

COMPARISON OF FIRST YEAR MEDICAL UNDERGRADUATES' PERCEPTIONS REGARDING THEIR RESPECTIVE INSTITUTIONAL EDUCATIONAL ENVIRONMENT IN INTEGRATED VS TRADITIONAL MEDICAL CURRICULUM BY USING DREEM INVENTORY

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ABSTRACT

OBJECTIVE: To compare the first-year medical undergraduates' perceptions regarding their institutional educational environment in traditional and integrated medical curricula by using the Dundee Ready Educational Environment Measure (DREEM) inventory.

METHODS: This cross-sectional comparative study was conducted in 2017-18 at two medical institutions of Rawalpindi and Islamabad labeled as Institution A (with integrated curriculum) and B (with traditional curriculum). After seeking written informed consent, paper format DREEM questionnaire was administered to 100 first year MBBS students. Data was analyzed using SPSS version 24. Descriptive and inferential statistics were applied.

RESULTS: Mean global DREEM score for institution A was 131.09 ± 19.94 with minimum score of 87 and maximum score of 175. Mean global DREEM score for institution B was 117.11 ± 21.02 with minimum score of 65 and maximum score of 167. These scores reveal a "more positive" environment (scores of 101-150), with no statistically significant difference (p -value > 0.05) between them. DREEM subscales scores for both institutions indicated room for improvement at both institutions in all five domains.

CONCLUSION: We concluded that there were no statistically significant differences between first year medical students' perceptions of their respective institutional educational environment in integrated versus traditional medical curriculum by using DREEM. However, students in integrated medical curriculum perceived their educational environment more positively than their counterparts in traditional medical curriculum.

KEY WORDS: Educational environment (Non-MeSH); Students, Medical (MeSH); Traditional curriculum (Non-MeSH); Integrated curriculum (Non-MeSH); DREEM (Non-MeSH).

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INTRODUCTION

Educational environment plays substantial role in students' learning, motivation, behavior, self-esteem, academic achievement, successful future career choices and a sense of overall well-being.¹⁻² The learning environment is defined as "everything that happens within the classroom or teaching space, department, faculty, campus or university", which is essential in determining the success of

undergraduate medical education.³ Learners' perceptions of several connotations of the learning environment, such as the physical, virtual, intellectual or social, psychological or emotional etc., have profound impact upon their responses to learning processes.⁴ Genn highlights that while the educational environment seems rather intangible, unreal and insubstantial; but its effects are pervasive, real, substantial and influential.⁵ Even slightly changing the physical structure of a teaching and

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learning setting, a unique tactic to modify the educational environment, strongly influences learners' perceptions.⁶

Several instruments have been devised for measuring learning environment in medical institutions in the past few decades. These include Symptom Questionnaire (SQ), Learning Environment Questionnaire (LEQ), Medical School Learning Environment Survey (MSLES) etc., These instruments have their own strengths and weaknesses both about their design and psychometric properties.⁷ However, these turned out to be outdated for new millennium by not considering of third generation curriculum reforms as proposed by the Global Independent Commission on Education for Health Professionals for 21st century published in The Lancet report in December 2010 at Bangkok.⁸ A revival of interest been observed owes to the recent imperatives towards enhanced quality in health professions education.^{9,10} Dundee Ready Educational Environment Measure (DREEM) inventory claims to be a valid, reliable, generic, multidimensional tool for measuring educational environment with excellent psychometric properties, particularly at undergraduate level.¹¹⁻¹³ Besides, being the significant component of program appraisal, it provides a comprehensive account of strengths

TABLE I: MEAN GLOBAL DREEM SCORES AND SUBSCALES FOR INSTITUTIONS A AND B

#	Scores	Max. Score	Institution A			Institution B		
			Mean \pm SD	% of Max. score	Interpretation	Mean \pm SD	% of Max. score	Interpretation
1	Total DREEM	200	131.09 \pm 19.94	65.5	More positive than negative	117.11 \pm 21.02	58.5	More positive than negative
2	SPOL	48	32.67 \pm 6.11	68.06	A more positive perception	28.57 \pm 6.08	59.52	A more positive perception
3	SPOT	44	30.52 \pm 4.43	69.36	Moving in the right direction	25.59 \pm 5.45	58.16	Moving in the right direction
4	SASP	32	20.78 \pm 4.61	64.94	Feeling more on the positive side	19.84 \pm 4.02	62	Feeling more on the positive side
5	SPLA	48	31.62 \pm 5.84	65.87	A more positive atmosphere	27.73 \pm 6.39	57.77	A more positive atmosphere
6	SSSP	28	15.51 \pm 3.85	55.39	Not too bad	15.39 \pm 3.77	54.96	Not too bad

