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Research Article

A Study to Identify the Relationship between Posture and Musculoskeletal Disorders using Branson's Posture Assessment Scale and Nordic Musculoskeletal Questionnaire Scale among Dentists- Research Article

Sukirti Mohun[1]* and Sunil KM[2]

[1]Associate Professor, Physiotherapist in MSK and Sports, Harsha Institute of Physiotherapy, RGUHS, Bengaluru, Karnataka, India

[2]SDM college of physiotherapy, Dharwad. University- Rguhs Karnataka, India

***Corresponding Author:** Sukirti Mohun, Associate Professor, Physiotherapist in MSK and Sports, Harsha Institute of Physiotherapy, RGUHS, Bengaluru, Karnataka, India.

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Abstract

Background and objective: Dentists are more prone to various work-related musculoskeletal disorders. These affect the neck, shoulder, wrist, upper back, lower back and lower extremities. In previous studies, working posture of a dentists was assessed by using Branson's posture assessment scale. The PAI is most likely more effective with real-time situations where limited visibility is not an issue when observing postures. Branson's posture assessment scale has a potential utility in the dentistry to evaluate and monitor the dentist posture during work. Musculoskeletal disorders was assessed using standardized Nordic questionnaire. To our knowledge none of the studies have been done to correlate Branson's posture assessment as a postural assessment tool and standardized Nordic questionnaire as a tool to assess musculoskeletal disorder. So our aim is to recognize the compromised posture adapted by the dentists and correlate them with musculoskeletal disorders. In this cross sectional survey, 66 subjects were contacted for study purpose. Data were collected through, using Standardized Nordic Questionnaire for the analysis of musculoskeletal symptoms and Branson's posture assessment scale for Analysis of working posture of a dentists. The dynamic working posture will be assessed by using Branson's posture assessment instrument, while the dentist is treating their patients. Branson's posture assessment scale assess posture as it occur. Our study predicts about the site and duration of pain and correlation between the posture and musculoskeletal disorders. Results showed When assessed working posture of a dentists by using BPAI scale 3.13% of dentists were in acceptable category, 96.88% of dentists were in compromised category. In our study none of the dentists were in harmful category. When we compared the Standardised Nordic questionnaire with BPAI the total of 83% of dentists is having musculoskeletal symptoms at least in one or the other body parts and these dentists coming under compromised category which is 96.88%. Hence we came to the conclusion that There is 83% of prevalence of work related musculoskeletal disorders. Among professionals dentists with neck being the most affected area and with ankle being the least. There are associations with age, gender differences, Dominance, Height, Weight, Body Mass Index, Working Experience, fitness and activity level of a professional dentists.

Keywords: Professional Dentists; Musculoskeletal Disorders; Pain; Nordic Questionnaire; Branson's Posture Assessment Scale; Survey

Abbreviations

WRMSDS: Work Related Musculoskeletal Disorder; MSD: Musculoskeletal Disorders; RSI: Repetitive Stress Injury; BMI: Body Mass Index; PSPS: Prolonged Static Postures; BPAI: Branson's posture assessment instrument/scale; PAI: Posture Assessment Instrument; NMQ: Nordic Musculoskeletal Questionnaire

Introduction

According to World Health Organization musculoskeletal disorder defines as "a disorder of the muscles, tendons, peripheral nerves or vascular system, not directly resulting from an acute or instantaneous events". These disorders are considered to be work related, when the work environment and the performance of work contribute significantly, also there are numbers of factors which contributing to the causation of a multifactorial disease [1].

Dentist assume prolonged static postures which require more than 50% of the body's muscles to contract to hold the body in one position while resisting gravity. Since maintaining static posture or restriction of a joints due to muscles contraction for a long period of time, the production of synovial fluid decreases in the weight bearing joints, this increases the friction and resulting into

decrease joint range of motion. Many abnormal postures and uncomfortable positions adapted by a dental personnel during an average work day which have a huge impact to the body. Dental professionals commonly experience musculoskeletal pain during the course of their careers[1].The musculoskeletal disorder can be reduced by the following proper guidelines, the dentist position, sitting with maintaining low back curve, the seat should be tilted to 15degree forward to maintain low back curve this will place hips slightly higher than the knees and it increases hip angle greater than 90degree which may allow for closer positioning to the patient, the equipment use by the dentist should be within the reach to avoid twisting and turning, the patient's operating chair should be height adjustable. It also advice for the dentists to take periodic break between the treatment sessions. Dentists can do stretching and strengthening exercise in breaks, repositioning the feet of a dentists these are some of the guidelines by which dentists can prevent MSDS [2-4]. WRMSD's may be discussed conveniently under four headings: localized inflammations, diffuse pain syndromes, low back pain, and nerve compression syndromes. The examples of localized inflammation are lateral epicondylitis, medial epicondylitis, de-Quervain's tenosynovitis, etc. The classic example of diffuse pain syndromes is non-specific diffuse forearm pain, and that of nerve compression syndromes is carpal tunnel syndrome [5]. Dentistry is a high risk profession for developing musculoskeletal disorder because of high visual demand result in prolonged and affixed as uncomfortable postures. They need a high level of precision and control as they have to look closely and intensely into someone's mouth and work with very fine tools in a confined space for a prolonged period of time [6]. Studies showed musculoskeletal disorder more commonly occur in males than in females [22]. Standardized Nordic Questionnaire for Analysis of Musculoskeletal Symptoms" is a valid and reliable tool for assessing Work Related Musculoskeletal Disorders (WRMSDS) [23-26]. The aim was to develop and test a standardised questionnaire methodology allowing comparison of lower back, neck, shoulder and general complaints for use in epidemiological studies. The NMQ can be used as a questionnaire or as a structured interview [23-26].

