as they have already passed undergraduate level university exams prior.[17,18]

The improper usage of gloves lead to hand discomfort that indirectly lead to carpel tunnel syndrome.[13,19,20] In this study, only 72% respondents thought that gloves needed changes in its designs. This suggested an unsure response of the dental professionals in this view.

The dental chair is one of the most important of all equipment in dental procedures. Haddad O et al[14]recommended that before development of wrong posture early student training is required about proper chair position to minimize the risk of MSI. In this study it is found that only 57.84% PGs were aware that the proper chair height must be adjusted so that patient's mouth should be at operator's elbow level.[21] Furthermore, only 38% interns were aware regarding chair adjustment.

The most complex equipment is operator's stool. Dentists who sit for more than 80–100% of the day in a chair coupled with poor lumbar support and inadequate adjustability has more risk of developing lower back pain.[15] In our study, 0% of PGs and 27% of interns admitted that they are not aware of the desired positioning of operator's knees to hips during stool adjustment.

Martin et al[22] proved that the lighting and surgical magnification are necessary for maintaining operator positions. To reduce eye-strain, it should be so adjusted that its intensity is slightly higher than that of the overhead operating light. However, surprisingly in this study, overall 33% PGs and 39% interns gave incorrect response, demonstrating lack of awareness regarding the same. Gerwatowski et al[23] found that to prevent stress, sharpening of working edge is required. 88% of participants in our study have a knowledge regarding proper accessibility, sharpness and angulation of instruments .

Microbreaks in-between the work is necessary to prevent musculoskeletal problems and also for improvement of work productivity .[16] A study by Galinsky et al[24] examined the effect of brief rest periods among operators and found positive effects on musculoskeletal comfort.In general, microbreaks are usually recommended for the dentists during dental procedures because they are more prone for developing musculoskeletal problems.[25] Diaz-Caballero et al[26]recommended that education and training required for dentist professionals.However, in our study, 100% PGs and 57% interns expressed that they have used brief rest periods in-between the working hours but still 27% interns stated that they have never used microbreaks in-between the dental procedure.

Raja Rajeswari S et al[22] in 2016 found that proper education about equipment ergonomics among dentist was lacking. Training should be initiated before development of musculoskeletal problems. Our study also found that the participants lacked a proper understanding of equipment ergonomics and the newer advances in the conventional instruments. Since the dental curriculum in India has not been included the vital part of equipment ergonomics. For the education of EE, initiatives through seminars which involves basics, curative and diagnostic process, auxiliary personnel, professional risks and prevention programs can be undertaken. Within the limitations of this study, we suggest improvising the scenario of an acquaintance of EE in the dental curriculum.

In our study, 100% of the PGs and 73% of the interns agreed that equipment ergonomics should be involved in the dental curriculum before the dental student enters for clinical practice.Budding dental professionals in India are trained to excel theoretically; however, there seems to be disconnect between what is learned and what is applied in the clinics.

The habits that are ignored by us, causes stress and this impedes our ability to respond positively to such stimuli in our daily lives. This fundamental problem could be addressed effectively by means such as self-awareness programs[27], relaxation and cognitive training, exercise therapy[28], aerobic exercises and kinesio taping.[29] Karatas et al.[30] demonstrated that kinesio tape technique was effective to prevent musculoskeletal problems and also improve dentists functional performance.

As our study was limited to only the dental Interns and PGs of K.M Shah Dental College and Hospital, Gujarat, India. Additional longitudinal studies need to be carried out to appraise the knowledge of the dental student community altogether.

CONCLUSION

Practical application of equipment ergonomics found to be lacking. Importance of microbreaks with a chair side exercises should be initiated at early stage before they suffer musculoskeletal problems. Within the limitations of this study, we suggest improvising the scenario of an acquaintance of equipment ergonomics in the dental curriculum.

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