Evaluation of Clinical Educational Environment at King Fahad Hospital of Dammam University Using the Postgraduate Hospital Education Environment Measure (PHEEM) Inventory

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Abstract

Background: Good educational environment has been shown to have a positive influence on learning outcome. Unpleasant educational environment that fosters low quality teaching, humiliation and weak clinical supervision is expected to hinder teaching and learning process. During bedside teaching, the environment of education is determined by numerous factors.   The administration of the Postgraduate Hospital Education Environment Measure (PHEEM) questionnaire helps to identify weaknesses and strengths of the clinical educational environment for the purpose of remediating weak areas and enhancing the strong aspects.

Objectives: To evaluate the educational environment of the King Fahad Hospital, Dammam University as perceived by medical residents in the three domains of PHEEM which are the perceptions of role autonomy, perceptions of teaching and perceptions of social support. To investigate the associations perception of educational environment with gender and stages of the residency program (R1-R4).

Methods: This study used English version of the Postgraduate Hospital Educational Environment Measure (PHEEM) to measure the educational environment for all medical residents (N=226) at the King Fahad Hospital of Dammam University, Kingdome of Saudi Arabia. Identity of participants was kept anonymous to the researchers.

Results: Approximately 137 (60.61%) residents filled the questionnaire. The residents perceived the overall educational environment as more positive than negative but with room for improvement (82.64/160). They perceived the role of autonomy as good and have more positive perception of one's job (29.38/56). The residents' perception of teaching showed that teachers are in need for some retraining (32.34/60). There was a statistical significant difference (p < 0.001) in the perception of the environment as regarded by female and male. Male residents rated the environment as more positive than negative with potentials for improvement as indicated by an overall mean score of 88.7/160. Female residents' perception indicated a plenty of problems (mean value of 77.14/160). There is no different perception of education environment between stages of the residency program.

Conclusion: The medical residents of the King Fahad Hospital of Dammam University considered their educational environment as more positive than negative with potential aspects for improvement. Perception of educational environment are associated with gender but not with stages of the residency program.

Keywords*: Educational environment, Hospital, Postgraduate, Residents, PHEEM

Introduction

Currently, there are 20 medical schools in the Kingdome of Saudi Arabia, where medical education is provided for free for Saudi nationals. Medical students must pass an entrance examination and complete one-year pre-medical courses of basic medical sciences such as: Biology, Chemistry, Physics, Biostatistics, and English language. After the pre-medical phase, students involve into five years of professional study in addition to one year of clerkship training. After successful completion of the program, MBBS (Bachelor of Medicine, Bachelor of Surgery) degree is awarded. Graduate doctors who pass the Saudi Commission for Health Specialties (SCFHS) required test (1) usually enroll in a residency program that involves three (basic) to seven years of training according to the chosen specialty. Completing the residency program qualifies the trainee to receive certification as a specialist.

The educational environment has been linked for many years to students' achievement, satisfaction and success. Therefore, understanding climate of any educational program is fundamental to managing curriculum development and change (2). A good clinical teaching environment ensures relevancy of teaching and learning, active participation of learners, and promotion of good attitudes and behavior at the bedside. Good planning of clinical teaching, both for structure and content, is very essential to create positive and dynamic educational environment. If it is not well planned, bedside teaching can be a source of many mistakes. These include lack of clear objectives; focus on factual learning as opposed to problem-solving skills, teaching at the wrong level, and passive observation (3).

Many researchers investigated components of effective learning environment and developed special questionnaires to assess environment of different educational settings. For example, the 50-item Dundee Ready Education Environment Measure (DREEM) was developed by Roff et al. (4) to evaluate academic environment in undergraduate health related programs. Several studies using the DREEM have been conducted. DREEM questionnaire was translated into different languages and used in many countries including the Gulf States, Nepal, Nigeria, India, Thailand, China, and Canada, the United Kingdom and Saudi Arabia (4). The Postgraduate Hospital Educational Environment Measure (PHEEM) is a 40-item questionnaire that was developed by Roff S. et al. to evaluate various aspects of learning environment in hospital settings for postgraduate medical students (5). The PHEEM measures three domains of the clinical learning environment: perceptions of autonomy; perceptions of teaching; and perceptions of social support. It can be used as a diagnostic tool of the clinical learning environment. To our knowledge, it has not been used to assess residency program in any of the Saudi Arabian University hospitals.

valuate and assess educational environment of King Fahad Hospital, Dammam University using the PHEEM inventory. It evaluated the educational environment in three domains which are the perceptions of role autonomy, perceptions of teaching, and perceptions of social support. This study also attempted to investigate associations between perception of educational environment with gender and stages of the residency program (R1, R2, R3, R4). Resident's perceptions of learning environment should provide information on the effectiveness of teaching and learning

environment as well as the strengths and weaknesses of the residency program.