S.D. = Standard Deviation; SPOL = Students' perceptions of learning; SPOT = Students' perceptions of teachers; SASP = Students' academic self-perceptions; SPLA = Students' perceptions of learning atmosphere; SSSP = Students' social self-perceptions

and weaknesses of a curriculum. Measuring students' perceptions by using DREEM has been utilized as diagnostic inquiries allowing quality assurance evaluations to be made between programs as well as within different modules of a program.¹⁴

Most public sector medical schools in Pakistan have adopted traditional medical curriculum. Nevertheless, few institutions in private sector have implemented system-based integrated modular curriculum e.g., The Aga Khan University (AKU), Shifa Tameer-e-Millat University (STMU) and Riphah International University (RIU) etc. However, there is scarcity of comparative studies regarding undergraduates' perceptions of their institutional educational environment in traditional vs. integrated curriculum both locally and globally.¹⁵⁻¹⁶ The aim of the present study was to compare the first-year medical undergraduates' perceptions regarding their institutional academic environment in traditional vs. integrated medical curriculum by using the DREEM inventory at two institutions of Rawalpindi/ Islamabad located in the north of Pakistan. The results may be used 'diagnostically' to identify strengths and weaknesses of the respective institutions' educational environments as perceived by their respective students. By utilizing these results 'therapeutically', respective medical educationists along with policy makers may rationalize and optimize their priorities for necessary future interventions in terms of resources allocation and curricular reforms to maximize educational output. Besides, this data will serve as a baseline to help subsequent studies to perceive results

of the corrective strategies. Furthermore, it will supplement the academic research and scholastic literature in the field of medical education especially in the context of Pakistan.

METHODS

This cross-sectional comparative study was conducted in 2017-18 at two institutions of Rawalpindi and Islamabad i.e., one following integrated (Institution A) and the other following traditional (Institution B) medical curricula. Ethical approval was sought and received for the present study from Institutional Review Board (IRB) of both institutions (IRB reference # 679-125-2016). Written informed consent was obtained from all the participants of this study and their participation was voluntary.

"Power Analysis Formula" was used to calculate sample size.¹⁷ It was estimated that a minimum of "65 students" were needed for each of our two groups. Hundred first year MBBS students from each institution A and B were enrolled who have spent at least 6 months in these institutions and gave informed written consent. Persons who did not meet this inclusion criteria were excluded from our study. Institution with integrated curriculum i.e., institution A had an annual intake of 100 first year medical students. All the target population was enrolled in this study and there was no sampling technique applied in this case. Whereas the institution with traditional curriculum i.e., institution B had intake of around 300 first year medical students per year. Then, we selected target population of 100 participants by using the "lottery method" of simple random sampling. The DREEM inventory comprising of 50 closed-ended

questions was used to collect data.¹¹ Since, all participants were well versed and competent in English language, an Internationally validated English version of DREEM was applied to avoid any respondent's bias due to translation of instrument.¹³ Prior to data collection, a pilot study was conducted on subjects from a different year of study other than the population selected to assess the clarity and uniform interpretation of the questions. The pilot study sample was not included in the main study.

The 50 items of DREEM questionnaire have been distributed among five domains: students' perceptions of learning (SPOL), students' perceptions of teachers (SPOT), students' academic self-perceptions (SASP), students' perceptions of learning atmosphere (SPLA), and students' social self-perceptions (SSSP). Out of the 50 items, 41 were scored on a five-point Likert scale from 0 (strongly disagree) to 4 (strongly agree). The remaining 9 items (4, 8, 9, 17, 25, 35, 39, 48 and 50) were negative statements and were scored in reverse order for analyses i.e., invert scores. A score of 0 is the lowest and a very distressing. The maximum score is 200 representing greater satisfaction with one's educational environment. DREEM subcategories are considered more realistic to measure the overall motivation and learning attitude of students. Ranges provided by McAleer and Roff 18 were used as standard reference.