Questionnaire is aided by a body map to indicate a symptom sites being neck, shoulder, upper back, elbows, lower back, wrist/hand, hips/thighs, knees and ankles/feet. Branson's posture assessment scale has a potential utility in the dentistry to evaluate and monitor the dentist posture during work. BPAI will be helpful to determine the effect of new equipment and device on posture. It is a valid and reliable scale for assessing dynamic posture of a dentists during work andwith musculoskeletal disorder. The PAI is most likelymore effective with real- time situations where limited visibility is not an issue when observing postures. It is possible that using the PAIto conduct real-time assessments of clinician posture may increase variance in that subtle changes in movement become more noticeable [6,27-30].

For BPAI validity and reliability an expert panel defined the basic parameters for acceptable, compromised, and harmful operator postures and established face validity of a posture assessment instrument (PAI) by using Delphi approach in first phase. During the second phase, the PAI was tested for reliability using generalizability theory. Four raters tested the instrument for reliability. (G-0.797) The intraclass co-relation coefficient was found 0.95, p-value < 0.001 [27,28].

Branson's posture assessment instrument is used to identify the posture over 5 minute when dentist will be handling the case. Branson's posture assessment instrument is done at 1minute, 3minute and 5minute while dentist working on a patients. It categories posture into 3components acceptable, compromised, and harmful [6,27-30].

Aims and Objectives

The main aim of the study is to investigate the correlation of Branson's posture assessment as a postural assessment tool and standardized Nordic questionnaire as a tool to assess musculoskeletal disorder among dentist.

Need of the study

Dentists are more prone to various work related musculoskeletal disorders. These affect the neck, shoulder, wrist, upper back, lower back and lower extremities. Many studies had been done to investigate the prevalence and impact of musculoskeletal disorders among dentists in the past in abroad and in India. In previous studies, working posture of a dentists was assessed by using Branson's posture assessment scale. The PAI is most likely more effective with real-time situations where limited visibility is not an issue when observing postures. Branson's posture assessment scale has a potential utility in the dentistry to evaluate and monitor the dentist posture during work. Musculoskeletal disorders was assessed using standardized Nordic questionnaire. To our knowledge none of the studies have been done to correlate Branson's posture assessment as a postural assessment tool and standardized Nordic questionnaire as a tool to assess musculoskeletal disorder. So our aim is to recognize the compromised posture adapted by the dentists and correlate them with musculoskeletal disorders.

Materials and Methodology

The list of professionals dentists who are doing private practicing in Hubli -Dharwad was taken from Indian dental association Hubli.

- **Study design**: A cross sectional survey.
- **Study location**: The list of professionals dentists who are doing private practicing in Hubli -Dharwad was taken from Indian dental association Hubli
- **Study duration:** 1 year September 2022-october 2023
- **Sample size-** 66 dentists.
- **Sample size calculation:** As per the data available from Indian Dental Association there are 66 dentists who are doing their private practice. They are taken for the study, based on the inclusion and exclusion criteria through the data base.
- **Subjects and Selection Method**: 66 subjects were contacted for study purpose.As per the data available from Indian Dental Association there are 66 dentists who are doing their private practice Professional Dentists who are registered under Indian dental association doing private practice in Hubli -Dharwad, who met the inclusion criteria were taken for the study.

Materials used

- Consent Form.
- Data collection sheet.
- Standardized Nordic Questionnaire for Analysis of musculoskeletal disorder.
- Branson's Posture Assessment Scale for Assessing Working Posture

Inclusion criteria

- Dentists who have working experience of at least 12 months of duration.
- Dentists who are practicing in sitting position.
- Only professionals private practitioners.
- All specialities of dental department.
- Either gender.
- Either a sports person.

Exclusion criteria

- Congenital musculoskeletal disorder.
- Rheumatoid arthritis.
- Subjects who are not willing for study.
- Incomplete Questionnaire filled by dentist.
- Previous surgeries.
- Pregnancy.
- Working experience less than 1 year.
- Dentists who practicing in standing position

Procedure methodology

The list of professional dentists who are working as a private practitioners and are registered under Indian Dental Association practising in Hubli-Dharwad are only taken. Professional dentists who have working experience of at least 1 year only taken for the study. The dentists will be contacted personally, if they met the inclusion and exclusion criteria they were explained about the purpose of study and were requested to participate in the study. If the dentists are willing to participate their informed written consent were taken. Then once the professional dentist given their written consent they were provided the general demographic data collection sheet which contain name, age, gender, dominance, height, weight, BMI, working experience as a professional dentist, fitness and activity level of a dentist. They were explained how to fill the Questionnaire, then the Standardized Nordic Questionnaire were given to them which has 3 components which tell about pain, ache or any kind of discomfort in any part of body that is neck, shoulder, elbows, wrist/hands, upper back, lower back, hips/thighs, knees, ankle/feet. The dentist is asked to fill wherever he or she feels pain in last 12 months, pain during 12 months, and pain during last 7 days which is preventing them to do normal work at any time [23-26]. The dynamic working posture will be assessed using Branson's posture assessment instrument, while the dentist is treating their patients. Branson's posture assessment scale assess posture as it occur. The BPAI is most likely more effective with real-time situations where limited visibility is not an issue when observing postures [6,27-30].

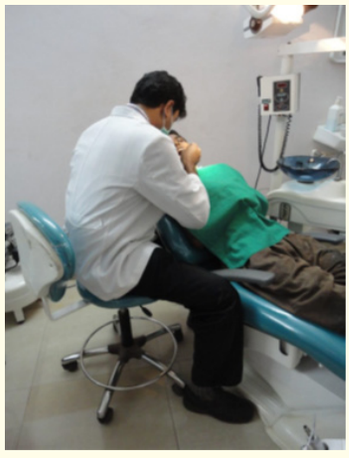

Figure a

This evaluation is done where therapist is standing at 8 o'clock and 12 o'clock position. The level of hips on stool, trunk movement (front and back, side to side rotation, rotation between planes), head and neck movement, (front and back, side to side rotation, rotation between plane), shoulder level and the wrist position is evaluated by using by observational method [6,27,28]. The evaluation is done at 1minute, 3minute, and 5minute. The point scoring obtained in each of the categories will be added up to obtain the final score. Depending on the score they are categorized into [6,27,28].

