

THE DENTAL WAITING-ROOM ENVIRONMENT AND ITS ASSOCIATION WITH DENTAL ANXIETY IN PRIVATE DENTAL CLINICS AND HOSPITAL DENTAL DEPARTMENTS

Hammad Hassan¹, Muhammad Saqib Rabbani², Asma Shakoor³, Hafiz M Majid Jehangir⁴, Rabiya Saif⁵, Shafaq Habib⁶

¹Assistant Professor, Science of Dental Materials, Azra Naheed Dental College, Superior University, Lahore

²Assistant Professor, Behavioral Sciences, Azra Naheed Dental College, Superior University, Lahore

³Associate Professor, Department Community & Preventive Dentistry, CMH, Lahore Medical College, NUMS, Lahore

⁴Professor, Department of Oral Pathology, Azra Naheed Dental College, Lahore

⁵Demonstrator, Department of Oral Pathology, de'Montmorency College of Dentistry, Lahore

⁶Registrar, Paediatric Dentistry, Lahore Medical and Dental College, Lahore

Correspondence:

Dr. Hammad Hassan

Email: hammadhassanh@gmail.com

Abstract

Background: Dental anxiety is a major barrier to oral health care. Waiting room conditions may influence pre-treatment anxiety, but evidence from private dental settings in Lahore is limited.

Objective: To assess the association between patient-perceived waiting room environmental and organizational factors and dental anxiety among adult patients attending private dental clinics and private hospital dental departments in Lahore, Pakistan.

Material and Methods: This cross-sectional study was conducted in the waiting rooms of 4 private dental clinics and 2 private hospitals in Lahore from Jan to Nov 2025, after approval from the IRB of Azra Naheed Dental College. Adults aged 18 years and above attending scheduled non-emergency dental care and able to understand English or Urdu were recruited through consecutive sampling. Data was collected using a questionnaire covering demographics, the Modified-Dental-Anxiety-Scale (MDAS), and a literature-informed checklist of patient-perceived waiting-room factors. Chi-square tests compared clinics and hospitals, while multinomial logistic regression identified predictors of MDAS anxiety categories.

Results: Out of 700 patients approached, 651 completed the questionnaire, with a response rate of (651)93%. The mean age was 33.2±13.7 years; 313 (48.1%) were male and 338 (51.9%) female. The mean MDAS score was 13.19±4.62. Low, moderate, and high anxieties were reported by 293 (31.2%), 360 (55.3%), and 13.5% of participants, respectively. Mean MDAS scores did not differ significantly between clinics and hospitals ($p=0.115$). In multivariable analysis, perceived cleanliness and minimized waiting time were independently associated with lower anxiety categories

Conclusion: Patient-perceived cleanliness and shorter waiting time were associated with lower dental anxiety in private dental settings in Lahore.

Keywords: Anxiety Prevention & Control; Dental Anxiety; Dental Clinics; Patient Comfort; Private Hospitals; Waiting Rooms

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Introduction:

Dental anxiety is a significant barrier to oral health checkup and treatment globally. Patients who experience anxiety before, during or after dental visits are more likely to delay treatment, worsen disease progression, and may require general sedation.^{1, 2} In the clinical setting, the waiting room environment plays an important role in dental anxiety as patient's time in

the waiting area is an emotional and anxious experience, can lead to sensory overload or distraction, all of which may influence their subsequent behavior in the dental chair.³

Previous research has reported that the waiting in dental office or hospital can trigger dental anxiety due to longer waiting times, uncertain scheduling, and