Data was gathered by guided self-administered questionnaire to all eligible participants towards the mid of their first year to maximize response rate. A minimum of an hour session slot was requested in first year timetable. A brief orientation was given to student,

TABLE II: THE INDEPENDENT SAMPLE t-TEST TO COMPARE GROUP STATISTICS BETWEEN INSTITUTIONS A AND B

Scores	Institution	N	Min.	Max.	X±S.D.	SEM	p-value*
SPOL	A	97	16	48	32.67±6.106	0.620	0.96
	B	97	12	44	28.57±6.076	0.617	
SPOT	A	97	20	41	30.52±4.433	0.450	0.12
	B	97	8	38	25.59±5.450	0.553	
SASP	A	97	9	31	20.78±4.608	0.468	0.17
	B	97	10	28	19.84±4.015	0.408	
SPLA	A	97	18	46	31.62±5.844	0.593	0.25
	B	97	13	44	27.73±6.389	0.649	
SSSP	A	97	2	23	15.51±3.486	0.391	0.59
	B	97	1	23	15.39±3.771	0.383	
Total DREEM	A	97	87	175	131.09±19.936	2.024	0.60
	B	97	65	167	117.11±21.025	2.135	

* Independent sample t-test; A = Institution with Integrated curriculum; B = Institution with Traditional curriculum; N = Number of respondents; Min. = Minimum; Max. = Maximum; X = Mean; SEM = Standard Error of Mean.

enlightening the purpose of the study, procedures involved and details regarding DREEM inventory. Furthermore, it was addressed that this data would be used for research, quality assurance and educational purposes. After seeking the written informed consent of enrolled participants, data was collected from the willing participants. It was emphasized that the identity of the participants would remain anonymous, and the data would not be able to be tracked back to the students. Researchers were present throughout the data collection process to answer any queries of respondents in case clarification required about statements or educational terms used in the questionnaire.

All the ethical principles pertaining to data protection were strictly followed throughout data collection process. Duly filled questionnaires were handled and stored in accordance with the tenets of the Helsinki Declaration. All questionnaires were manually checked and edited for completeness. The data collected was plotted in Microsoft Excel Spreadsheets in a password protected computer for statistical analysis. All data kept electronically was accessible to the principal investigator and co-investigators only, who were responsible for ensuring its confidentiality and privacy.

Prior to data analysis, normality of distribution was confirmed. The data was regrouped according to the five domains, as questions about perception were in different locations in the original questionnaire. Data analysis was carried out using both Microsoft Office Excel 2010 (Microsoft Co., Redmond, WA, USA) and SPSS version 24 (SPSS Inc.,

Chicago, IL, USA) for Windows. Descriptive statistics were employed. Summary statistics yielded mean total DREEM score for 50-items and mean scores for each of its five subscales (SPOL, SPOT, SASP, SPLA, and SSSP) for both institutions. Using inferential statistics, independent samples, t-test was applied to compare group means for institutions A and B. Results were statistically significant at a p-value < 0.05.

RESULTS

Out of 100 participants from institution A, 98 were present in data collection session and gave their consent. From institution B, 100 students participated in the study. Incomplete questionnaires led to the drop out of four students in total; three from institution B (out of 100 participants) and one from institution A (out of 98 participants); indicating total response of 97 participants each from Institution A and B (97% response rate).

Mean global DREEM score for institution A was 131.09±19.94 (range 87-175) and for institution B was 117.11±21.02 (range 65-167). These scores reveal a "more positive" environment (scores of 101-150) [Table I]. SPOL scores for institutions A and B were 32.67±6.11 (range 16-48) and 28.57±6.08 (range 12-44) respectively. Use of score descriptors for the subscale scores for the DREEM revealed that students' perception of learning (SPOL) was a "more positive perception" (scores of 25-36). SPOT scores for institutions A and B were 30.52±4.43 (range 20-41) and 25.59±5.45 (range 8-38) respectively, indicating "moving in the right direction" (scores of 23-33). SASP

scores for institutions A and B were 20.78±4.61 (range 9-31) and 19.84±4.02 (range 10-28) respectively. It revealed that SASP were "feeling more on the positive side" (scores of 17-24). SPLA scores for institutions A and B were 31.62±5.84 (range 18-46) and 27.73±6.39 (range 13-44) respectively, which disclosed "more positive atmosphere" (scores of 25-36). SSSP scores for institutions A and B were 15.51±3.85 (range 2-23) and 15.39±3.77 (range 1-23) respectively, meaning "not too bad" (scores of 15-21).