Acceptable posture which score between 10 to 40, Postures in this category will not put the operator at risk for musculoskeletal discomfort or cumulative trauma disorders [6,27,28].

Figure b

Compromised posture which score between 41 to 80, Postures in this category, if held for more than five minutes repeatedly throughout the work day, will put the operator at risk for musculoskeletal discomfort or cumulative trauma disorders. Harmful posture which score in between 81 to 194, Postures in this category, if held for any length of time, will put the operator at risk for cumulative trauma disorders or injury [6,27,28].

Figure c

Results

Age groups	Male	%	Female	%	Total	%
<35yrs	18	52.94	23	76.67	41	64.06
>35yrs	16	47.06	7	23.33	23	35.94
Total	34	100.00	30	100.00	64	100.00
Mean age	35.65		32.17		34.02	
S D age	6.25		5.63		6.18	

Table 1: Distribution of samples by age groups and gender.

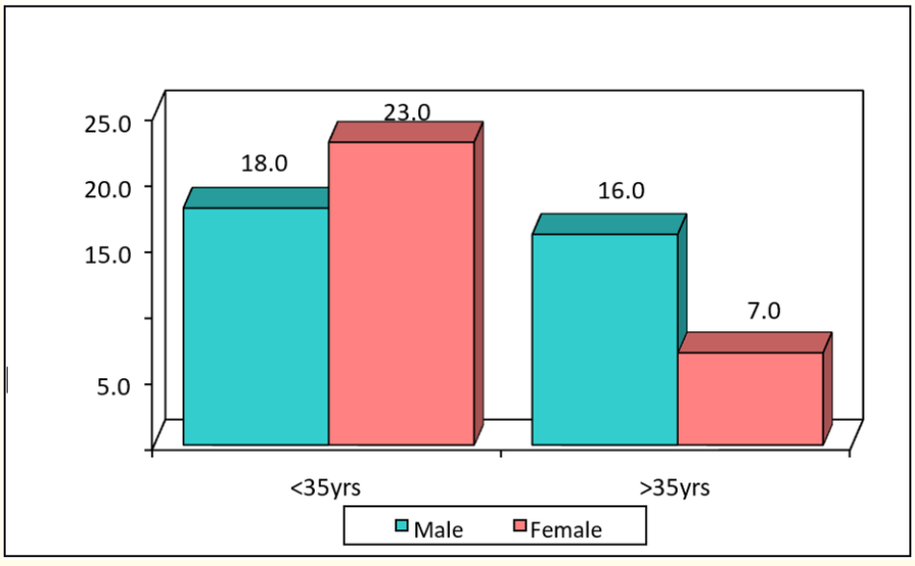

Figure 1: Distribution of samples by age groups and gender.

BMI groups	Male	%	Female	%	Total	%
Underweight	0	0.00	3	10.00	3	4.69
Normal	11	32.35	14	46.67	25	39.06
Obese	19	55.88	11	36.67	30	46.88
Overweight	4	11.76	2	6.67	6	9.38
Total	34	100.00	30	100.00	64	100.00
Mean	26.18		24.03		25.18	
SD	2.86		4.00		3.58	

Table 2: Distribution of samples by BMI groups and gender.

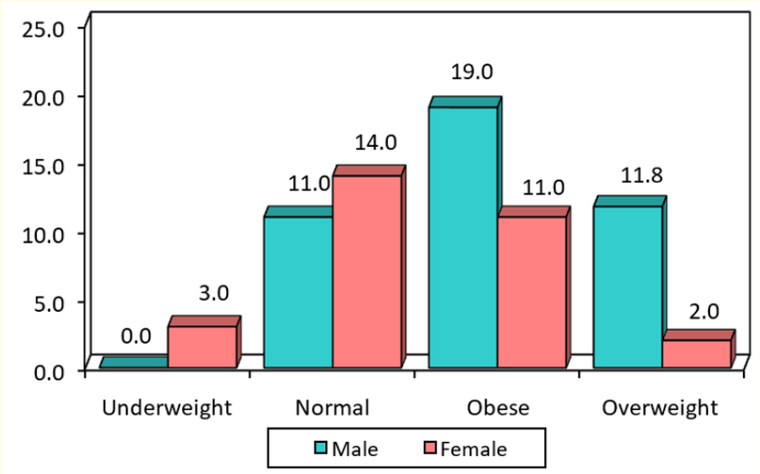

Figure 2: Distribution of samples by BMI groups and gender.

Working experience	Male	%	Female	%	Total	%
<5yrs	10	29.41	12	40.00	22	34.38
>5yrs	24	70.59	18	60.00	42	65.63
Total	34	100.00	30	100.00	64	100.00
Mean	10.59		8.33		9.53	
SD	7.03		6.10		6.66	

Table 3: Distribution of samples by working experience of dentists and gender.

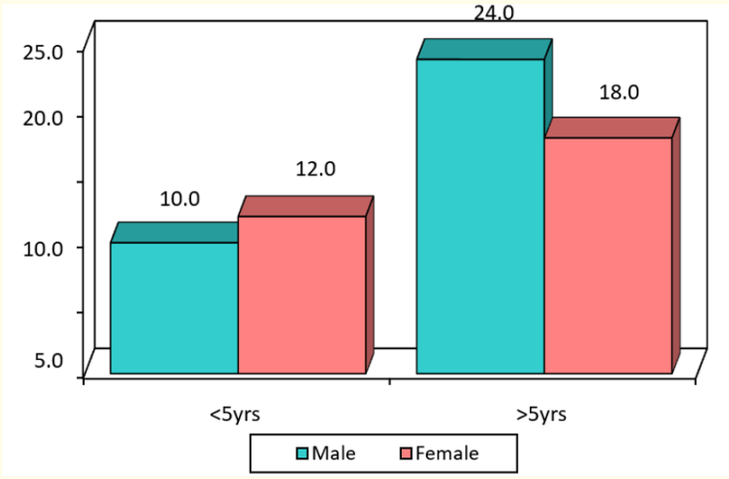

Figure 3: Distribution of samples by working experience of dentists and gender

Dominance	Male	%	Female	%	Total	%
Left	2	5.88	1	3.33	3	4.69
Right	32	94.12	29	96.67	59	92.19
Total	34	100.00	30	100.00	64	100.00

Table 4: Distribution of samples by dominance and gender.

