

# Factors Affecting Clinical Performance among Pakistani Dental Students: A Cross-Sectional Study

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## ABSTRACT

**Objective:** To identify the factors affecting clinical performance among dental students and to help addressing these problems. **Material and Methods:** A cross-sectional study in which students of third and final year of dentistry participated. Data was collected from June 2022 till September 2022. Data was collected from the third and final year dental students of both public and private dental colleges within the Pakistan using a purposive sampling technique. **Results:** A total of 372 dental students participated in this study. Thirty eight (31.9%) students belonged to third year while 81 (68.1%) were final year students from government college. For the private dental college, 121 (47.8%) were third year students while 132 (52.2%) were final year students. Majority of the participants were males from both the colleges. 42.9% of government dental students and 26.5% of private dental students agreed on well-preparedness of clinical instructors. 5.5% from private and 21.0% from government dental colleges agreed that adequate personal protective equipment were present in clinical departments. **Conclusion:** From this study, it is concluded that there should be focus more focus on the factors to enhance clinical skills, supervision of students in clinical practice to help addressing the problems faced during learning and performance in a clinical environment, to produce self-confident, motivated, knowledgeable, skillful and a professional dental graduates.

**Keywords:** Dentistry; Students, Health Occupations; Clinical Competence.

## Introduction

Learning environment plays a vital role in developing knowledge, skills in any profession. There is always a room for improvement in improving clinical skills even if there is limitation of resources. Dental education demands unique consideration due to its numerous practical units and its vast aspects of skill learning [1]. Dental students should be able to develop their clinical reasoning during exposure in the clinical set-up. Learning in real environment is more challenging and it directly affects clinical performance [1].

Although dental education is a combination of understanding and practical learning experiences that enable students to acquire the knowledge, skills, and attitudes for providing oral health care [2]. To become competent, accountable, and independent professional, dental students need to be encouraged and mentored. Clinical environment provides opportunity for students to apply their knowledge into practice [3]. An ideal dental educational environment should enable students to acquire non-clinical, clinical and interpersonal competencies, which must be supported by integration among knowledge of biomedical, behavioral, and dental courses, by cognitive and psychomotor skills, and by professional and ethical values [4]. Clinical settings enable dental students to acquire skills and provide abilities and deliver secure and effective oral health care through practice [5].

Multiple factors play direct/indirect role in the clinical performance among dental students during their pre-clinical/clinical setting. The learning environment if challenged by such factors may in turn affect learning adversely or vice versa. Positive learning environment encourage students to perform well. According to reports, clinical instructors' attitudes have an impact on how well dental students do in the clinical setting. Positive attitudes foster a learning environment for students. Negative criticism is a barrier to effective clinical performance, whereas constructive criticism improves practice. Too many students in a pre-clinical/clinical setting, insufficient number of instructors and limited resources for practice in clinical set-up, may have a negative impact on clinical performance of dental students [6]. Among dental students, depression, burnout, and stress are more frequently observed. This worsens psychiatric morbidity and has an impact on productivity [7].

Although, there are number of studies, which may identify factors affecting learning of medical and dental students, only few have been conducted in Pakistan and most of them focused on academic performance of medical students. A study like this is necessary to fill this gap because there are only few studies that may identify the factors associated with dental students' performance in clinical settings. Our study evaluated the variables influencing clinical performance among third and final year dental students. The findings of this study may have an impact on educational institutions which may in turn have efforts to increase the number of resources and clinical instructors in Pakistan.

## Material and Methods

### Study Design and Ethical Clearance

This is a cross-sectional study. This study was approved by the Institutional Review Board of HBS Medical and Dental College (Ethical no. Appl # EC, 05/27/04/2022).

### Study Setting

Pakistan is a developing country with limited resources. Teaching and learning plays an important role in health profession and most of the healthcare professionals further helps to teach students, patients, relatives or other staff at some point in their career [8]. Number of dental colleges is less as compare to the medical

colleges in Pakistan. Similarly, dental student's ratio is less than the medical students. Resources are limited that may include, faculty, equipment, infrastructure etc. Similarly, quality of faculty and other resources plays a major role on the quality of future clinicians. Therefore, this study was carried out to identify the factors that affect dental student's clinical performance for which data is collected from the third and final year dental students of both public and private dental colleges within the Pakistan. Data was collected from June 2022 till September 2022.