Methodology

The English version of PHEEM instrument was used to assess the educational environment of the residency program. The study period was 9 months (April to December 2010). The study obtained ethical approval from the Ethical Committee of Dammam University in June 2010.

PHEEM is a self-administered 40 statements inventory with which the respondents were asked to indicate their agreement using a 5 point Likert scale. These range from strongly agree (4), agree (3), unsure (2), disagree (1) to strongly disagree (0). Agreement with the items indicates a 'good' environment giving high scores. The four negative statements (questions 7, 8, 11, and 13) were scored in reverse so that the higher the score the more negative the environment. Information on gender, residency year R1, R2, R3, R4 and specialty were also included as part of the questionnaire.

Questionnaires were distributed mainly through the chief resident of each residency program at the King Fahad University Hospital where he\she handed the questionnaires during morning reports or whenever he\she thought it is appropriate time. The PHEEM questionnaire was distributed to all residents in King Fahad Hospital of Dammam University (N=226). About 137 residents responded to the questionnaire. The participation in the study was entirely voluntary and anonymous. Scores for each item and domain were calculated and entered into a spreadsheet. Raw scores were coded and calculated with relative easiness.

The data were analyzed using PAST statistical package (9). Descriptive statistics were reported as median, mean and standard deviation. The comparative statistics used the nonparametric methods of Mann–Whitney U for two independent samples between females and males and Kruskal-Wallis for multiple independent samples (10) to measure the statistical significant between different residency programs R1 (first year in residency training) through R4 (fourth year in residency training). Global mean scores, for individual respondents, were calculated with missing values scored as 2 (the midpoint on this 0–4 scale).

Results

Out of 226, 137 trainees (60.61%) completed the questionnaire. Number of residents in each program varied from 2–45 trainees (table 1). There were 24 (32.12%), 27 (19.71%), 32 (23.36%), and 2 (1.4%) participated from R1, R2, R3 and R5. Number of years spent at each stage ranged from 0 to 2 years.

Out of possible 5480 responses to the 40 statements, there were only 42 (0.77%) missing values suggesting that the questionnaire was easy to understand and time spent to fill it out was appropriate. Mean, median, and standard deviation for the three domains and for the overall measure were summarized in table 2. Mean scores for each item of the overall inventory was calculated as shown in table 3. There were no statements which were highly rated (mean value > 3), and 19 statements were poorly rated (mean value 2 or less).

For the three domains, male trainees ranked the environment significantly higher than the female trainees (Table 4). There were

statistical significant gender differences in all total scores ($p < 0.05$) (Table 5).

There was no statistically significant difference in perception scores of education environment between stages of the residency program as perceived by the trainees ($p > 0.05$) (table 6). However, the order of ranking was as follows: R1, R2, R3 and R4 for all PHEEM total scores except for the role of autonomy where the order of ranking was R1, R2, R4, and R3. Resident trainees in the first year perceived the environment better in the three areas of educational environment.

Discussion

This study used PHEEM as a tool to evaluate educational environment for the postgraduate residency programs. The documented differences between male and female residents in perceiving educational environment can be attributed to many factors. Oftentimes, our societal culture creates disparity at workplace between male and female. This may have an influence on how both genders perceive the environment of work.

PHEEM instrument designed to evaluated the educational environment in three domains which are the perceptions of role autonomy, perceptions of teaching, and perceptions of social support. In one study, psychometrical testing of PHEEM instrument indicated that it is a one-dimensional and does not measure three domains (6). However; further psychometric testing suggested that PHEEM instrument is multi-dimensional and does measure all three domains (7, 8). PHEEM has been used successfully in several countries including England, Australia, Scotland, Chile, Japan, Denmark, Brazil, and Sri Lanka (12-14).

One PHEEM study assessed the educational environment of the residents in different intensive care units (12) whereas another study compare between three residency programs in one hospital (13) one study measured PHEEM results for the hospitals' medical interns (14) while the our study assessed the educational environment among all of the residents at King Fahad Hospital of Dammam University .

In this study, stage of the program did not seem to have an effect on how trainees assess their educational environment. We speculate that type of participants used in this study (graduate students) may explain the findings that their perceptions of learning environment did not differ significantly as they progress in their residency program. However, there was a trend towards a decline in their perceptions of the educational environment as they move from R1 to R4. One PHEEM study done in UK showed that the junior trainees (house officers and senior house officers) perceived their environment to be significantly better than did the senior trainees (12) which is similar to our study findings.

