

# 1 ORAL HEALTH STATUS AMONG BANK EMPLOYEES AND ITS 2 RELATION WITH STRESS IN JAIPUR CITY.

## 3 4 ABSTRACT

5 Background: Occupational stress has emerged as a major public health concern among banking  
6 professionals due to increasing workload, rapid technological transformation, stringent  
7 performance targets, and customer-related pressures. Chronic stress has been linked with various  
8 adverse systemic and oral health outcomes, including periodontal disease, dental caries, and poor  
9 oral hygiene practices. However, limited evidence is available regarding the relationship between  
10 occupational stress and oral health among bank employees in India.

11 Aim: To assess the oral health status of bank employees and evaluate its association with  
12 occupational stress among employees working in public and private sector banks in Jaipur city.

13 Materials and Methods: A cross-sectional study was conducted among 252 bank employees  
14 working in selected public and private sector banks in Jaipur city between January and June  
15 2025. Occupational stress was assessed using the Occupational Stress Inventory-Revised (OSI-  
16 R) and Cohen's Perceived Stress Scale (PSS). Oral health status was evaluated using the WHO  
17 Oral Health Assessment Form (2013), Decayed Missing Filled Teeth (DMFT) Index, and  
18 Community Periodontal Index for Treatment Needs (CPITN). Data were analyzed using SPSS  
19 version 25. Statistical significance was considered at  $p < 0.05$ .

20 Results: Among the study participants, 53% were females and 47% were males. Moderate stress  
21 was observed in 70% of employees, while 27% reported low stress and 3% experienced high  
22 stress. Occupational stress domains demonstrating higher scores included role overload,  
23 workplace discomfort, responsibility, and physical strain. Mean DMFT scores increased with  
24 increasing stress levels; however, the association was not statistically significant ( $p = 0.08$ ). A  
25 statistically significant association was observed between stress levels and periodontal health  
26 assessed through CPITN ( $p = 0.01$ ), indicating greater periodontal destruction among highly  
27 stressed employees.

28 Conclusion: Moderate occupational stress was highly prevalent among bank employees.  
29 Although stress was not significantly associated with dental caries experience, a significant  
30 association was observed between stress and periodontal health. Workplace stress-management  
31 programs and preventive oral health interventions may contribute substantially to improving  
32 employee well-being and oral health outcomes.

33 **Keywords:** Occupational Stress; Bank Employees; Oral Health; Periodontal Disease; DMFT;  
34 CPITN; Perceived Stress Scale; Public Health Dentistry

## 35 INTRODUCTION

36 Health is a multidimensional concept encompassing physical, mental, and social well-being  
37 rather than merely the absence of disease. Occupational health forms an integral component of

38 overall health because work-related conditions directly influence quality of life, productivity, and  
39 psychosocial functioning. The International Labour Organization estimates that occupational  
40 illnesses and workplace-related stress contribute substantially to global economic losses through  
41 absenteeism, reduced productivity, and increased healthcare expenditure. In service-oriented  
42 sectors such as banking, employees are frequently exposed to demanding workloads,  
43 performance pressures, customer interactions, and organizational changes that predispose them  
44 to occupational stress.<sup>1,2</sup>

45 Occupational stress refers to the psychological and physiological responses that occur when job  
46 demands exceed an individual's coping resources. During the last two decades, globalization,  
47 digitalization, and technological advancement have transformed the banking industry  
48 considerably. Employees are now expected to adapt continuously to evolving technologies,  
49 maintain digital competencies, achieve performance targets, and simultaneously satisfy  
50 increasingly informed customers. Such changes have generated unique occupational stressors  
51 including techno-stress, role ambiguity, decision fatigue, and concerns regarding job security.<sup>3,4</sup>