### Sample Size

The total sample of the study participants was 373. The third and final year dental students for selected for this study because they had sufficient experience in clinical settings to offer their knowledgeable, opinions on proposals for clinical practice. Study participants who responded were students of dental colleges from different provinces within Pakistan. The sampling was intentional.

### Research Tool and Data Collection

Based on literature reviews, the researcher created a self-administered questionnaire. Questionnaire was developed by three to four experts in the department of medical education based on the general questions related to clinical performance, validity (CVR = 0.91, CVI = 0.88) and reliability was verified using Cronbach's alpha, which was 0.80 [9]. The questionnaire was pre-tested before the actual data was gathered to identifying any ambiguities in it. Pre-testing was carried out by distributing the same questionnaire twice, separated by two weeks, to people who were not enrolled in the study. The questionnaire included three sections based on voluntary participation, basic demographic traits and factors affecting clinical performance among dental students. In order for all participants to easily comprehend the questionnaire, it was written in English.

Questionnaire was shared with the students both in hard form as well the link of the questionnaire created using a google form was shared with the third and final year students of dental colleges in Pakistan via WhatsApp, Facebook messenger etc. The responses were measured on a 5-point Likert scale anchored by "strongly agree" (5) to "strongly disagree" (1) Participation was on voluntary basis, and the inclusion criteria were students of third and final year dental undergraduates of both public and private dental colleges with in the Pakistan, whereas, first and second year dental undergraduates were excluded because of their limited knowledge and experience in clinical area.

### Data Analysis

Descriptive analysis was done to summarize information of the study participants. Summary statistics was done for continuous variables while frequency and percentages was calculated of categorical variables. Data was analyzed using Statistical Package for Social Sciences version 20.0 (IBM Corp., Armonk, NY, USA).

## Results

A total 372 dental students participated, filled and returned the questionnaire. Students from both government (n=119; 32.0%) as well from the private dental colleges (n=253; 68.0%) participated. Table 1 shows that there were 38 (31.9%) students from third year while 81 (68.1%) students from 4th/final year from government dental college. Of them, 64 (53.8%) were males and 55 (46.2%) were females. There were 121 (47.8%) students from third year while 132 (52.2%) students from 4th/final year from private college. Of them, 144 (56.9%) were males and 109 (43.1%) were females. Most of the mostly study participants were in the age range of 21-23 for both the dental institutes.

**Table 1. Demographic information of participants.**

Variables	Government Dental College	Private Dental College
	N (%)	N (%)
Age (Years)		
18-20	0 (0.0)	5 (2.0)
21-23	114 (95.8)	247 (97.6)
24-26	5 (4.2)	1 (0.4)
Gender		
Male	64 (53.8)	144 (56.9)
Female	55 (46.2)	109 (43.1)
Academic Year		
Third	38 (31.9)	121 (47.8)
Fourth	81 (68.1)	132 (52.2)

Table 2 shows the frequency and percentage of the factors affecting clinical performance among dental students. For all the statements, majority of the participants gave a neutral response.