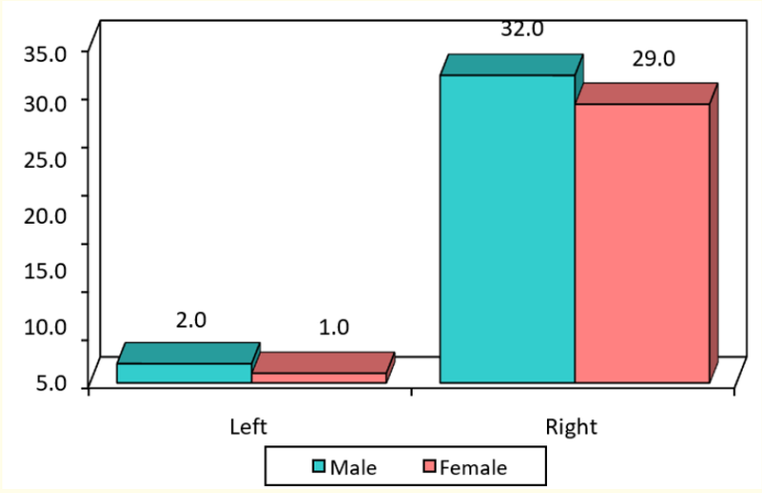

Figure 4: Distribution of samples by dominance and gender.

Category	Male	%	Female	%	Total	%
Acceptable	1	2.94	1	3.33	2	3.13
Compromised	33	97.06	29	96.67	62	96.88
Total	34	100.00	30	100.00	64	100.00

Table 5: Distribution of samples by category and gender.

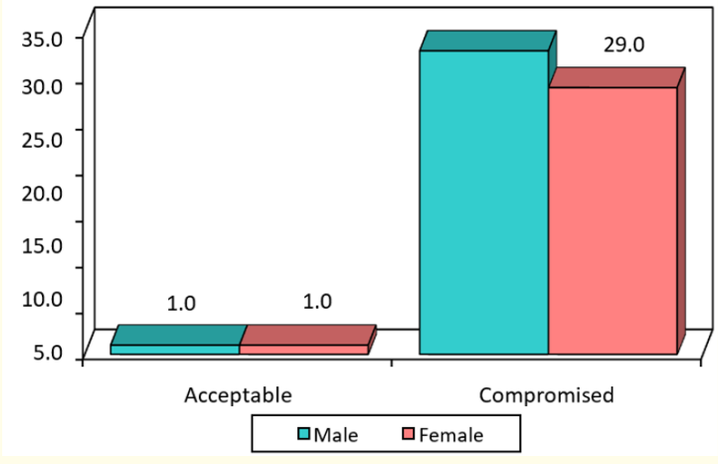

Figure 5: Distribution of samples by category and gender.

Symptoms	Male	%	Female	%	Total	%	Chi-square	P-value
Neck	20	58.82	19	63.33	39	60.94	0.1363	0.7119
Shoulder	10	29.41	12	40.00	22	34.38	0.7921	0.3735
Elbows	0	0.00	3	10.00	3	4.69	4.7138	0.0299*
Wrist/hands	8	23.53	4	13.33	12	18.75	1.0876	0.2970
Upperback	5	14.71	1	3.33	6	9.38	2.4261	0.1193
Lowerback	21	61.76	9	30.00	30	46.88	6.4576	0.0111*
Hips/thighs	1	2.94	0	0.00	1	1.56	0.8964	0.3438
Knees	1	2.94	0	0.00	1	1.56	0.8964	0.3438
Ankle/feet	2	5.88	1	3.33	3	4.69	0.2318	0.6302

Table 6: Comparison of male and female with prevalence of musculoskeletal symptoms in Last 12 month.

*p < 0.05.

Symptoms	<35yrs	%	>35yrs	%	Total	%	Chi-square	P-value
Neck	26	63.41	13	56.52	39	60.94	0.2941	0.5876
Shoulder	12	29.27	10	43.48	22	34.38	1.3189	0.2508
Elbows	3	7.32	0	0.00	3	4.69	1.7657	0.1839
Wrist/hands	7	17.07	5	21.74	12	18.75	0.2106	0.6463
Upperback	3	7.32	3	13.04	6	9.38	0.5687	0.4508
Lowerback	18	43.90	12	52.17	30	46.88	0.4048	0.5246
Hips/thighs	1	2.44	0	0.00	1	1.56	0.8995	0.3429
Knees	1	2.44	0	0.00	1	1.56	0.5699	0.4503
Ankle/feet	3	7.32	0	0.00	3	4.69	1.6487	0.1991

Table 7: Comparison of age groups with prevalence of musculoskeletal symptoms in Last 12 month.