One of the advantages of PHEEM is that it allows program administrators to highlight weakness and strengths of the program. In this study, it was found that level of trainees supervision, long working hours, unavailability of clinical protocols, inefficient use of training time, lack of constructive feedback, and presence of blaming-culture were major issues for trainees. These issues and others with a mean score of less than 2 are potential caveats in the training program that in need of immediate remedial action. For a training program to succeed, many requirements have to be met. Training programs should be designed according to the best educational standards that ensure

trainees and stakeholder's satisfactions. PHEEM is a good tool to assess such satisfaction.

Some strong aspects of the residency program were evident in this study. Trainees indicated that they have good collaboration with colleagues, appropriate level of responsibility, and they were given sufficient time to practice actively in the educational events.

This study has some limitations. Difficulty in communication with residents may have reduced number of participants in this study. However, the response rate was relatively good (60.61%) and sufficient enough to generalize our conclusions.

Conclusion and Recommendations

This study used PHEEM as a method to evaluate postgraduate educational environment for Medical residents at King Fahad Hospital of Dammam University. The residents considered their educational environment as more positive than negative with potential aspects for improvement. Female trainees perceived the educational environment better than male trainees. Both genders' perceptions of the educational environment did no changes significantly among different stages of the program.

Based on our results, we recommend that the level of supervision for the junior doctor to be evaluated for possible changes towards better intensity and quality of supervision. Accommodation in this residency program is another potential area for improvement (mean value <2). After remedial interventions, we recommend to use PHEEM in a regular base (e.g. every year) to assess

and follow up on effectiveness of the corrective measures.

Reference

1. Saudi Commission for Health specialties (SCFHS) http://english.scfhs.org.sa/, Date of access: 26/01/2010

2. Genn JM. AMEE Medical Education Guide No. 23 (Part 1): Curriculum, environment, climate, quality and change in medical education –-unifying perspective. Med Teach. 2001; 23: 337-344. http://dx.doi.org/10.1080/01421590120063330

3. Spencer J. Learning and teaching in the clinical environment. Br Med J. 2003; 326: 591-594.
http://dx.doi.org/10.1136/bmj.326.7389.591

4. Roff S, McAleer S, Harden RM, Al-Qahtani M, Ahmed AU, Deza H, et al. Development and validation of the Dundee Ready Education Environment Measure (DREEM). Med Teach. 1997; 19: 295-99.http://dx.doi.org/10.3109/01421599709034208

5. Roff S, McAleer S, Skinner A. Development and validation of an instrument to measure

the Postgraduate clinical learning and teaching educational environment for hospital-based junior doctors in the UK. Med Teach. 2005; 27 (4); 326-331. http://dx.doi.org/10.1080/014215905001508 74

6. Boor K, Scheele F, van der Vleuten CPM, Scherpbier AJJA, Teunissen PW, Sijtsma K. Psychometric properties of an instrument to measure the clinical learning environment. Med Educ. 2007; 41: 92-99. http://dx.doi.org/10.1111/j.1365-2929.2006.02651.x

7. Wall D, Clapham M, Riquelme A, Vieira J, Cartmill R, Aspergren K, Roff S. Is PHEEM a multi-dimensional instrument? An international perspective. Med Teach. 2009; 31; e521-e527

8. Riquelme A, Herrera C, Aranis C, Oporto J, Padilla O. Psychometric analyses and internal consistency of the PHEEM questionnaire to measure the clinical learning environment in the clerkship of a Medical School in Chile. Medical Teach. 2009; 31 (6): e221-e225

9. Hammer, Harper DAT, Ryan PD. 2001. PAST: Paleontological Statistics Software Package for Education and Data Analysis. Palaeontologia Electronica. 2001; 4(1): 9.

10. Jamieson S. Likert scales: how to use them. Med Edu. 2004; 38: 1217–1218 http://dx.doi.org/10.1111/j.1365-2929.2004.02012.x

11. Chambers R, Wall DW. Teaching Made Easy: A Manual for Health Professionals. Abingdon: Radcliffe Medical Press Ltd, 2000.

12. Clapham M, Wall D, Batchelor A. Educational environment in intensive care medicine—use of Postgraduate Hospital Educational Environment Measure (PHEEM) Med Teach. 2007; 29: e184–e191 http://dx.doi.org/10.1080/014215907012885 80

13. Vieira JE. The postgraduate hospital educational environment measure (PHEEM) questionnaire identifies quality of instruction as a key factor predicting academic achievement, CLINICS 2008; 63(6): 741-746

14. Gooneratne IK, Mnasinghe SR, Siriwardena C, Olupeliyawa AM, Karunathilake. Assessment of Psychometric Properties of a Modified PHEEM Questionnaire. Ann Acad Med Singapore. 2008; 37: 993-997