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insufficient information about delays.⁴⁻⁶ In dental clinics, waiting room ambiance including lighting, sound, smell, signage, seating comfort and time management can contribute to the dental anxiety of patients.^{4, 7} A study on pediatric patients reported that longer waiting times in a dental waiting area significantly increased dental anxiety.⁸ Literature associated to the design of dental clinic waiting areas highlights that ambient lighting, natural views, indoor plants, and seating may reduce stress and anxiety.^{6, 9} A previous study in Iran and Sweden used computer-generated waiting-area images with various designs and reported that design features like large windows with nature view, indoor plants, curved walls, mixed seating, and ambient lighting were preferred for lowering perceived stress.^{6, 10, 11} A systematic review concluded that waiting-room interventions can reduce anxiety even when the waiting time is longer. In hospital settings, it was found that inclusion of natural elements in the waiting environment significantly lowered anxiety of patients.^{5, 12}

Despite these factors, there is limited data on multiple waiting-room environmental variables related to dental anxiety of patients particularly in the dental hospitals or clinics. Most dental clinics use a shared waiting area for patients where all type of patients with different personalities sit and interact and may lead to influences on both patient experience and clinical efficiency.¹³

The present study aimed to assess the association between patient-perceived waiting-room environmental and organizational factors and dental anxiety among adult patients attending private dental settings in Lahore. The contribution of this study is regional and observational as it provides baseline evidence on which perceived waiting-room factors are associated with MDAS anxiety categories in private urban dental facilities.

Material and Method:

Study Setting and Duration:

The study was conducted in the waiting rooms of four private dental clinics and two private hospital dental departments in Lahore, Punjab, Pakistan, from January 2025 to November 2025. Ethical approval was obtained from the Institutional Review Board of Azra Naheed Dental College, Superior University, Lahore (No. ANDC/RAC/2025/62). The first page of the questionnaire explained the study purpose, voluntary participation, the right to refuse participation without effect on treatment, anonymity, and confidentiality. No names or direct personal identifiers were recorded on the questionnaire, and completed forms were coded for analysis.

Sample Size and Sampling Method:

The required sample size was calculated as 382 using a 95% confidence level, 5% margin of error, and an anticipated frequency of 54.3%.³ The target sample was increased to 700 to improve precision and to include participants from both private clinics and private hospital dental departments. Participants were recruited consecutively from eligible adult patients attending the selected facilities during the data collection period. Consecutive sampling was used for feasibility; however, it may introduce selection bias because patients attending during the data collection periods may differ from those attending at other times.

Inclusion Criteria:

Adult patients aged 18 years and above attending the dental clinic and private dental hospitals for scheduled non-emergency dental treatment or checkup, and could understand both English and Urdu language were included in the study.

Exclusion Criteria:

Patients were excluded if they were unable to complete the questionnaire because of language or cognitive limitations, required urgent or emergency dental procedures, or experienced major procedural delays greater than 60 minutes. The exclusion of patients with very prolonged waiting times was applied to avoid mixing routine waiting-room experience with exceptional service disruption; however, this exclusion may underestimate the association between prolonged waiting and dental anxiety and is acknowledged as a study limitation.

Questionnaire Development:

The study instrument consisted of three sections: demographic information, the Modified Dental Anxiety Scale (MDAS), and a literature-informed checklist of waiting-room environmental and organizational factors. The MDAS contains five items scored from 1 (not anxious) to 5 (extremely anxious), producing a total score from 5 to 25. For analysis, MDAS scores were categorized as low anxiety (5-9), moderate anxiety (10-18), and high anxiety (19-25).⁶ The waiting-room section assessed patient-perceived features of the waiting area, including availability of reading materials or distractions, cleanliness, ambient lighting or natural view, receptionist/staff behavior, minimized waiting time, comfortable temperature, comfortable seating and spacing, organized scheduling or updates, background music, pleasant smell, and television/screens. These items were not treated as a validated psychometric scale; rather, they were analysed as separate binary indicators of whether participants perceived each feature to be present or adequate. Therefore, the term endorsement refers to a Yes response for the presence or adequacy of a waiting-room factor.