Independent sample t-test was applied to compare institution A and institution B. There was no statistically significant difference (p > 0.05) in mean global DREEM score and its entire five subscales between the two institutions (Table II).

DISCUSSION

Learning environment is an aggregate of the internal and external conditions surrounding and affecting learning process.⁵⁻⁶ Besides ambience and up-to-date technology, it includes educational organization's culture, vision and mission, curriculum design, instructional strategies, instructors' behavior, the social, emotional and academic environment, and psychological support system available to students during anxiety and stress etc..⁷ The main objective of the present study was to compare the first year MBBS student's perceptions regarding their institutional learning environment in an integrated versus traditional medical curriculum by using a valid and reliable quantitative survey tool the DREEM.

Response rate (97%) and volunteerism

among participants is commendable in our study comparing with previous studies using DREEM ranged from 45% to 100%.^{10-15,19-22} High response rate and adequate sample size reported in current study, despite the freedom of choice to evade, was an indication of learners' confidence and trust upon the survey techniques. Brief introduction given to students regarding the aim of this study might have encouraged them and led them to think that the results of such study would proceed to significant changes in their learning. Above and beyond, it might be a sign of the learners' desire to share their opinions about learning environment to bring positive change. Most of the students had responded to all the items verifying that DREEM favorable, user friendly and relevant. Besides, sufficient time required to fill the survey forms indicated that the DREEM inventory was practical to use in Pakistan.

Total DREEM scores for institutions A and B were 131.09/200 (65.54%) and 117.11/200 (58.55%) respectively. DREEM global mean scores for both institutions were optimistic demonstrating more positive aspects than negative about education environment as per the interpretation suggested in the literature.¹⁸ Although, there is no objective consensus on the adequate or standard DREEM questionnaire scores from available literature. Yet, a range of DREEM scores (90/200-140/200 ~ 45.0-70.0%) have been reported from studies on medical undergraduates.⁹ Our learners' perspectives compared satisfactorily with studies conducted internationally. Such positive outcome was encountered by other scholars as well who used DREEM questionnaire for undergraduate students in various countries including Nigeria, Pakistan, KSA, UK, Malaysia, Germany, Greece, Iran, Ireland, Australia, New Zealand, India and Sri Lanka.^{9,16,19-23} Despite the differences in study settings (in terms of varying cohorts of participants from different study levels, curriculum, ethnic backgrounds, and multiple undergraduate and postgraduate courses related to health sciences), the mean scores ranged well within the range 101-150 as ours which indicated a "more positive than negative"

perception of environment at both institutions A and B.

Results of inferential statistics revealed no statistically significant difference (p -value > 0.05) between first year medical students' perceptions of their respective institutional educational environment in integrated versus traditional medical curriculum by using the DREEM. Although, there is no statistically significant difference in the mean total DREEM scores; yet this study validates that student in integrated medical curriculum perceived their educational environment more positively (131/200) than their counterparts in traditional medical curriculum (117/200). The better mean global DREEM scores for institution A with integrated curriculum as compared to their counterparts in institution B reflected student's satisfaction with student-centered curriculum. It has also been perceived that learner in innovative curricula tend to show more contentment with their learning environments, compared to students of the traditional curriculum.⁴ Higher DREEM scores highlighted the significance of modern student-centered curriculum and its progressive effects on student's perception of learning environment. Many studies had a higher mean global DREEM score than the institution A in the present study which may reflect that these institutions were equally progressive in terms of providing a student-centered approach to education.²³ However, much effort is needed to achieve the standards of education as set by Roff S, et al.¹² Furthermore, it has been suggested that medical and dental schools offering traditional curricula generally tend to report lower total DREEM scores (usually score < 120).¹³ The results of our study have supported this notion.

