

# Relationship between dental anxiety with dental caries and periodontal disease among army recruits in Bangalore city - A cross sectional study

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## Abstract

**Introduction:** Dental anxiety can affect the dental health status of an individual leading to avoidance behavior, poor oral hygiene and periodontal health and delay in seeking necessary treatment.

**Objectives:** This study aimed to assess the prevalence of dental anxiety in army recruits in Bangalore city and to explore the relationship of dental anxiety with dental caries and periodontal disease among army recruits in Bangalore city.

**Methodology:** The total population of the army recruits in Army Service Corps Center and College was around 1000. General information included name, age, sex educational qualification, address, number of dental visits and age of first visit. The closed ended multiple-choice questionnaire consisting of 4 questions based on previous dental experience given by Corah was used to assess the anxiety level of the individual. Clinical examination of dental and periodontal health was noted using Decayed, Missing, Filled and Surface (DMFS) Index and Community Periodontal Index and Treatment Needs (CPITN) Index.

**Results:** The mean Dental Anxiety Scale score was 9.64 with a standard deviation of 3.6. Of the 836 participants in the study, 444 (53.1%) reported no dental anxiety at all. Two hundred and sixty-three (31.5%) were moderately dental anxious (scoring 9–12), 10.4% were highly anxious (scoring 13–14) and 5% were severely anxious (scoring 15–20). Anxious individuals had poorer periodontal health necessitating treatment compared to nonanxious individuals. The mean DMFS of the study population was highest among those having high and severe dental anxiety (mean DMFS = 11.0 and 12.59, respectively) which was statistically significant ( $P < 0.001$ ).

**Conclusion:** The present study showed a prevalence of dental anxiety of 47%. Impact of dental anxiety on oral health was found to be obvious as higher DMFT/DMFS was evident among dentally anxious subjects; dental anxiety also showed a strong association with higher CPITN scores.

**Keywords:** Army, Community Periodontal Index and Treatment Needs, Decayed, Missing, Filled and Teeth/Surface, dental anxiety, dental caries, dental visit, periodontal health

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## INTRODUCTION

Anxiety disorders are composed of state and trait anxiety. State anxiety is a transitory emotional condition that varies in intensity and fluctuates over time, whereas trait anxiety is relatively stable over time.<sup>[1]</sup> The anxiety disorder such as dental anxiety arises from regulation of normal defensive responses, which are relatively stable over time in spite of recent sophisticated technological advances of dental care delivery.<sup>[2]</sup>

Dental anxiety is described as the state of anxiety as it occurs due to dental treatment procedure and is said to be related to negative expectation which is often linked to earlier traumatic experiences, negative attitudes in the family,<sup>[3]</sup> fear of pain, trauma and perception of a painful and unsuccessful previous dental treatment. Studies have reported a possible association between dental anxiety and Decayed, Missing, Filled and Surface (DMFS) status in a population of navy recruits consisting of young men relatively of low rate of dental caries.<sup>[3-5]</sup> Dental anxiety has been recognized as significant health issues in many countries such as, US, UK, Netherlands, Denmark, Norway, Sweden, Hong Kong and Canada.<sup>[6]</sup>

Dental anxiety can be evaluated by physiological signs and anxiety scale. A study reported the association of dental anxiety and poor dental and periodontal health.<sup>[7]</sup> A study reported a possible association between dental anxiety and DMFS status in a population of navy recruits consisting of young men relatively of low rate of dental caries.<sup>[8]</sup> Wisloff *et al.*<sup>[4]</sup> found military recruits with dental fear to be characterized by more oral health problems in comparison to nondental fear recruits. Thus, dental anxiety played a major role in dental treatment avoidance.

Very fewer epidemiological studies have been conducted in India which assess the oral health status of military personnel; hence, the present study aims to assess the relationship of dental anxiety with dental caries and periodontal disease among army recruits.

## METHODOLOGY

The present study is a cross-sectional study. The study was conducted among 1000 army recruits, from The Army Service Corps Center and College (ASC center) at old airport road, Kakul Block, Agaram Bangalore. Study group consisted of only male soldier with the same minimum educational qualification, the same diet with free health benefit.

Before the start of study, the study proposal was submitted for approval and clearance from the institutional ethical review board. Administrative wing of ASC Center was approached; the necessary permission to conduct the study was obtained by colonel administration.