Data Collection:

Eligible participants completed the questionnaire while seated in the waiting room before dental treatment. The questionnaire was available in English and Urdu according to participant preference. Completed forms were checked for completeness at the time of collection. Because the questionnaire was completed before treatment, responses may have been influenced by anticipatory anxiety related to the upcoming dental procedure; this potential information bias is considered in the limitations.

Statistical Analysis:

Data were entered into Microsoft Excel and analyzed using SPSS version 24. Descriptive statistics were calculated for demographic variables, MDAS scores, facility type, and patient-perceived waiting-room factors. Frequencies and percentages were reported for categorical variables, and means with standard deviations were reported for continuous variables. Chi-square tests were used to compare the endorsement of waiting-room factors between private clinics and private hospital dental departments. MDAS scores were categorized as low (5-9), moderate (10-18), and high (19-25). Multinomial logistic regression was used to identify waiting-room predictors of MDAS anxiety category, with high anxiety as the reference outcome category. For binary predictors, No was used as the reference category unless otherwise specified. Odds ratios (ORs) greater than 1 indicate higher odds of being in the low or moderate anxiety category rather than the high anxiety category. Model fit was assessed using Pearson and deviance goodness-of-fit statistics. Bivariate comparisons were considered exploratory, and the multivariable model and effect sizes with 95% confidence intervals were used for primary interpretation. Statistical significance was set at $p < 0.05$.

Results:

A total of 700 participants were approached and 651 participants completed questionnaires. The response rate was 93%. There were 48.1% male, 51.9% female and the mean age was 33.2 ± 13.7 years. The sample was balanced by gender (48.1% male, 51.9% female). 55% of the respondents were surveyed in private hospitals, while 44.7% in private clinics.

The mean MDAS score was 13.19 ± 4.62 . Based on the predefined MDAS categories, 31.2% of participants were classified as having low anxiety, 55.3% moderate anxiety, and 13.5% high anxiety. Mean MDAS scores did not differ significantly between private clinics (13.51 ± 4.91) and private hospital dental departments (12.93 ± 4.36 ; $p = 0.115$).

<https://bmcjms.org/index.php/bmcj/issue/view/14>

Waiting-room factor (Yes)	Overall (n=651)	Clinics (n=291)	Hospitals (n=360)	χ^2	p
Availability of reading material	125(19.2)	69(23.7)	56(15.6)	6.899	0.009
Cleanliness of waiting area	345(53.0)	167(57.4)	178(49.4)	4.077	0.043
Ambient lighting/natural view	159(24.4)	105(36.1)	54(15.0)	38.749	<0.001
Behavior of receptionist/staff	205(31.5)	108(37.1)	97(26.9)	7.713	0.005
Minimized waiting time ^a	426(65.4)	210(72.2)	216(60.0)	12.194	0.002
Warmth/temperature comfortable	376(57.8)	195(67.0)	181(50.3)	18.466	<0.001
Comfortable seating & spacing	449(69.0)	213(73.2)	236(65.6)	4.389	0.036
Organized scheduling/regular updates	266(40.9)	135(46.4)	131(36.4)	6.663	0.010
Pleasant background music	97(14.9)	46(15.8)	51(14.2)	0.342	0.559
Pleasant smell	218(33.5)	103(35.4)	115(31.9)	0.860	0.354
Presence of television/screens	64(9.8)	33(11.3)	31(8.6)	1.352	0.245

Table 1 shows the distribution of patient-perceived waiting-room factors by facility type. In this analysis, endorsement refers to a Yes response indicating that the participant perceived the feature to be present or adequate. Compared with private hospital dental departments, private clinics had significantly higher endorsement of reading materials/distractions ($p = 0.009$), cleanliness ($p = 0.043$), ambient lighting/natural view ($p < 0.001$), positive receptionist/staff behaviour ($p = 0.005$), minimized waiting time ($p = 0.002$), comfortable temperature ($p < 0.001$), comfortable seating/spacing ($p = 0.036$), and organized scheduling/updates ($p = 0.010$). Differences were not statistically significant for background music ($p = 0.559$), pleasant smell ($p = 0.354$), or television/screens ($p = 0.245$) (Table 1).