Table 1: The Response Rate of the participants according to department

Specialty	Participant (n)	Total (N)	Response rate (%)
Pediatrics	13	18	72
Psychiatry	17	20	85
Neurosurgery	2	3	66
General Surgery	9	10	90
Radiology	10	17	58
Dermatology	5	5	100
ENT	3	3	100
Anesthesia	2	2	100
Orthopaedic	6	8	75
Ophthalmology	14	28	50
Obstetric	5	13	38
Emergency Room	2	10	20
Medicine	26	41	63
Family medicine	24	45	53
Urology	2	3	66
Total	137	226	61

Table 2: Overall mean and subscales score of the PHEEM

Domain (maximum total score)	Mean	Median	Std. error
Overall impression (160)	82.63	81	1.79
Perceptions of Role Autonomy (56)*	29.37	30	0.65
Perceptions of teaching (60)**	32.33	32	0.81
Perceptions of social support (44)***	20.91	21	0.47

* Sum of question 1, 4, 5, 8, 9, 11, 14, 17, 18, 29, 30, 32, 34, and 40.
** Sum of question 2, 3, 6, 10, 12, 15, 21, 22, 23, 27, 28, 31, 33, 37, and 39.
*** Sum of question 7, 13, 16, 19, 20, 24, 25, 26, 35, 36, and 38.

Table 3: Summary results of PHEEM questionnaire (# – questions with reverse scoring) by mean

Question	Mean
Q1 I have a contract of employment that provides information about hours of work	1.70
Q2 My clinical teachers set clear expectations	2.32
Q3 I have protected educational time in this post	1.88
Q4 I had an informative induction programme	2.15
Q5 I have the appropriate level of responsibility in this post	2.42
Q6 I have good clinical supervision at all time	2.58
Q7 There is racism in this post #	1.95
Q8 I have to perform inappropriate tasks #	2.07
Q9 There is an informative Junior Doctors handbook	1.81
Q10 My clinical teachers have good communication skills	2.00
Q11 I am bleeped inappropriately#	2.26
Q12 I am able to participate actively in educational events	2.69
Q13 There is sex discrimination in this post#	1.96
Q14 There are clear clinical protocols in this post	1.59
Q15 My clinical teachers are enthusiastic	1.80
Q16 I have good collaboration with other doctors in my Grade	2.98
Q17 My hours conform to the new deal	1.93
Q18 I have the opportunity to provide continuity of care	1.58
Q19 I have suitable access to careers advice	2.12
Q20 This hospital has good quality accommodation for junior doctors, especially when on call	1.54
Q21 There is access to an educational programme relevant to my needs	1.35
Q22 I get regularly feedback from seniors	2.15
Q23 My clinical teachers are well organized	2.28
Q24 I feel physically safe within the hospital environment	1.73
Q25 There is a no-blame culture in this post	1.46
Q26 There adequate catering facilities when I am on call	2.54
Q27 I have enough clinical learning opportunities for my needs	2.80
Q28 My clinical teachers have good teaching skills	2.27
Q29 I feel part of a team working here	2.04
Q30 I have opportunities to acquire the appropriate practical procedures for my grade	1.86
Q31 My clinical teachers are accessible	1.92
Q32 My workload in this job is fine	1.88
Q33 Senior staff utilize learning opportunities effectively	1.65
Q34 The training in this post makes me feel ready to be a SpR/Consultant	2.38
Q35 My clinical teachers have good mentoring skills	2.11
Q36 I get a lot of enjoyment out of my present job	2.40
Q37 My clinical teachers encourage me to be an independent learner	2.09
Q38 There are good counseling opportunities for junior doctors who fail to complete their training satisfactorily	2.59
Q39 The clinical teachers provide me with good feedback on my strengthens and weaknesses	1.80
Q40 My clinical teachers promote an atmosphere of mutual respect	2.01

Table 4: Mean values of the different dimensions

Category		Overall Impression	Perceptions of Role Autonomy	Perceptions of teaching	Perceptions of social support
gender	Male	88.72	31.69	34.82	22.22
	Female	77.14	27.29	30.09	19.75
R1		87.77	30.52	34.79	22.45
R2		82.33	28.89	32.52	20.93
R3		80.63	28.72	31.75	20.16
R4		78.25	28.88	29.59	19.78

Table5: Summary of comparisons of different dimensions among males and females

Domain	p value*
Overall Impression	0.001
Perceptions of Role Autonomy	0.001
Perceptions of teaching	0.002
Perceptions of social support	0.015

*Mann-Whitney test, $p < 0.05$ considered as significant different

Table 6: Summary of comparisons of different dimensions among the different stages (R1 to R4)

Dimension	p value*
Overall Impression	0.143
Perceptions of Role Autonomy	0.682
Perceptions of teaching	0.075
Perceptions of social support	0.158

*Kruskal-Wallis test, $p < 0.05$ considered as significant different.

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