**Table 2. Frequency and percentage of factors affecting clinical performance among dental students.**

Statements	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
	N (%)	N (%)	N (%)	N (%)	N (%)
A. Are the clinical instructors/demonstrators well prepared?	15 (4.0)	103 (27.6)	200 (53.6)	47 (12.6)	8 (2.1)
B. Are you supervised properly during clinical procedures?	17 (4.6)	84 (22.5)	184 (49.3)	80 (21.4)	8 (2.1)
C. Are you being briefed properly before the start of the clinical procedure?	19 (5.1)	85 (22.8)	195 (52.3)	67 (18.0)	7 (1.9)
D. Are you instructed enough to take history and to examine the patient?	21 (5.6)	149 (39.9)	163 (43.7)	29 (7.8)	11 (2.9)
E. Are you satisfied with the level of communication of your instructor/demonstrator?	14 (3.8)	89 (23.9)	170 (45.6)	90 (24.1)	10 (2.7)
F. Are the learning resources adequate in clinical setting?	16 (4.3)	109 (29.2)	138 (37.0)	96 (25.7)	14 (3.8)
G. Is adequate PPE present in clinical departments?	12 (3.2)	27 (7.2)	111 (29.8)	171 (45.8)	52 (13.9)
H. Is the time allocation to work in the clinical departments sufficient?	28 (7.5)	207 (55.5)	99 (26.5)	33 (8.8)	6 (1.6)
I. Is the work environment favors in enhancing knowledge and experience among each students	29 (7.8)	125 (33.5)	170 (45.6)	44 (11.8)	5 (1.3)
J. Is the work environment helps in building self-confidence among each student?	29 (7.8)	98 (26.3)	192 (51.5)	47 (12.6)	7 (1.9)

Table 3 shows the comparison of factors affecting the clinical performance of undergraduate BDS students in selected private and government dental colleges. 42.9% of BDS students of government dental college were willing that their clinical instructors were well-prepared at the time of demonstration of any clinical procedure. While only 26.5% BDS students of private dental college agreed with this. When asked about their satisfaction with the level of communication of their clinical instructor/demonstrator, only 39.5% of BDS students of public setup while 47.4% of BDS students of private dental college were satisfied. 5.5% from private and 21.0% from government dental colleges agreed that adequate personal protective equipment (PPE) were present in clinical departments. When asked from students that “does the work environment favor in enhancing knowledge and experience”, 10% students of government college whereas 12% students of private dental hospitals did not agree.

**Table 3. Summary statistics comparison of government and private dental students.**

Statements	Government Colleges				Private Colleges			
	Agree %	Neutral %	Disagree %	Mean ± SD	Agree %	Neutral %	Disagree %	Mean ± SD
A. Are the clinical instructors/ demonstrators well prepared?	42.9	47.1	10.1	1.67 ± 0.42	26.5	56.5	17.0	1.90 ± 0.65
B. Are you supervised properly during clinical procedures?	37.8	44.5	17.6	1.79 ± 0.51	22.1	51.4	26.5	2.04 ± 0.70
C. Are you being briefed properly before the start of the clinical procedure?	38.7	48.7	12.6	1.73 ± 0.45	22.5	54.2	23.3	2.00 ± 0.68
D. Are you instructed enough to take history and to examine the patient?	59.7	31.9	8.4	1.48 ± 0.42	38.7	49.4	11.9	1.73 ± 0.66
E. Are you satisfied with the level of communication of your instructor/demonstrator?	39.5	42.0	18.5	1.78 ± 0.54	21.7	47.4	30.8	2.09 ± 0.72
F. Are the learning resources adequate in clinical setting?	38.7	29.4	31.9	1.93 ± 0.71	31.2	40.3	28.5	1.97 ± 0.77
G. Is adequate PPE present in clinical departments?	21.0	28.6	50.4	2.29 ± 0.63	5.5	30.0	64.4	2.58 ± 0.60
H. Is the time allocation to work in the clinical departments sufficient?	76.5	17.6	5.9	1.29 ± 0.33	5.5	30.0	64.4	1.56 ± 0.71
I. Does the work environment favor in enhancing knowledge and experience among each student?	58.0	31.9	10.1	1.52 ± 0.46	56.5	30.8	12.6	1.81 ± 0.67
J. Does the work environment help in building self-confidence among each student?	58.8	31.1	10.1	1.51 ± 0.46	33.2	52.2	14.6	1.94 ± 0.62

## Discussion

Health professionals face a problem in designing the ideal clinical learning environment. Understanding, students experience, their surroundings and the elements they believe have an effect on their learning is essential to evaluate results in improving the clinical learning environment. This study is aimed at identifying the factors affecting clinical performance among dental students in Pakistan. Frequencies and percentages were calculated after administering a self-administered questionnaire, which included questions on; preparation of clinical demonstrator, supervision during clinical procedures, briefed properly before the start of the clinical procedure, instructed on how to take history and examine patient, satisfaction with the level of communication of your instructor, adequacy of learning resources, presence of PPE in clinical departments, time allocation for clinical work, clinical environment in terms of knowledge and experience and work environment in terms of building confidence.