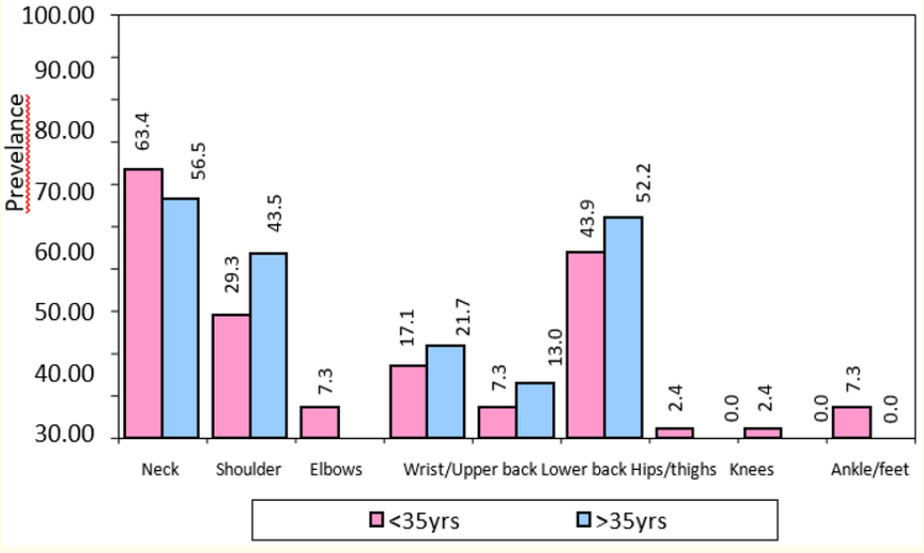

Figure 6: Comparison of age group with prevalence of musculoskeletal symptoms in last 12 month.

Symptoms	<5yrs	%	>5yrs	%	Total	%	Chi-square	P-value
Neck	11	50.00	28	66.67	39	60.94	1.6848	0.1943
Shoulder	6	27.27	16	38.10	22	34.38	0.7646	0.3819
Elbows	1	4.55	2	4.76	3	4.69	0.0015	0.9690
Wrist/hands	3	13.64	9	21.43	12	18.75	0.5754	0.4481
Upperback	0	0.00	6	14.29	6	9.38	5.3748	0.0204*
Lowerback	7	31.82	23	54.76	30	46.88	3.0520	0.0807
Hips/thighs	0	0.00	1	2.38	1	1.56	0.5321	0.4657
Knees	0	0.00	1	2.38	1	1.56	0.5321	0.4657
Ankle/feet	0	0.00	3	7.14	3	4.69	1.6487	0.1991

Table 8: Comparison of working experience with prevalence of musculoskeletal symptoms in Last 12 month.

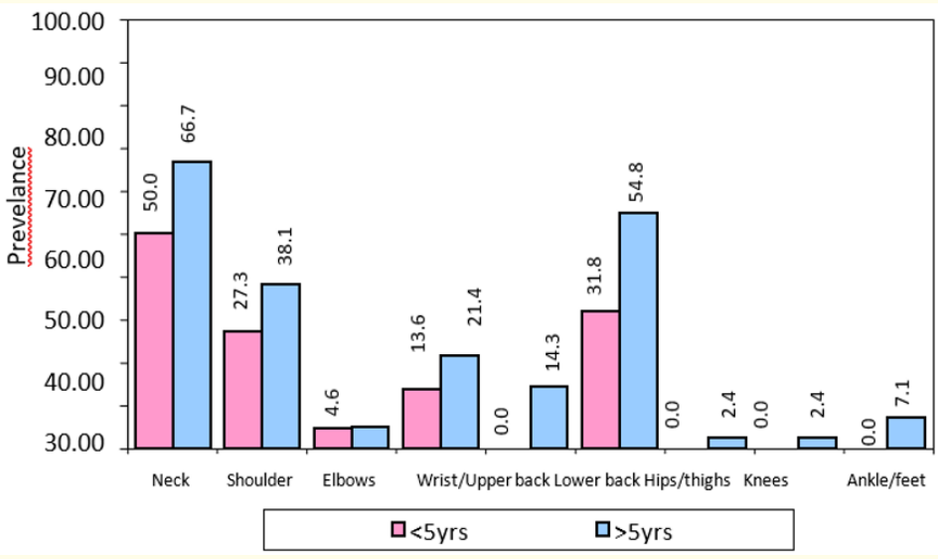

Figure 7: Comparison of working experience with prevalence of musculoskeletal symptoms in last 12 month.

Symptoms	Male	%	Female	%	Total	%
Neck	2	5.88	2	6.67	4	6.25
Shoulder	0	0.00	0	0.00	0	0.00
Elbows	0	0.00	0	0.00	0	0.00
Wrist/hands	0	0.00	0	0.00	0	0.00
Upperback	1	2.94	1	3.33	2	3.13
Lowerback	4	11.76	2	6.67	6	9.38
Hips/thighs	0	0.00	0	0.00	0	0.00
Knees	0	0.00	0	0.00	0	0.00
Ankle/feet	0	0.00	1	3.33	1	1.56

Table 9: Comparison of male and female with prevalence of musculoskeletal symptoms in During 12 month.

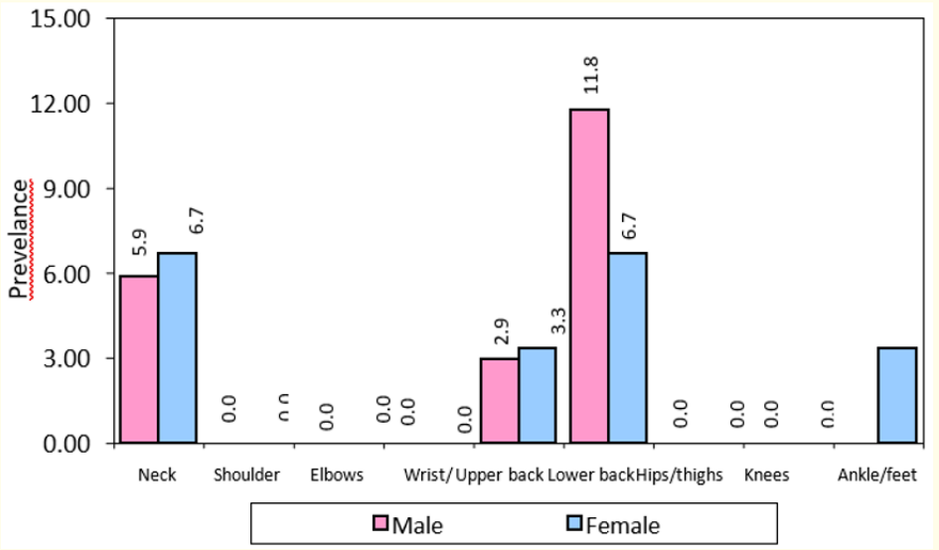

Figure 8: Comparison of male and female with prevalence of musculoskeletal symptoms in during 12 month.