The mean scores for all the five DREEM subscales revealed positive perception ($>50\%$) by the students at both institutions. It was specified that most participants settled to a "more positive perception" regarding their perception of learning (SPOL), "moving in the right direction" for perception of teachers (SPOT), feeling "more on the positive side" for their academic self-perception (SASP), feeling "more on the positive side" for the perception of atmosphere

(SPLA), and reported "not too bad" for the social self-perceptions (SSSP). In a nutshell, the subscale scores for both institutions were placed in the second tier, a phase below the perfect one. These results matched with the findings published in previous studies from various other institutions.^{9,24} There was no statistically significant difference ($p > 0.05$) in DREEM five subscales between institution A and institution B. However, institution A had better DREEM subscales scores as compared to their counterparts in traditional medical curriculum (table II).

The highest scoring contributory subscales for institution A was SPOT with 69.36% as compared to institution B with 58.16% (table I). It has suggested that teachers at institution A were highly qualified and well trained in terms of their interactions with both students and patients. Students' perceptions of faculty have a direct and lasting psychological effect on the students and the learning environment. It is described as the chief determinant of the success of a curriculum.⁵⁻⁶ Since, teachers are considered "role models" for the students. Their attitudes can ultimately affect their learners. Consequently, teachers must participate frequently in continuing medical education (CME) activities of faculty development and training. Highest scores in this domain are contrary to the findings of Al-Hazimi A, et al. who reported lowest scores for SPOT.¹⁹ However, our findings correspond with the results of Rehman et al. who reported SPOT as the best cataloged domain.¹⁵ The highest scoring (62%) contributory domain for institution B was SASP (table I). Nevertheless, institution A had revealed better scores for this domain (64.94%). Academic self-perception of students' is defined as learners' self-concepts in terms of perceptions formed through experience with and interpretations of one's environment.²⁵

The lowest scoring contributory subscales for both institutions A and B was student's social self-perceptions (SSSP) with scores of 55.39% and 54.96% respectively (table I), which could be attributed to stress, boredom, and the exhaustion. Although, students reported to have good friends; but they

did not have a good social life. Again, the hectic timetables leave no time to socialize in at the campus. It is a point of concern both for administration and faculty. These findings were attributed to either the lack of student support system or an overloaded curriculum. A similar observation was reported among medical students in Pakistan²⁶ and worldwide.¹⁶ Since, students are among the principal stakeholders; hence their concerns must be addressed. In this regard, both institutions need to support the students and create enabling environment that endorses healthy social communication and co-curricular/leisure activities.

The substantial strength of our cross-sectional comparative study included adequate sample size and high response rate at both institutions. It indicated good co-operation of students in terms of their time and feedback comments. Besides, the DREEM questionnaire was used in its original form and language (i.e., in English) with unswerving high reliability.

The major limitation of this study was that it presented perceptions of only first year MBBS students. Their views were indiscriminate if we would have considered all medical students of these two institutions. Besides, data collection was limited to merely two medical institutions in the region of Rawalpindi/Islamabad, which cannot be generalized to all institutions of Pakistan since each institution has its own unique learning environment.

However, it is suggested to conduct the similar studies on a larger scale covering as many aspects as possible such as perceptions of teachers/staff and parents, association with academic achievements and levels of learners' stress, etc.

CONCLUSION

The present study revealed that first year medical students of both institutions perceived their educational environment positively. Although, there was no statistical difference reported; nevertheless, the perceptions of participants at institution A with integrated medical curriculum were somewhat better than their counterparts at institution B with

traditional medical curriculum. This study also revealed areas of improvement in educational environment for both institutions, which would enable the respective stakeholders to adopt remedial measures accordingly. Since, the educational environment affects learners' motivation and achievement, it is imperative to document first year medical student's views vis-à-vis their educational environment.

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AUTHOR'S CONTRIBUTION

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

TZ: Conception and study design, acquisition of data, drafting the manuscript, critical review, approval of final version to be published

MIK: Acquisition of data, analysis and interpretation of data, drafting the manuscript, approval of final version to be published

MU: Acquisition of data, drafting the manuscript, approval of final version to be published

HeZ: Acquisition, analysis and interpretation of data, critical review, approval of 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.

CONFLICT OF INTEREST

Authors declared no conflict of interest

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The data that support the findings of this study are available from the corresponding author upon reasonable request.



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