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Evaluation of the Post Graduate Learning Environment of the Dental Teaching Hospitals of the Twin Cities Using PHEEM Inventory

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ABSTRACT

Objective: To evaluate the effectiveness of the post-graduate learning environment of the dental teaching hospitals.
Study Design: Cross-sectional study
Place and Duration of Study: Nine dental hospitals of Rawalpindi and Islamabad, Pakistan from Feb to July 2023.
Methodology: A validated PHEEM questionnaire based on 40-item questions was distributed via Google forms as well as in-person questionnaire, among post graduate residents (1st- 4th year) of the dental hospitals of Rawalpindi/ Islamabad. The data was collected from 204 participants. Descriptive analysis of the age and the scores of the PHEEM inventory was done. Gender, level of training and specialty was determined via frequency and percentage. Subgroup analysis in terms of gender and level of training was assessed with one way ANOVA test with post hoc analysis applying Tukey test.
Results: The mean age of the participants was 28.96±2.69 years. The total PHEEM inventory score of the dental hospitals of Rawalpindi and Islamabad was 100.51±20.18 showing more positive than negative educational environment. The total score for role of autonomy, teaching and social support was 35.04±6.10, 39.58±9.51 and 25.89±7.34 respectively.

Conclusion: The post-graduate learning environment of the dental teaching hospitals is satisfactory.

Keywords: Learning environment, Postgraduate education, PHEEM.

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INTRODUCTION

Learning environment plays an essential role in determining the effectiveness of a medical education program. A learner's training level is significantly influenced by the quality of engagement, dedication, passion, and motivation provided in the learning environment. According to the theory of Andragogy, teaching not only involves transmitting knowledge or sharing expertise but also creating the backdrop, context, climate, or environment essential for effective learning.[1] As new teaching hospitals and postgraduate programs, particularly in developing countries, continue to expand, the creation of a high-quality training environment for post-graduate trainees has become a matter of considerable importance. Consequently, modern training standards have expanded to incorporate a broad spectrum of skills, including management, teamwork, supervision, social support and research. It requires a thorough understanding of the surrounding to efficiently manage these programs and boost their effectiveness.[2,3]

As most of the training imparted to postgraduate residents is inside the hospital, it may cause several errors if chairside teaching is not adequately prepared.[4] Therefore, it is necessary that a thorough analysis of the issues relating to the standard of instruction given and the overall learning environment must be carried out, in order to provide better training and patient care.[5] A step towards training perfection is the creation and application of various measures that assess the effectiveness of training programs in routine clinical practice. Numerous approved tools are being developed in several nations to enhance training programs. These include the "Surgical Theatre Educational Environment Measure (STEEM),[6] the "Anaesthetic Theatre Educational Environment Measure (ATEEM),[7] and the "Dundee Ready Educational Environment Measure (DREEM),[8] for undergraduate health professional education, among others.

An assessment tool has been developed and validated by the researchers from UK and other countries, in order to evaluate the learning and teaching for junior doctors in hospital based

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postgraduate settings.[9] This tool, called as the "Postgraduate Hospital Educational Environment Measure (PHEEM)".It comprises of 40 items categorized under 3 heading- "role autonomy, perceptions of instruction, and perceptions of social support". This tool may show reliable findings in assessing the postgraduate learning environment in Pakistan as medical training is similar to that in UK and Ireland.[10] Using this "PHEEM inventory" in Pakistani university teaching hospitals can help in providing a precise understanding of the strengths and weaknesses of their postgraduate dental education. This study aimed to evaluate the postgraduate hospital educational environment of dental hospitals.