Symptoms	<35yrs	%	>35yrs	%	Total	%
Neck	2	4.88	2	8.70	4	6.25
Shoulder	0	0.00	0	0.00	0	0.00
Elbows	0	0.00	0	0.00	0	0.00
Wrist/ hands	0	0.00	0	0.00	0	0.00
Upper back	1	2.44	1	4.35	2	3.13
Lower back	2	4.88	4	17.39	6	9.38
Hips/thighs	0	0.00	0	0.00	0	0.00
Knees	0	0.00	0	0.00	0	0.00
Ankle/feet	0	0.00	1	4.35	1	1.56

Table 10: Comparison of age groups with prevalence of musculoskeletal symptoms in During 12 month.

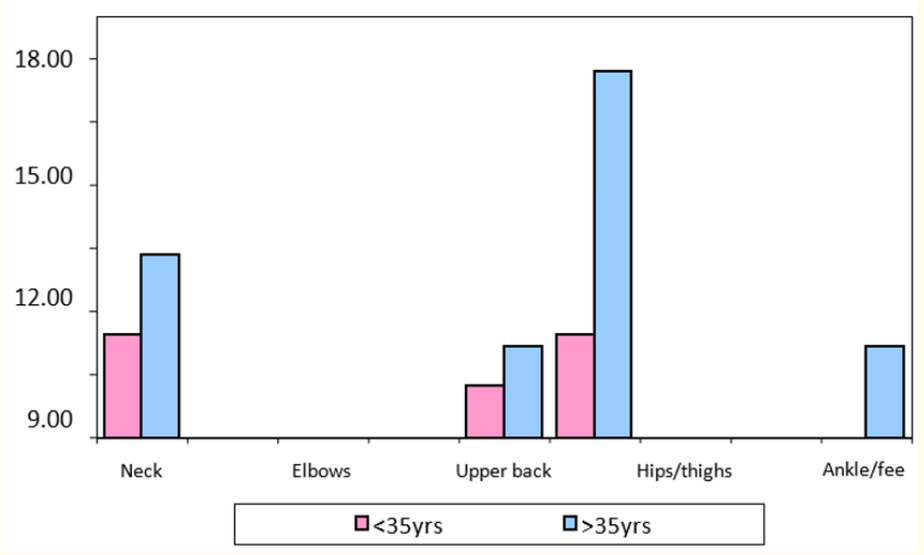

Figure 9: Comparison of age groups with prevalence of musculoskeletal symptoms in during 12 month.

Symptoms	<5yrs	%	>5yrs	%	Total	%
Neck	2	9.09	2	4.76	4	6.25
Shoulder	0	0.00	0	0.00	0	0.00
Elbows	0	0.00	0	0.00	0	0.00
Wrist/ hands	0	0.00	0	0.00	0	0.00
Upper back	0	0.00	2	4.76	2	3.13
Lower back	1	4.55	5	11.90	6	9.38
Hips/thighs	0	0.00	0	0.00	0	0.00
Knees	0	0.00	0	0.00	0	0.00
Ankle/feet	0	0.00	1	2.38	1	1.56

Table 11: Comparison of working experience with prevalence of musculoskeletal symptoms in During 12 month.

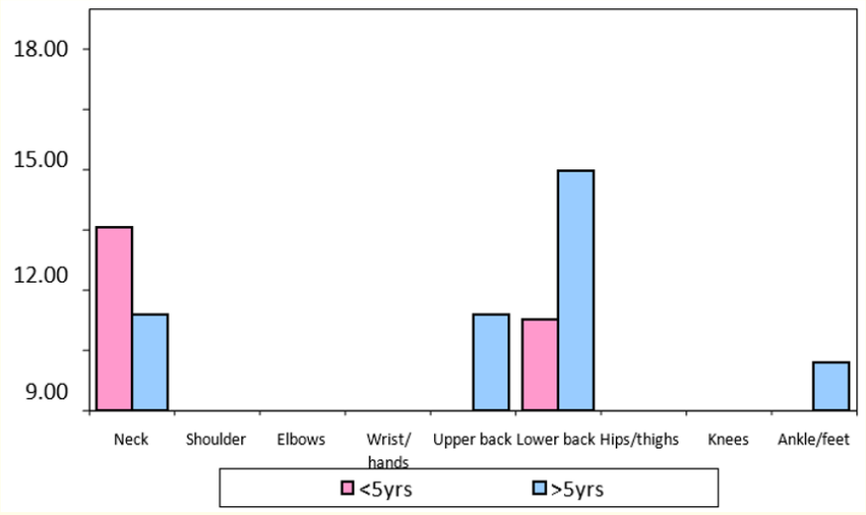

Figure 10: Comparison of working experience with prevalence of musculoskeletal symptoms in during 12 month.

Symptoms	Male	%	Female	%	Total	%
Neck	0	0.00	1	3.33	1	1.56
Shoulder	0	0.00	0	0.00	0	0.00
Elbows	0	0.00	0	0.00	0	0.00
Wrist/ hands	0	0.00	0	0.00	0	0.00
Upper back	0	0.00	0	0.00	0	0.00
Lower back	1	2.94	0	0.00	1	1.56
Hips/thighs	0	0.00	0	0.00	0	0.00
Knees	0	0.00	0	0.00	0	0.00
Ankle/feet	0	0.00	1	3.33	1	1.56

Table 12: Comparison of male and female with prevalence of musculoskeletal symptoms in During 7 days.