52 The banking profession has consistently been recognized as one of the most stressful occupations  
53 worldwide. Studies from Europe, Asia, and India have reported moderate-to-high levels of  
54 occupational stress among bank employees due to excessive workload, long working hours,  
55 financial accountability, target-oriented performance evaluation systems, and interpersonal  
56 conflicts.<sup>5,6</sup> Occupational stress not only affects psychological well-being but also contributes to  
57 various systemic disorders such as hypertension, cardiovascular diseases, diabetes mellitus,  
58 anxiety, depression, musculoskeletal disorders, and sleep disturbances.<sup>7</sup>

59 Increasing evidence suggests that psychological stress may significantly influence oral health.  
60 Stress can affect oral health through behavioral and biological pathways. Individuals  
61 experiencing chronic stress frequently neglect oral hygiene practices, adopt unhealthy dietary  
62 habits, increase tobacco and alcohol consumption, and postpone dental visits. Furthermore,  
63 stress-induced alterations in neuroendocrine and immune responses may impair host defense  
64 mechanisms and increase susceptibility to periodontal disease. Elevated cortisol levels associated  
65 with chronic stress have been implicated in enhanced inflammatory responses and periodontal  
66 tissue destruction.<sup>8,9</sup>

67 Oral diseases continue to represent a major global public health challenge. According to the  
68 Global Burden of Disease Study, untreated dental caries affects approximately 2.3 billion  
69 individuals worldwide, while severe periodontal disease affects nearly 800 million people. These  
70 conditions adversely affect mastication, speech, aesthetics, quality of life, and occupational  
71 productivity.<sup>10</sup> Consequently, understanding factors that contribute to poor oral health among  
72 working populations has become increasingly important.

73 Several international studies have explored the relationship between occupational stress and oral  
74 health outcomes. Yoshino et al. demonstrated significant associations between job stress and  
75 subjective oral symptoms among financial workers in Japan.<sup>11</sup> Similarly, Vasiliou et al. reported  
76 that individuals experiencing higher stress levels exhibited poorer oral health status and  
77 increased oral disease burden.<sup>12</sup> Studies conducted among corporate employees and healthcare  
78 workers have also reported associations between stress and periodontal disease, xerostomia,  
79 bruxism, and oral mucosal lesions.<sup>13,14</sup>

80 In India, research examining occupational stress among bank employees has primarily focused  
81 on psychological outcomes, burnout, and job satisfaction. Limited investigations have assessed  
82 oral health consequences associated with occupational stress in this occupational group.  
83 Furthermore, evidence from Rajasthan remains scarce. Therefore, the present study was  
84 undertaken to assess occupational stress levels among bank employees and evaluate their  
85 association with oral health status in Jaipur city.

86 A better understanding of this relationship may facilitate the development of integrated  
87 workplace health promotion programs targeting both psychological well-being and oral health.  
88 Such interventions have the potential to improve employee productivity, quality of life, and  
89 overall health outcomes while reducing the burden of oral diseases among working populations.

90 Aim: To assess oral health status and its association with occupational stress among bank  
91 employees in Jaipur city.

92 Objectives: 1. To assess occupational stress among bank employees. 2. To evaluate oral health  
93 status among bank employees. 3. To determine the association between occupational stress and  
94 oral health status. 4. To identify occupational factors contributing to stress among bank  
95 employees.

## 96 MATERIALS AND METHODS

### 97 Study Design and Setting

98 A cross-sectional observational study was conducted among bank employees working in selected  
99 public and private sector banks in Jaipur City, Rajasthan, India, between January 2025 and June  
100 2025. The study was designed to evaluate occupational stress and its association with oral health  
101 status among banking professionals.

102 The study was conducted in accordance with the principles outlined in the Declaration of  
103 Helsinki. Ethical approval was obtained from the Institutional Ethics Committee of Rajasthan  
104 Dental College and Hospital, Jaipur. Written informed consent was obtained from all participants  
105 before enrollment.

### 106 Study Population

107 The target population consisted of clerical, officer-grade, and managerial employees working in  
108 public and private sector banks located in Jaipur city.

### 109 Inclusion Criteria

- 110 1. Employees present on the day of examination.
- 111 2. Employees willing to participate and provide informed consent.
- 112 3. Employees with at least one year of work experience.