METHODOLOGY

The cross-sectional study was conducted in a multicenter setting focusing on different dental hospitals of Rawalpindi and Islamabad, Pakistan. The dental hospitals providing post graduate training were Islamic International Dental College, Islamabad Medical and Dental College, Armed Forces Institute of Dentistry, Margalla Institute of Health Sciences, Rawal Institute of Health Sciences, Foundation University College of Dentistry, Pakistan Institute of Medical Sciences, Polyclinic hospital and Kahuta Research Laboratory hospital. Ethical approval was granted by the Ethical Review Committee of Margalla Institute of Health Sciences. (Ref. No: DK/186/14-02-23) The study was conducted from February to July 2023. The sample size of 200 was calculated using the World Health Organization (WHO) calculator keeping anticipated population proportion for knowledge of residents regarding epidemiology methods at 45.6% and absolute precision at 7%.[11,12] the study participants were recruited through Convenience sampling.

Inclusion criteria: Dental postgraduate residents of either gender practicing at various levels of residency, having minimum training of 3 months were included in the study.

Exclusion criteria: Non-dental postgraduate residents, undergraduate dental students, post graduate residents less than 3 months into training were excluded.

A validated questionnaire was sent to the dental residents through Google forms and in-person as well. The questionnaire was based on a validated 40-item questionnaire called the Postgraduate Hospital Educational Environment Measure (PHEEM) tool. The questionnaire was divided into 4 sections: Demographics, Autonomy, Role of Teaching and Social Support. The instrument consists of 40 items with responses based on a five-point Likert scale from "strongly disagree" to "strongly agree", scored 0-4. These range from "strongly agree (4), agree (3), unsure (2), disagree (1) to strongly disagree (0)". However, 4 of the 40 items (Number 7,8,11 and 13) are negative statements and should be scored as "strongly agree (0), agree (1), unsure (2), disagree (3) to strongly disagree (4)".

Agreement with the items indicate a positive learning environment yielding high scores. The maximum possible scores were, 56 in the category of autonomy, 60 for teaching, 44 for social support and an overall score of 160. The score was interpreted as overall score:0-40: Very poor, 41-80: Plenty of problem, 81-120: More positive than negative but room for improvement and 121-160: Excellent

A guide to interpret the score of three constructs of PHEEM is done as "Perception of role of Autonomy: 14 items, Maximum score: 56(0-4: Very poor, 15-28: A negative view of one's role, 29-42:A more positive perception of one's job, 43-56: Excellent perception of one's job) .Perception of Teaching: (15 items, Maximum score: 60) 0-15:Very poor quality, 16-30:In need of some re-training, 31-45: Moving in the right direction, 46-60: Model teachers Perception regarding Social Support: (11 items, Maximum score: 44)0-11: Non-Existent, 12-22: Not a pleasant place, 23-33: More social support available, 34-44: A good supportive environments"

The responses were extracted, and results were compiled using a software Statistical Package for Social Sciences (SPSS version 26). Descriptive analysis was done for the age and the scores of the PHEEM inventory. Frequency and percentages were calculated for gender, level of training, specialty and type of training. To assess the differences in outcomes across the categories like gender and level of training, Chi Sq test was applied.

RESULTS

The response rate was 52%. The mean age of the participants was 28.96±2.69 years. The demographic details are depicted in Table-I. The total PHEEM inventory score of the dental hospitals of Rawalpindi/Islamabad was 100.51±20.18 as shown in Table-II. Of the 40-itmes of the PHEEM inventory, 35 items had a mean score between 2 and 3 and could be improved to enhance the educational environment. In the autonomy domain the question having the highest

mean score was "I have appropriate level of responsibility in this post" and question having lowest mean score was "There is informative junior doctor handbook". In the teaching domain the question having the highest mean score were "My clinical teachers encourage me to be an independent learner" and "My clinical teachers have good communication skills". In the social support domain the question with higher score were "I feel physically safe in the hospital environment" and "I have good collaboration with other doctors in my grade" and questions with lower score were "There is adequate catering facilities when I am on call" and "There are good counseling opportunities for junior doctors who fail to complete their training satisfactorily".