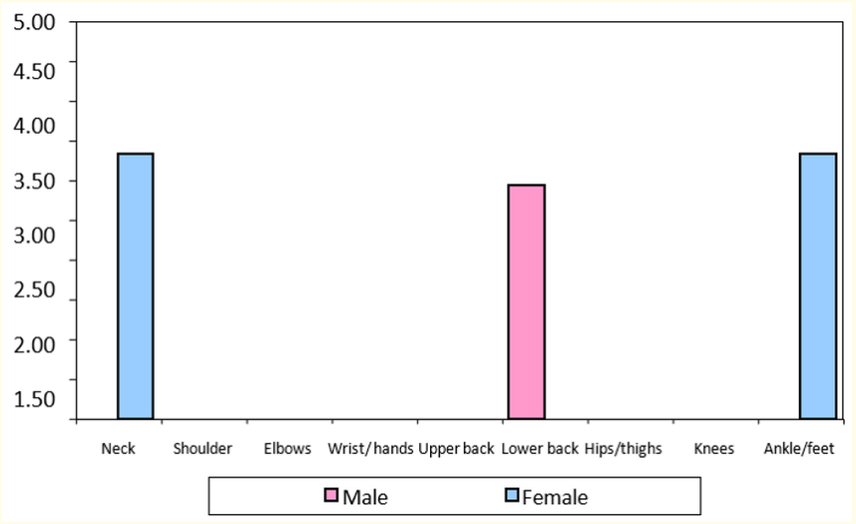

Figure 11: Comparison of male and female with prevalence of musculoskeletal symptoms in during 7 days.

Symptoms	<35yrs	%	>35yrs	%	Total	%
Neck	1	2.44	0	0.00	1	1.56
Shoulder	0	0.00	0	0.00	0	0.00
Elbows	0	0.00	0	0.00	0	0.00
Wrist/ hands	0	0.00	0	0.00	0	0.00
Upper back	0	0.00	0	0.00	0	0.00
Lower back	0	0.00	1	4.35	1	1.56
Hips/thighs	0	0.00	0	0.00	0	0.00
Knees	0	0.00	0	0.00	0	0.00
Ankle/feet	0	0.00	1	4.35	1	1.56

Table 13: Comparison of age groups with prevalence of musculoskeletal symptoms in During 7 days.

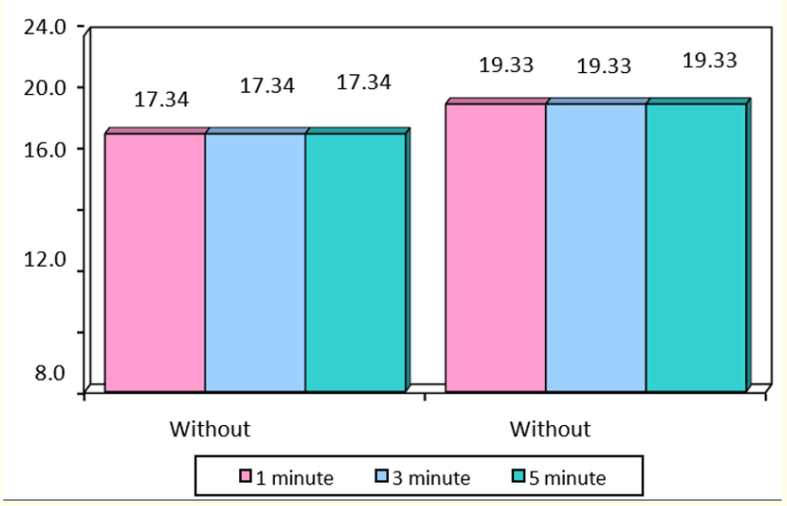

Figure 12: Comparison without and with musculoskeletal symptoms in during 7 days with respect to BAPI scores at 1minute, 3minutes and 5 minutes.

Symptoms	<5yrs	%	>5yrs	%	Total	%
Neck	1	4.55	0	0.00	1	1.56
Shoulder	0	0.00	0	0.00	0	0.00
Elbows	0	0.00	0	0.00	0	0.00
Wrist/ hands	0	0.00	0	0.00	0	0.00
Upper back	0	0.00	0	0.00	0	0.00
Lower back	0	0.00	1	2.38	1	1.56
Hips/thighs	0	0.00	0	0.00	0	0.00
Knees	0	0.00	0	0.00	0	0.00
Ankle/feet	0	0.00	1	2.38	1	1.56

Table 14: Comparison of working experience with prevalence of musculoskeletal symptoms in During 7 days.

Variable	Symptom	Mean	SD	t-value	p-value
1 minute	Without symptom	17.34	2.90	-1.1609	0.2501
	With symptom	19.33	2.89		
3 minute	Without symptom	17.34	2.90	-1.1609	0.2501
	With symptom	19.33	2.89		
5 minute	Without symptom	17.34	2.90	-1.1609	0.2501
	With symptom	19.33	2.89		
Total	Without symptom	52.03	8.69	-1.1609	0.2501
	With symptom	58.00	8.66		

Table 15: Comparison without and with musculoskeletal symptoms in During 7 days with respect to BAPI scores at 1minute, 3 minutes and 5 minutes and their total by t test.

Discussion

Table 1 explain about the distribution of sample by age group and gender. Among 64dentists the percentage of males were affected 82.3% [34]. Percentage of females affection was 83% [30]. Out of total 64 dentists above 35 years of age dentists suffered from musculoskeletal disorder was 64.06% (41). Above 35 years of age the percentage of affection in males are 47.06 [16]. Females above 35 years of age are23.33% [7]. affected. In which below 35 years of age 52. affected. Inmales area affected, and females 76.67% [23] below 35years of age were affected from musculoskeletal disorder. So the total dentists were 35.94% [23] below 35 years of age are affected. Figure 1 represent the graphical distribution of samples by age group and gender.

Table 2 depicts the distribution of samples according to BMI group and gender. A total of 3 dentists (4.69%) all females were in underweight category. A total of 25 dentists (39.06%) had normal body weight. Total of 30 (46.88%) dentists were in the category of obese. 6 (9.38%) dentists were overweight. The mean BMI for total sample was 25.18 with the standard deviation of 3.58. Figure 2 depicts the graphical presentation of the distribution of samples by BMI group and gender.