### 113 Exclusion Criteria

- 114 1. Individuals unwilling to participate.

- 115 2. Pregnant employees.
- 116 3. Individuals with known systemic diseases that could influence stress or oral health
- 117 outcomes.

#### 118 Sample Size Determination

119 Sample size estimation was performed using the formula:

$$120 n = Z^2p(1-p)/d^2$$

121 where:

- 122 •  $Z = 1.96$  at 95% confidence interval
- 123 •  $p = 0.70$  (expected prevalence of stress among bank employees)
- 124 •  $d = 5\%$  absolute precision

125 The minimum calculated sample size was 252 participants.

#### 126 Sampling Technique

127 Jaipur city was divided into four geographical zones: North, South, East, and West. A list of

128 public and private sector banks was obtained and selected using simple random sampling.

129 Employees from selected branches were invited to participate. Recruitment continued until the

130 required sample size was achieved.

#### 131 Pilot Study and Calibration

132 A pilot study was conducted among 30 bank employees to assess feasibility and reliability of the

133 study instruments. These participants were excluded from the final analysis.

#### 134 2. Occupational Stress Assessment

135 Occupational stress was assessed using the Occupational Stress Inventory-Revised (OSI-R).

136 The OSI-R evaluates:

##### 137 *Occupational Roles Questionnaire (ORQ)*

- 138 • Role overload
- 139 • Role ambiguity
- 140 • Role boundary
- 141 • Responsibility
- 142 • Physical environment

##### 143 *Personal Strain Questionnaire (PSQ)*

- 144 • Psychological strain

145 • Interpersonal strain

146 • Vocational strain

147 • Physical strain

148 *Personal Resources Questionnaire (PRQ)*

149 • Recreation

150 • Self-care

151 • Social support

152 • Rational coping

153 Responses were recorded on a five-point Likert scale.

154 3. Perceived Stress Assessment

155 Perceived stress was assessed using Cohen's Perceived Stress Scale (PSS-10).

156 Scores were categorized as:

157 • Low Stress: 0–13

158 • Moderate Stress: 14–26

159 • High Stress: 27–40

160 Oral Health Examination

161 Clinical examination was performed according to WHO Oral Health Survey Methods (5<sup>th</sup>  
162 Edition, 2013).

163 The following indices were recorded:

164 Dentition Status

165 Dental caries experience was assessed using the Decayed, Missing and Filled Teeth (DMFT)  
166 Index.

167 Periodontal Status

168 Periodontal condition was assessed using the Community Periodontal Index for Treatment Needs  
169 (CPITN).

170 CPITN codes:

171 • Code 0: Healthy periodontium

172 • Code 1: Bleeding on probing

173 • Code 2: Calculus

174 • Code 3: Shallow periodontal pocket (4–5 mm)

175 • Code 4: Deep periodontal pocket ( $\geq 6$  mm)

## 176 Statistical Analysis

177 Data were entered into Microsoft Excel and analyzed using IBM SPSS Version 25.

178 Descriptive statistics included frequencies, percentages, means, and standard deviations.

179 Associations between stress levels and oral health parameters were evaluated using:

180 • Chi-square test

181 • Analysis of Variance (ANOVA)

182 A p-value  $< 0.05$  was considered statistically significant.

## 183 RESULTS

### 184 1. Demographic Characteristics

185 A total of 252 bank employees participated in the study. Table-1 illustrates the sociodemographic  
186 characteristics of participants

187 **Table 1. Sociodemographic Characteristics of Participants**

Variable	Category	n (%)
Age Group	20–40 years	211 (83.7)
	41–60 years	41 (16.3)
Gender	Male	118 (46.8)
	Female	134 (53.2)
Marital Status	Single	163 (64.7)
	Married	89 (35.3)
Experience	<10 years	180 (71.4)
	10–20 years	53 (21.0)
	21–30 years	9 (3.6)
	>30 years	8 (3.2)
Education	Diploma	20 (7.9)
	Bachelor's Degree	207 (82.1)
	Master's Degree	25 (9.9)

Variable	Category	n (%)
Designation	Clerical	146 (57.9)
	Officer	66 (26.2)
	Manager	40 (15.9)
Type of Bank	Private	162 (64.3)
	Public	90 (35.7)

188 The majority of participants belonged to the 20–40 years age group (83.7%). There were females  
 189 (53.2%) more than males, worked in private banks (64.3%), and had less than 10 years of  
 190 professional experience (71.4%).