Table-I: Characteristics of Study Participants (n=154)

Demographics		n(%)
Gender	Male	57(36.5%)
	Female	99(63.5%)
Level of Residency	1st Year	21(13.5%)
	2nd Year	53(34%)
	3rd Year	31(19.9%)
	4th Year	51(32.7%)
Specialty	Periodontics	7(4.5%)
	Operative Dentistry	60(38.5%)
	Oral and Maxillofacial Surgery	10(6.4%)
	Prosthodontics	24(15.4%)
	Orthodontics	54(34.6%)
	Oral Medicine	1(0.6%)
Type of Post Graduation	FCPS	124(79.5%)
	MDS	24(15.4%)
	MCPS	6(3.8%)
	MD/MS	2(1.3%)

A comparison between the perception of male and female residents regarding the PHEEM domains is shown in Table-III. A comparison between the level of residency and the PHEEM domains is shown in Table-IV. No statistically significant difference was found in both the comparisons. However, 3rd year residents seemed more satisfied with the hospital educational environment and 1st year students appeared less satisfied as compared to other year residents.

DISCUSSION

The dental hospitals of the Rawalpindi and Islamabad, according to our study, achieved a total PHEEM inventory score of 100.51 out of 160, indicating a predominantly positive educational environment. Nevertheless, there is always room for improvement. There are various tools for measuring the educational environment of the postgraduate dental residents and among them PHEEM is an easy, multidimensional, valid and highly reliable, quality assuring measuring instrument[13].

The total score results of our study are similar to the studies by Bu Ali et al. and Javad Yousaf M, where they evaluated the post-graduate training program in Saudi Arabia and Pakistan, respectively.1,5 The total PHEEM score by Bu Ali et al was 100.19, with sub-scale scores of 34.91 in role of autonomy, 38.89 in role of teaching and 26.38 in social support.[5] The study by Javad Yousaf et al. had a total score of 103.29 with sub-scale scores of autonomy, role of autonomy, teaching and social support of 36.11, 39.02 and 28.16, respectively.[1] which is in agreement with scores of our study.

Table II: Interpretation of Results of PHEEM Regarding General Score and Domains

PHEEM Domain	Study Score (Mean±SD)/ Total Score	Interpretations
Role of Teaching	39.58±9.51	Teaching in the hospitals is moving in the right direction
Role of Autonomy	35.04±6.10	More positive environment
Social Support	25.89±7.34	More social support is available to the residents
Total Score	100.51±20.18	More positive than negative educational environment however, room for improvement is there

The scores of this study are also comparable to Mahendran's (2015) evaluation of postgraduate psychiatry residency training program in Singapore[14] .However, there is a noticeable distinction in the scores for the role of teaching between the two studies. While Mahendran reported a score of 44.48±6.17, our study found a slightly lower score of 39.58±9.51.

Our study scores (35.04±6.10) indicated a notably positive environment in the sub-scale of autonomy. These scores are comparable to the studies conducted in developed countries like Saudi Arabia and Dubai.[5,13] Autonomy, accountability, respect, teamwork and communication skills are vital qualities of a good medical practitioner. Some of these are inherent but they can also be nurtured and enhanced through exemplary role models, supportive learning environment and effective feedback[15] Proficient communication skills are an important attribute of a good clinical teacher, and therefore enable them to provide clear, simple and logical explanations to their students leading to a better educational environment[16] . It was found that poor relationship with the faculty leads to an unfavorable educational environment[17].

Table III: Comparison of PHEEM Domains Among the Gender

PHEEM Domain	Gender								*p*-value
	Male n, Interpretation				Female n, Interpretation				
Role Of Autonomy	0	10	41	6	0	12	80	7	0.440
	Very Poor	Negative View	More Positive Perception	Excellent	Very Poor	Negative View	More Positive Perceptin	Excellent	
Role of Teaching	1	6	36	14	0	19	62	18	0.246
	Very Poor Quality	Need some Retraining	Moving in the right direction	Model Teachers	Very Poor Quality	Need some Retraining	Moving in the right direction	Model Teachers	
Social Support	1	16	28	12	4	32	54	9	0.183
	Non Existent	Not a Pleasant Place	More Social Support Available	A Good Supportive Environme nt	Non Existent	Not a Pleasant Place	More Social Support Available	A Good Supportive Environment	
Total Score	0	10	36	11	0	20	68	11	0.365
	Very poor	Plenty of Problem	More Positive	Excellent	Very poor	Plenty of Problem	More Positive	Excellent	