Table 3 depicts the distribution of samples by working experience of a dentists and gender. Out of 64 subjects (22) 34.38% dentists had less than 5 years of working experience. (42) 65.63% dentists had more than 5 years of working experience. The mean working experience of a dentists were 9.53 with the standard deviation 6.66. Figure 3 depicts graphical representation of samples by working experience of a dentists and gender.

Table 4 depicts the distribution of samples by dominance and gender. (59) 92.19% dentists were right dominance and (3) 4.69% dentists were left dominant. Figure 4 shows the graphical representation of distribution of samples by dominance and gender.

Table 5 shows the distribution of samples by category and gender this table indicate about the posture of a dentists which was assessed by BPAI scale. Out of 64 dentists only (2) 3.13% dentists had acceptable posture. The rest of the (62) 96.88% dentists had compromised posture assessed by BPAI scale. None of the dentists were in harmful range. Figure 5 represent the graphical distribution of samples by category and gender.

Table 6 depicts comparison of male and female with the prevalence of musculoskeletal symptoms in Last 12 month the neck prevalence was highest 60.94%followed by the low back 46.88% which was followed by shoulder 34.38%, and wrist and hands 18.75% respectively. Upper back pain is (6) 9.38%, ankle/feet pain and elbow pain is (3) 4.69%. In knees and hips/thighs the prevalence of MSD is (1) 1.56%. females showed more affection in neck 63.33%, shoulder 40%, elbows10%,as compared to males. Males are more affected by lower back pain 61.76%as compared to females. According to our study females showed more affection of MSD than males on the contrary one study showed the prevalence of MSD occurred in males more than in females [22].

Table 7 depicts the comparison of age group with the prevalence of musculoskeletal symptoms in Last 12 months. According to our survey we found that 63.41% of less than 35 years of age dentists had neck pain. Figure 7 depicts the graphical representation of comparison of age group with the prevalence of musculoskeletal disorder in Last 12 months.

Table 8 showed the comparison of working experience with the prevalence of musculoskeletal disorder in Last 12 months. According to our survey there is a increase prevalence of musculoskeletal disorder symptoms in the dentists who had more than 5 years of working experience. Dentists shows more affection of neck pain 66.67%, followed by lower back pain 54.76%, shoulder pain 38.10%, wrist and hand 21.43%, upper back pain 14.29%, ankle and feet pain 7.14%, followed by elbow pain 4.76%, knee pain 2.38%, hips and thighs pain 2.38%.

Figure 8 depicts the graphical representation of comparison of working experience with the prevalence of musculoskeletal disorders in last 12 months.

Table 9 showed the comparison of male and female with the prevalence of musculoskeletal symptoms in During 12 months. The prevalence of musculoskeletal symptoms were higher in females with the percentage of affection in neck and lower back (2) 6.67%, and upper back pain and ankle and feet is (1) 3.33% respectively. Where as males were higher in low back category (4) 11.76%, which is followed by neck pain (2) 5.88%. 2.94% (1) is having upper back pain. So in our study males shows more affection in lower back region as compared with females. Figure 9 depicts the graphical representation of comparison of male and female with the prevalence of musculoskeletal symptoms in during 12 months.

Table 10 depicts the comparison of age group with the prevalence of musculoskeletal symptoms in During 12 months. when compared with the age group with the musculoskeletal symptoms during 12 months the neck pain 8.70%, upper back 4.35%, lower back 17.39%, ankle and feet 4.35% were more in dentists above 35 years of age. Figure 10 depicts the graphical representation of Comparison of age groups with prevalence of musculoskeletal symptoms in During 12 month.

Table 11 depicts the comparison of working experience with the prevalence of musculoskeletal symptoms in During 12 months. when compared with working experience During 12 months with musculoskeletal symptoms dentists having more than 5 years of experience showed higher prevalence of neck pain 4.76%, upper back pain 4.76%, lower back pain 11.90%, ankle and feet pain 2.38%. Figure 11 depicts the graphical representation of comparison of working experience with prevalence of musculoskeletal symptoms in during 12 month.

Table 12 depicts the comparison of male and female with the prevalence of musculoskeletal symptoms in During 7 days. According to our survey females had more of neck pain 3.33% whereas males had more of lower back pain 2.94%. Figure 12 depicts the graphical representation of comparison of male and female with the prevalence of musculoskeletal symptoms in during 7 days.

Table 13 showed the comparison of age group with the prevalence of musculoskeletal symptoms in During 7 days. According to our study during 7 days only (1) dentist 2.44% had neck pain who is less than 35 years of age. 4.35% of dentists had lower back pain more than 35 years of age and 4.35% of dentists had ankle and feet pain more than 35 years of age.

Table 14 showed the comparison of working experience with the prevalence of musculoskeletal symptoms in During 7 days. According to survey (1) 4.55% dentist below 5 years of working experience had neck pain. (1) 2.38% dentist above 5 years of working experience had lower back pain and (1) 2.38% dentist had ankle and feet pain.

Table 15 shows the Comparison without and with musculoskeletal symptoms in During 7 days with respect to BPAI scores at 1minute, 3 minutes and 5 minutes and their total by t test. According to our survey the dentists without musculoskeletal symptoms are having similar scoring on BPAI scale at 1minute, 3 minute, 5 minute as compared to dentists having musculoskeletal symptoms. It can be because of the dentists with musculoskeletal symptoms during 7 days shows least affection 1.56% of neck pain, lower back pain, ankle and feet pain.

Figure 15 depicts the graphical representation of comparison without and with musculoskeletal symptoms in During 7 days with

respect to BAPI scores at 1minute, 3 minutes and 5 minutes and their total by t test

Conclusion

When assessed working posture of a dentists by using BPAI scale 3.13% of dentists were in acceptable category, 96.88% of dentists were in compromised category. In our study none of the dentists were in harmful category. When we compared the Standardised Nordic questionnaire with BPAI the total of 83% of dentists is having musculoskeletal symptoms atleast in one or the other body parts and these dentists coming under compromised category which is 96.88%.

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