The multinomial logistic regression model used high anxiety as the reference outcome category. The model showed adequate goodness of fit based on Pearson and deviance statistics. In the likelihood-ratio tests shown in Table 2, minimized waiting time ($p = 0.009$) and cleanliness of the waiting area ($p < 0.001$) were the consistent statistically significant predictors. Participants who endorsed minimized waiting time had higher odds of being in the low anxiety category rather than the high anxiety category (OR=3.63, 95% CI: 1.50-8.77, $p = 0.004$). Participants who endorsed cleanliness had higher odds of being in both the low anxiety category (OR=4.65, 95% CI: 2.45-8.80,

$p < 0.001$) and the moderate anxiety category ($OR = 3.30$, 95% CI: 1.82–5.97, $p < 0.001$) compared with the high anxiety category. Other waiting-room factors were not independently associated with MDAS category after adjustment in the multinomial model and adequate. p -values were obtained using chi-square tests.

should be interpreted as site-level differences rather than independent predictors of anxiety.

Values are presented as $n(\%)$. Endorsement refers to a Yes response indicating that the participant perceived the waiting-room feature to be present or

Factor (comparison level shown first)	LR	p-value	OR — Low vs High (95% CI)	p	OR — Moderate vs High (95% CI)	p
Minimized waiting time*	9.486	0.009	3.63 (1.50–8.77)	0.004	1.50 (0.77–2.91)	0.232
Cleanliness of waiting area*	24.864	<0.001	4.65 (2.45–8.80)	<0.001	3.30 (1.82–5.97)	<0.001
Warmth / temperature comfortable	5.572	0.062	1.42 (0.94–2.13)	0.062	1.22 (0.87–1.71)	0.237
Reading materials / distractions	1.582	0.453	1.10 (0.68–1.77)	0.653	1.01 (0.63–1.62)	0.976
Ambient lighting / natural view	1.962	0.375	1.15 (0.72–1.83)	0.549	1.12 (0.74–1.70)	0.592
Positive Behavior of receptionist/staff	1.715	0.424	1.28 (0.82–1.98)	0.269	1.14 (0.75–1.74)	0.551
Comfortable seating & spacing	0.825	0.662	1.04 (0.66–1.64)	0.870	1.02 (0.67–1.56)	0.931
Organized scheduling / regular updates (No vs Yes)	0.263	0.877	0.91 (0.61–1.36)	0.636	0.94 (0.64–1.38)	0.753
Pleasant background music	1.529	0.466	1.10 (0.62–1.97)	0.735	1.05 (0.59–1.87)	0.858
Pleasant smell	0.308	0.857	0.97 (0.62–1.52)	0.876	0.99 (0.64–1.55)	0.960
Presence of television/screens	3.336	0.189	1.23 (0.65–2.32)	0.531	1.17 (0.66–2.09)	0.597

Multinomial logistic regression was performed with high anxiety as the reference outcome category. Unless otherwise specified, No was the reference category for each binary predictor. $OR > 1$ indicates higher odds of low or moderate anxiety compared with high anxiety. LR = likelihood-ratio test; OR = odds ratio; CI = confidence interval. Bivariate and multivariable findings should be interpreted cautiously because the waiting-room indicators were exploratory and binary.