### The data were collected through structured pro forma constituting of three parts

- a. General information including name, age, sex, educational qualification, address, number. of dental visits and age at first dental visit
- b. The close ended multiple-choice questionnaire consisting of four questions based on previous dental experience given by Corah.<sup>[9]</sup>  
The scale has been widely used and well-established scale for the evaluation of anxiety in various critical contents. This scale scores overall dental anxiety, while other scales deal with more specific fear arousing situations. This is a 4-item test that measures dental fear on scales 4 (none) to 20 (high) and is considered to be a simple, crude but valid and reliable questionnaire method. This is useful in identifying individuals with normal, moderate, high and severe anxiety.
- c. Clinical examination consisted of assessment of dental and periodontal health using Decayed, Missing, Filled and Teeth (DMFT) Index, DMFS Index and Community Periodontal Index Treatment Needs (CPTIN) Index.

Inclusion criteria were military personnel who have visited a dentist previously and all military personnel who have signed the consent form. A subject who does not consent to participate in the study was excluded.

By total enumeration method, all soldiers residing in the Army service Corps Center and College during the study period were included in the study.

Written informed consent was obtained from soldiers in English before the beginning of examination.

Conduct of examination: Examination was carried out in two medical inspection rooms (MI Room) present in campus, i.e., Central Medical inspection Room room and ASC College medical inspection room (ASC MI) to cover the entire population of center. Corah Anxiety Scale was distributed among soldiers before the conduct of examination. After filling the form which contained demographic detail and Corah Anxiety Scale, oral health status was assessed in terms of DMFT/DMF Index to measure dental caries status and CPTIN Index to report and periodontal health.

**Statistics**

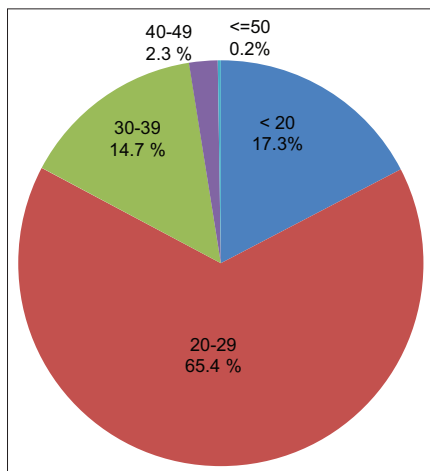
The relationship between the dental anxiety and oral health status was established by means of cross-categorizations of low, moderate and high anxiety groups using Chi-square. Simple descriptive statistics was used to describe the central tendency and variation in the data. Difference between different subgroup was tested using Student's *t*-test or Chi-square test and multivariate analysis performed with, respectively, DMFT as a dependent variable and anxiety oral hygiene as an independent variable.  $P < 0.05$  was considered significant.

**RESULTS**

Army soldiers represented 83% ( $n = 836$ ) of the sample. The age of the participants varied from 18.0 to 52 years (mean: 24.10, SD: 5.74). Majority of the subjects belonged to the age group of 20–29 years [Figure 1].

The mean Dental Anxiety Scale (DAS) score was 9.64 (SD: 3.6) based on the criteria stipulated by Corah,<sup>[9]</sup> more than one half of the participants ( $n = 444$ , 53.1%) reported no anxiety, more than one-third of the participants ( $n = 263$ , 31.5%) had moderate anxiety (9–12), only fewer participants ( $n = 87$ , 42, 10.4%, 5%) reported high (13–14) and severe anxiety (15–20), respectively.

Those with no anxiety were of age group >20 years, age group 20–29 years and 30–39 years were almost equally affected by moderate anxiety, equal number of the participants above 40 years had moderate-to-high anxiety. There was a statistically significant difference in mean anxiety score and age ( $F=3.03$ ,  $P < 0.001$ ), intragroup analysis showed that dental anxiety was significantly associated with age [Table 1].



**Figure 1:** Distribution of study population according to age

The distribution of mean Decayed Teeth (DT), Missing Teeth (MT), Filled Teeth (FT) and DMFT component of the study population with respect to anxiety level showed those subjects with high anxiety (13–14) had highest mean decayed component (mean DT = 3.86, SD = 1.869) and missing component (mean MT = 1.25, SD = 1.340) and the mean FT was high (mean FT = 2.74, SD = 1.631) among those subjects with moderate anxiety (9–12). Mean DMFT was high (mean= 6.58) among those with moderate dental anxiety, this association was statistically significant with the obtained  $P < 0.001$  [Table 2].