Finding showed that clinical instructors/demonstrators need to be well prepared. The student-teacher relationships in the clinical learning environment, is important for creating an optimal teaching and learning environment and enhancing student outcomes [10]. Similarly, finding revealed that constant supervision is necessary in ensuring quality of care delivery. Clinical supervision of dental undergraduates is important for patient safety and other aspects of quality care. It is professional development activity where a less experienced individual can utilize knowledge and experience from their supervisor or instructor [11].

Factors like briefing on the procedure before it starts, history taking and clinical examination is important and plays a vital role in undergraduate clinical performance. Clinical exposure prepares students for real-world practice. It is required by all the instructors to brief the undergraduates properly before the start of any clinical procedure and to teach them in depth how to take history and examine clinically. Teaching history taking and clinical examination on the patient to dental students can positively influence their sense of belonging to the discipline and improve their ethical conduct as future dentists [12].

It is very important to learn the skills of diagnosis in dentistry, for which history taking and clinical examination should be done properly. For learning and acquiring skills it is also important that there should be a satisfactory level of communication between a student and an instructor and feels comfortable in asking questions from the him/her and the instructor should must have enough knowledge to communicate well with the students which not only help in student's efficiency and to learn better how to diagnose, but also improved patient outcomes and satisfaction. Communication is one of the skill but its importance is not always accepted or valued, either by students or those with more experience [13]. Learning resources availability is very important in clinical setting, that may include; number of instructors, materials, work environment etc.

There is an ancient Chinese proverb that goes "*What I hear, I forget. What I see, I remember and what I do, I understand.*" [14].

Studies have shown that if there exists lack of resources whether physical or financial may results in lack of self-confidence, lack of interest, absenteeism, anxiety, poor learning and performance etc. [15]. Other resource that is important during clinical practice is use PPE. Due to exposure to saliva, blood, and other bodily fluids, as well as the use of sharp tools and procedures that produce aerosols, dental students and clinicians are at very high risk of infections during clinical work. The role of dental professionals in preventing the transmission of diseases like hepatitis, AIDS, COVID-19 [16] etc. is critically important. Therefore, it is important to have adequate PPE in clinical setting which may encourage students to perform well. Time allocated for students in clinical settings is also important, which in turn will increase perceived confidence, which will improve students' present and future professional performance, clinical skills improvement with adequate time allocation in clinical settings are required.

Dentistry in addition to motor skills also acquires knowledge and experience for ideal execution of any treatment plan for patients. A good work environment not only helps in enhancing knowledge and experience among students but also help in building self-confidence among them. Number of studies suggested that work environment has direct impact on learning, acquiring skills and self-confidence. Studies suggest that clinical teachers' optimal motivation is of paramount importance for promoting an adequate learning environment [17]. Thus, efforts should be made to enhance knowledge, skills and self-confidence among dental student's at work place.

The limitation is that the study provides a quantitative analysis of the problem and can be response biased because of the self-administered questionnaire.

## Conclusion

This study identifies the factors affecting clinical performance among dental students, the factors included; preparation of clinical instructors, supervision during clinical procedures, briefing before the start of clinical procedure, instructed on taking history and examination of the patient, level of communication with instructor, learning resources in clinical setting, Personal protective equipment in clinical departments, time allocation to work in the clinical departments, work environment in enhancing knowledge and skill among students and building a self-confidence among students. Considering the results, it is suggesting that there should be focus on these factors, supervision of students in clinical practice to help addressing the problems faced during learning and performance in a clinical environment, to produce self-confident, motivated, knowledgeable, skillful and a professional dental graduate.

## Authors' Contributions

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All authors declare that they contributed to critical review of intellectual content and approval of the final version to be published.

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None.

## Conflict of Interest

The authors declare no conflicts of interest.

## Data Availability

The data used to support the findings of this study can be made available upon request to the corresponding author.

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