Discussion:

The present study found a mean MDAS score of 13.19 ± 4.62 among adult patients attending private dental settings in Lahore. More than half of the participants were classified as having moderate dental anxiety, while 13.5% were classified as having high anxiety. These findings support the clinical relevance of assessing pre-treatment anxiety in dental waiting areas. However, because this was a cross-sectional survey, the results describe associations and cannot determine whether waiting-room factors caused lower or higher anxiety. Previous studies in adult population reported moderate to high dental anxiety levels in the range 19 to 47% and high anxiety in 10 to 20%.^{3, 14, 15} The higher prevalence in the current study may reflect differences in patient population, waiting room experience, culture and types of practice in Lahore. Moreover, healthcare system in Punjab is already overloaded with private hospitals facing more flow as compared to clinics which may lead to deficient and crowded waiting rooms.³

Mean MDAS scores did not differ significantly between private clinics and private hospital dental departments,

which suggests that facility type alone may not explain dental anxiety in this sample. Specific patient-perceived features of the waiting experience may be more relevant than whether the setting is labelled a clinic or hospital dental department. Previous literature on setting based differences in dental anxiety is limited, however, environmental factors may influence anxiety.^{13, 16} Previous studies suggests that anxiety is higher in hospital settings due to more invasive procedures or unfamiliar environment, however, the findings of the current study suggests that once demographic and visit characteristics are controlled, the waiting-room environment rather than setting type may be more important.^{13, 16, 17} The location alone may not affect anxiety levels, rather, the environmental experience and organizational factors are also important factors.^{3, 18}

Private clinics showed higher endorsement of several waiting-room features, including reading materials, cleanliness, ambient lighting or natural view, staff behavior, minimized waiting time, temperature comfort, seating and spacing, and organized scheduling. These differences show that patients perceived the waiting-room environment differently across facility types. However, site-level differences should not be interpreted as independent predictors of anxiety unless they remained significant in the multivariable model. These findings align with the previous literature that emphasizes how ambient factors, seating, and waiting time organization influence patient perceptions and anxiety.^{5, 6, 13, 19} Private dental clinics in this study were having a more favorable waiting room environment than hospitals, which may lead to reduced dental anxiety.

In the multinomial logistic regression analysis, perceived cleanliness and minimized waiting time were the most consistent predictors of lower anxiety categories. Cleanliness showed the strongest association, with participants who endorsed cleanliness having greater odds of being in low or moderate anxiety categories rather than the high anxiety category. This may reflect more than physical hygiene alone, a clean waiting area may function as an indication of professionalism, order, and safety. Similarly, minimized waiting time may reduce uncertainty and anticipatory distress before treatment. A 2019 case-control study in children found that longer waiting time was significantly associated with higher anxiety, even though waiting room type per se (multisensory vs traditional) had no effect.⁸ Ambient environment (lighting, layout, waiting time) affect patient stress and dental anxiety.²⁰ Improving waiting room cleanliness and providing reading materials/distractions may reduce dental anxiety by diverting attention and providing professional care.

This study has several limitations like the cross-sectional design and consecutive sampling from private urban dental settings in Lahore limiting external validity, as patients from public-sector facilities, rural areas, and other provinces were not represented. The waiting-room checklist was literature-informed but not a validated psychometric scale and responses were binary and subjective. Objective measures such as actual waiting time, noise level, lighting intensity, temperature, and crowding were not recorded. Important confounders like previous dental anxiety history, pain or urgency of treatment, detailed treatment type, dental visit frequency, socioeconomic status, and educational level were not included in the analysis. Interaction effects such as gender by environment or treatment type by environment were not tested. Future studies should use validated multidimensional environmental scales, objective environmental measurements, broader public and rural samples, and longitudinal or interventional designs to test whether modifying specific waiting-room features reduces MDAS scores.

Conclusion:

Among adult patients attending private dental clinics and private hospital dental departments in Lahore, patient-perceived cleanliness of the waiting area and minimized waiting time were independently associated with lower dental anxiety categories. Other waiting-room features differed between facility types but were not consistent independent predictors in the multivariable model. These findings should be interpreted as observational associations because the

study used a cross-sectional design, consecutive sampling, self-reported binary waiting-room measures, and private urban facilities only. Maintaining visible cleanliness and improving waiting-time management may be practical priorities for patient comfort, but future interventional studies are needed to determine causality, feasibility, and cost-effectiveness.

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