**Chi Sq Test*

Table-IV: Comparison of PHEEM Domains Regarding the Level of Residency

PHEEM Domain	Level of Residency																*p*-value
	1st Year n,Interpretation				2nd Year n,Interpretation				3rd Year n, Interpretation				4th Year n,Interpretation				
Role of Autonomy	0	5	15	1	0	8	39	6	0	3	26	2	0	6	41	4	0.741
	Very Poor	Negative View	More Positive Perception	Excellent	Very Poor	Negative View	More Positive Perception	Excellent	Very Poor	Negative View	More Positive Perception	Excellent	Very Poor	Negative View	More Positive Perception	Excellent	
Role of Teaching	1	1	15	4	0	7	39	7	0	5	16	10	0	12	28	11	0.067
	Very Poor Quality	Need some Retraining	Moving in the right direction	Model Teachers	Very Poor Quality	Need some Retraining	Moving in the right direction	Model Teachers	Very Poor Quality	Need some Retraining	Moving in the right direction	Model Teachers	Very Poor Quality	Need some Retraining	Moving in the right direction	Model Teachers	
Social Support	2	6	8	5	1	12	35	5	1	10	15	5	1	20	24	6	0.264
	Non Existent	Not a Pleasant Place	More Social Support Available	A Good Supportive Environment	Non Existent	Not a Pleasant Place	More Social Support Available	A Good Supportive Environment	Non Existent	Not a Pleasant Place	More Social Support Available	A Good Supportive Environment	Non Existent	Not a Pleasant Place	More Social Support Available	A Good Supportive Environment	
Total Score	0	3	15	3	0	11	37	5	0	6	19	6	0	10	33	8	0.904
	Very poor	Plenty of Problem	More Positive	Excellent	Very poor	Plenty of Problem	More Positive	Excellent	Very poor	Plenty of Problem	More Positive	Excellent	Very poor	Plenty of Problem	More Positive	Excellent	

**Chi Sq Test*

Hence, a healthy resident- supervisor relationship is essential in creating a learned environment.

In the social support domain, one of the item, namely "There are adequate catering facilities when I am on call" scored the lowest. This finding was not unique to this study but has been observed in various other studies[18,20].It is imperative to underscore the

importance of promoting sufficient catering services for doctors during on-call duties.

The results of the study related to the perception of male and female residents regarding hospital's educational environment do not show statistically significant difference. This was in correlation studies conducted by Bu Ali et al. and Manhendren[5,14].This shows that that gender appears to have negligible impact on student's perception regarding educational environment.

According to this study, third year residents seemed more satisfied with the hospital educational climate and first year students appeared less satisfied as compared to other year residents. Another study conducted by BuAli. also found the highest score among third year residents[5] .This observation could stem from various factors, such as familiarity with the hospital environment, increased experience, and a deeper understanding of the educational processes as residents progress through their training. It is important to ensure the quality of the post graduate programs in order to provide positive clinical learning environment and produce good clinical practitioners. Therefore, further studies in regards to the postgraduate educational environment in Pakistan can contribute in attaining valuable insights into strengths and areas of improvements.

CONCLUSION

The post-graduate learning environment of the dental teaching hospitals is satisfactory. The PHEEM inventory is not only a tool to evaluate the post graduate educational environment but it can also serve as a follow-up tool to enhance and upgrade the educational environment.

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Authors Contribution

Following authors have made substantial contributions to the manuscript as under:

ZR & SHZ: Data acquisition, data analysis, drafting the manuscript, critical review, approval of the final version to be published.

RA & AA: Study design, data interpretation, drafting the manuscript, critical review, approval of the final version to be published.

KS & MS: Conception, data acquisition, drafting the manuscript, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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