Mean decayed surface (DS) was high (mean: 5.29) among subjects with severe dental anxiety, whereas mean filled surface (FS) and missing surface (MS) was high (mean: 4.97, 2.95, respectively) among those with high dental anxiety and there was statistically significant ( $P < 0.001$ ) association between DMFS and dental anxiety.

Periodontal status of the subjects was good among those who had no anxiety (CPITN-0, 97.09%), bleeding on probing was present among majority (90.9%) of subjects

**Table 1: Distribution of dental anxiety among the study population according to age**

Age (years)	Anxiety Scale				$\chi^2$	P
	<9, n (%)	9-12, n (%)	13-14, n (%)	15-20, n (%)		
<20	95 (65.5)	37 (25.5)	8 (5.5)	5 (3.4)	43.25	<0.001*
20-29	285 (52.1)	183 (33.5)	51 (9.3)	28 (5.1)		
30-39	54 (43.9)	39 (31.7)	21 (17.1)	9 (7.3)		
40-49	10 (52.6)	4 (21.1)	5 (26.3)	0		
<=50	0	0	2 (100)	0		
Total	444 (53.1)	263 (31.5)	87 (10.4)	42 (5)		

\*Statistically significant. <9: No anxiety, 9-12: Moderate anxiety, 13-14: High anxiety, 15-20: Severe anxiety

**Table 2: Relationship between dental anxiety and Decayed, Missing, Filled and teeth scores**

	n	Mean	SD	Minimum-maximum	F	P
<b>DT</b>						
<9	444	0.34	0.982	0-5	346.82	<0.001*
9-12	263	3.11	1.657	0-8		
13-14	87	3.86	1.869	0-8		
15-20	42	3.57	1.648	0-8		
<b>MT</b>						
<9	444	0.18	0.503	0-4	60.322	<0.001*
9-12	263	0.74	0.926	0-4		
13-14	87	1.25	1.340	0-6		
15-20	42	0.79	0.782	0-2		
<b>FT</b>						
<9	444	0.77	1.280	0-8	114.101	<0.001*
9-12	263	2.74	1.631	0-8		
13-14	87	2.15	1.544	0-7		
15-20	42	2.48	1.502	0-7		
<b>DMFT</b>						
<9	444	1.28	1.941	0-9	585.324	<0.001*

\*significant P value < 0.005, <9: No anxiety, 9-12: Moderate anxiety, 13-14: High anxiety, 15-20: Severe anxiety, SD: Standard deviation, DT: Decayed teeth, MT: Missing teeth, FT: Filled teeth, DMFT: Decayed, Missing, Filled and teeth

with no dental anxiety and merely a small population of one-tenth who had bleeding on probing showed moderate (8.4%) to high (1.6%) dental anxiety. More than half of the participants (50.9%, n = 87) who had presence of calculus were suffering from moderate anxiety and those with pockets more than 6mm (CPTIN = 3) also experienced moderate anxiety (58.8%, n = 154). Those subjects with high anxiety had CPTIN score of 4 corresponding to deep pocket with loss of attachment. Periodontal health was directly proportional to dental anxiety which showed a statistically significant association [Table 3].

**DISCUSSION**

The present study was an attempt to assess the effect of dental anxiety on dental, periodontal health and role of dental anxiety in oral health among army recruits in Bangalore city.

There were 836 participants, the age of the participants varied from 18 to 53 years.

In the present study, 47% of the subjects were found to show dental anxiety. Findings are comparable to a study conducted by Eitner *et al.*<sup>[8]</sup> where 53% of the subjects were dentally anxious.

In the present study, the mean DAS score was 9.64. Findings of the present study are comparable to the study conducted by Eitner *et al.*<sup>[8]</sup> (DAS = 9.08) among the German army soldiers, Humphris and King<sup>[12]</sup> (DAS = 7.14) among Israel army, Cohen<sup>[4]</sup> (DAS = 8.91) among the US naval recruits and Wisløff *et al.*<sup>[5]</sup> (DAS = 8.24) among the Norwegian military recruits. The prevalence of dental anxiety is almost the same among different nations defense forces.

The present study reported that of the 836 participants in the study, 444 (53.1%) reported no dental anxiety at all, 10.4% were highly dentally anxious and 5.0% were severely dentally anxious. Results of present studies are comparable

to studies reported by Nicolas *et al.*<sup>[10]</sup> (9.2%), (7.3%) of the subjects were having high and severe dental anxiety. Wisløff *et al.*<sup>[5]</sup> found prevalence of severe dental anxiety among 4.07% of the Norwegian military recruits. according to Eitner *et al.*<sup>[8]</sup> (8.6%), the prevalence of dental anxiety among the German army soldiers were high.