### 191 Perceived Stress Among Participants

192 Table 2. Distribution of Stress Levels According to PSS

Stress Category	Frequency	Percentage
Low Stress	69	27.4
Moderate Stress	177	70.2
High Stress	6	2.4

193 Moderate stress was the predominant category affecting 70.2% of employees.

### 194 Occupational Stress Inventory Findings

195 **Table 3. Major Occupational Stress Domains**

Domain	Mean Score	Interpretation
Role Overload	2.28 ± 1.26	High
Role Ambiguity	1.47 ± 1.26	Moderate
Role Boundary	1.63 ± 1.29	Moderate
Responsibility	1.73 ± 1.32	Moderate–High
Physical Environment	1.84 ± 1.30	Moderate
Psychological Strain	1.49 ± 1.30	Moderate
Physical Strain	1.95 ± 1.18	High
Personal Resources	1.90 ± 1.54	Fair to Good Coping

196 Role overload and physical strain represented the most prominent stress-producing factors  
 197 among bank employees.

198 Oral Hygiene Practices

199 Table 4. Oral Hygiene Practices Among Participants

Variable	Category	n (%)
Brushing Frequency	Once Daily	130 (51.6)
	Twice Daily	122 (48.4)
Additional Oral Hygiene Aid	None	127 (50.4)
	Mouthwash	103 (40.9)
	Dental Floss	22 (8.7)
Toothbrush Type	Soft	163 (64.7)
	Medium	76 (30.2)
	Hard	13 (5.1)
Dental Visits	When Needed	171 (67.9)
	Regular	29 (11.5)
	Occasional	52 (20.6)

200 Most participants visited a dentist only when symptoms developed.

201 Association Between Stress and Dental Caries

202 **Table 5. Association Between Stress Levels and DMFT Scores**

Stress Level	n	Mean DMFT
Low	69	1.4
Moderate	177	3.2
High	6	5.8

203 ANOVA:  $p = 0.08$

204 Although DMFT scores increased with stress levels, the association was not statistically  
205 significant.

206 Association Between Stress and Periodontal Status

207 **Table 6. Association Between Stress Level and CPITN Scores**

Stress Level	Healthy/Bleeding	Calculus	Shallow Pocket	Deep Pocket
Low	28	31	8	2

Stress Level	Healthy/Bleeding	Calculus	Shallow Pocket	Deep Pocket
Moderate	52	86	25	14
High	0	1	3	2

208 Chi-square test:  $p = 0.01$

209 A statistically significant association was observed between stress levels and periodontal status.  
210 Participants with high stress exhibited greater periodontal destruction.

## 211 DISCUSSION

212 The present study investigated occupational stress and its relationship with oral health among  
213 bank employees in Jaipur city. The findings revealed that occupational stress was highly  
214 prevalent, with approximately 70% of employees reporting moderate stress levels. This  
215 observation is consistent with previous studies conducted among banking professionals in India  
216 and abroad, which have consistently demonstrated that banking remains one of the most  
217 psychologically demanding occupations.<sup>1-4</sup>

218 The predominance of moderate stress observed in the present study is comparable to the findings  
219 of Kumar et al., who reported substantial occupational stress among Indian bank employees due  
220 to workload, customer expectations, and administrative responsibilities.<sup>13</sup> Similar observations  
221 were reported by Giorgi et al., who identified workload pressure, organizational change, and role  
222 conflict as major contributors to stress in the banking sector.<sup>3</sup>