The result of the present study showed the mean DMFT score of 5.0. Results of the present study are comparable to the studies reported by Samorodnitzky GR *et al.*<sup>[7]</sup> and Jasmine *et al.*<sup>[11]</sup> (7.15) among Malaysian army personnel.

In the present study, high mean number of DT was demonstrated among the subjects having high, moderate and severe anxiety 3.11, 3.86 and 3.57, respectively. The findings of present study are comparable to studies conducted by Jasmin *et al.*<sup>[11]</sup> (3.67, 2.90 and 1.58), among Malaysian army personnel, Eitner *et al.*<sup>[8]</sup> (3.67, 2.90 and 1.58) among German soldiers and Ng and Leung<sup>[2]</sup> (8.5, 9.3 and 9.8).

Mean of MT of the present study population with respect to their anxiety level was demonstrated among the subjects having moderate (0.74), high (1.25) and severe dental anxiety (0.79), which are comparable to the study conducted by Jasmin *et al.*<sup>[11]</sup> among Malaysian army personnel where mean MT was demonstrated among the subjects having moderate (1.75), high (2.90) and severe anxiety (1.85).

In the present study, the distribution of mean FT of the study population with respect to their anxiety level was demonstrated among the subjects having moderate, high and severe dental anxiety, which were 2.74, 2.15 and 2.48, respectively. Results were comparable to the study conducted by Jasmine *et al.*<sup>[11]</sup> among Malaysian army personnel stated number of Filled tooth (FT) among the subjects having moderate, high and severe anxiety were 1.58, 2.90, 2.14 respectively. The present study showed that DMFT/DMFS significantly associated dental anxiety (P < 0.001). Results of the present study are comparable to the study reported by Gili *et al.*<sup>[8]</sup> which advocated DMFT significantly associated dental anxiety (P < 0.001). The effect of DAS on DS and FS was still significant after adjusting for variables such as education, brushing, flossing and sweet intake in regression analysis.

The results of the present study showed that those without dental anxiety has better periodontal health, and presence of deep dental pockets was associated with those among moderate-to-high dental anxiety. Complex periodontal needs was highest among those with the highest anxiety

**Table 3: Relationship between Dental Anxiety and Community Periodontal Index and Treatment Needs Scores**

	Anxiety				χ <sup>2</sup>	P
	<9, n (%)	9-12, n (%)	13-14, n (%)	15-20, n (%)		
CPITN 0	188 (97.9)	4 (2.1)	0	0	573.64	<0.001*
CPITN 1	170 (90.9)	13 (7.0)	3 (1.6)	1 (0.5)		
CPITN 2	54 (31.6)	87 (50.9)	14 (8.2)	16 (9.4)		
CPITN 3	29 (11.1)	154 (58.8)	54 (20.6)	25 (9.5)		
CPITN 4	3 (12.5)	5 (20.8)	16 (66.7)	0		
Total	444 (53.1)	263 (31.5)	87 (10.4)	42 (5)		

\*significant P value < 0.005, <9: No anxiety, 9-12: Moderate anxiety, 13-14: High anxiety, 15-20: Severe anxiety, CPITN: Community Periodontal Index and Treatment Needs



score, these results were comparable with a study reported by Nag and Leung<sup>[2]</sup> where clinical loss of attachment was high among those with high anxiety.

There was a statistically significant association of dental anxiety with poor periodontal health with treatment needs (CPI 2, 31.6%; CPI 3, 11.1%;  $P < 0.001$ ).

## CONCLUSION

The Indian Army occupies the most disciplined organization in the country. The role of Indian Army is to provide security and to create a peaceful and law-abiding community when called upon. This warrants good general as well as oral health. To maintain efficient military force, the health of army officials is of utmost importance. Armed forces need to strengthen their existing oral health care delivery system by emphasizing more on their preventive visits (dental checkup, filling and scaling) as these procedures are less painful and less anxiety causing, compared to symptomatic attendees (that is those who visit due to toothache and extraction). Provision for psychological consultation, along with assessment of dietary consumption, lifestyle, stress level and other associated risk factors, should be delivered.

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## Conflicts of interest

There are no conflicts of interest.

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