223 Role overload emerged as one of the most important occupational stressors in the present study.  
224 Employees frequently reported excessive workloads, limited time availability, and pressure to  
225 meet organizational targets. These findings support those of Majid et al., who demonstrated that  
226 strict deadlines and increasing job demands were strongly associated with stress and employee  
227 turnover among Malaysian banking professionals.<sup>8</sup>

228 An important finding of the present study was the significant association between occupational  
229 stress and periodontal health. Employees experiencing higher stress levels exhibited greater  
230 periodontal destruction, characterized by increased prevalence of periodontal pockets and  
231 calculus accumulation. Similar findings have been reported by Sato et al., whose systematic  
232 review concluded that occupational stress was consistently associated with poorer periodontal  
233 outcomes.<sup>12</sup>

234 Stress may influence periodontal health through several biological pathways. Chronic activation  
235 of the hypothalamic-pituitary-adrenal axis results in increased cortisol secretion, suppression of  
236 immune function, and enhanced inflammatory responses. These physiological changes contribute  
237 to periodontal tissue breakdown and impaired healing. Furthermore, stressed individuals  
238 frequently neglect oral hygiene practices, thereby increasing plaque accumulation and  
239 periodontal disease risk.<sup>29</sup>

240 In contrast, no statistically significant association was observed between stress levels and DMFT  
241 scores. Although mean DMFT increased progressively from low-stress to high-stress categories,

242 statistical significance was not achieved. Similar findings have been reported in several  
243 occupational studies where stress influenced periodontal outcomes more strongly than dental  
244 caries experience. This may be because periodontal tissues respond rapidly to stress-induced  
245 immunological alterations, whereas dental caries development depends on multiple long-term  
246 factors including diet, fluoride exposure, oral hygiene practices, and socioeconomic conditions.<sup>26</sup>

247 The oral hygiene findings indicate substantial scope for preventive interventions. More than half  
248 of participants brushed only once daily and nearly 68% sought dental care only when symptoms  
249 occurred. Such practices may contribute to the high prevalence of periodontal disease observed  
250 among stressed employees. These findings are consistent with reports from Ethiopia, Japan, and  
251 India demonstrating inadequate utilization of preventive dental services among working  
252 populations.<sup>28,26</sup>

253 The present findings emphasize the importance of integrating occupational health promotion  
254 with oral health programs. Workplace-based stress management interventions, counseling  
255 services, employee wellness programs, and regular dental screening camps may collectively  
256 improve both psychological well-being and oral health outcomes.

257 Strengths of this study include the use of validated stress assessment instruments, standardized  
258 clinical oral examinations, and inclusion of employees from both public and private banking  
259 sectors. Nevertheless, the cross-sectional design precludes causal inference, and future  
260 longitudinal studies are required to establish temporal relationships between stress and oral  
261 disease progression.

262 Overall, the findings suggest that occupational stress constitutes an important determinant of  
263 periodontal health among bank employees and should be considered in workplace health  
264 promotion strategies.

## 265 CONCLUSION

266 The present study evaluated occupational stress and oral health status among bank employees in  
267 Jaipur city and explored the relationship between these variables.

268 The findings demonstrated that occupational stress was highly prevalent among bank employees,  
269 with the majority of participants experiencing moderate levels of perceived stress. Occupational  
270 stressors such as role overload, workplace demands, responsibility, and physical strain emerged  
271 as major contributors to psychological burden among employees.

272 Although no statistically significant association was observed between occupational stress and  
273 dental caries experience as measured by the DMFT Index, a significant relationship was  
274 identified between stress levels and periodontal health status. Employees experiencing higher  
275 levels of stress demonstrated greater periodontal destruction and treatment needs compared to  
276 their less-stressed counterparts.

277 These findings suggest that occupational stress may act as an important determinant of  
278 periodontal health among banking professionals. The integration of stress management

279 strategies, workplace wellness programs, and preventive oral health services may contribute  
280 substantially to improving employee well-being and reducing the burden of oral diseases.

281 Addressing occupational stress should therefore be considered an essential component of  
282 comprehensive health promotion initiatives within the banking sector.

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