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EVALUATION OF POSTGRADUATE HOSPITAL EDUCATION ENVIROMENT MEASURE AMONG TRAINEE IN MILITARY HOSPITALS IN TAIF, SAUDI ARABIA

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ABSTRACT

Background: The learning environment during residency program can affect the quality of trained doctors and their future career. In this study we aim to assess the learning environment of residents in military hospitals of Taif city, in order to help training programs, recognize defective aspects that can be targeted by further improvement; and highlight strong aspects of the program that need to be enhanced further. **Objective:** The aim of this study was to assess hospital educational environment for learning purposes in military hospitals of Taif city. **Methods:** This cross-sectional study involved all residents receiving training in military hospitals of Taif city, Saudi Arabia. To assess the learning environment, residents were asked to respond to a questionnaire that was based on the Postgraduate Hospital Educational Environment Measure (PHEEM), which measures perceptions of autonomy, teaching, and social support. **Results:** 191 residents responded to the questionnaire. The PHEEM items had a high level of internal consistency among our study sample (Cronbach's alpha was 0.914). Analysis of the frequencies of responses to each item in the PHEEM questionnaire and their mean values in this study showed that the most problematic aspects of the residency program - as perceived by the respondents - included being paged inappropriately, sex discrimination, presence of adequate catering facilities and good quality accommodation for doctors when on call, as well as access to relevant educational programs. Interpretation of the overall score and its subscales showed that most respondents perceived that there are more positive points than the negative with a room for improvement. Their perception of teaching was more favorable than the other two subscales; as 53.4% viewed teaching as moving in the right direction and 32.1% viewed their trainers as model teachers. Univariate analysis showed that sex, stage of

residency, and specialty affect the scores. The highest median scores were obtained from men, fifth year residents, and those from internal medicine and pediatrics; while urology had the lowest median scores. **Conclusion:** Most residents perceived their learning environment as favorable. Some points of weakness were highlighted. We recommend reform measures that target the weak points in the residency program and enhance the strong aspects. Recommended measures include establishing well-defined job descriptions to minimize exploitation; improving catering facilities; and avoiding sex discrimination.

KEYWORDS: Learning environment; medical education; residency; medical training; evaluation.

INTRODUCTION

The educational environment is the atmosphere in which the learning process takes place. It is an important measure in medical education and plays a critical role in an institution's educational effectiveness (Diwadkar and Jelovsek, 2010). The educational environment is composed of three elements: the physical environment that includes comfort measures, food, and accommodations; the emotional climate that includes security and positive supportive methods and feedback; and the intellectual climate that includes evidence-based and reflective practices, active participation, motivation and planned education (Clapham et al., 2007; Mohanna, 2011).

The educational environment is in need of continuous assessment and evaluation, which represents a critical tool for quality assurance and enhancement, as well as for curriculum development. In addition, it provides important data for change and policy reform, and it offers an insight for both learners and educators about the nature of the learning experience (Khoja, 2015; Roff and McAleer, 2001). Because of its critical role in curriculum development and educational efficiency, good planning for and evaluation of the educational environment is of utmost importance, and it should always be incorporated in any educational activity (Maudsley, 2001).

A curriculum is a broad, comprehensive expression, which includes parts other than the formal intended curriculum, the hidden and informal curricula. They are usually exposed during different educational activities and evaluation of the educational environment, and it is always essential to assure that these work synergistically with the specified goals of the formal curriculum (Hafferty, 1998; Hundert et al., 1996).

Based on the best evidence from medical education and professional medical training, it was found that the quality of the educational environment has a great impact on the learning behavior and learning outcomes, and hence the future professional development. Therefore, preserving a positive educational environment assures a high quality learning in which learners and trainee are satisfied with their achievements and success (Genn, 2001; Harden, 2001; Roff et al., 2001). The quality of the educational experience and environment is of extreme importance for any residency training program. Therefore, many professional training programs are incorporating assessment of the educational environment and the trainees' perceptions of their training experience as essential measures of the program evaluation to identify areas requiring attention and as a prerequisite for quality assurance and accreditation (Roff et al., 1997; Roff et al., 2001; Roff, 2005; Roff et al., 2005).

The Postgraduate Hospital Educational Environment Measure (PHEEM) is a worthy tool that has been used to assess the educational environment and to identify strengths and weaknesses of different medical residency programs (Al-Marshad and Alotaibi, 2011; Vieira, 2008; Wall et al., 2009). Hence, the aim of this study was using PHEEM as a tool to assess hospital educational environment of the postgraduate residency program and factors influencing their perception of this environment in military hospitals of Taif city, Saudi Arabia.

METHODS

Ethical considerations

The study got an ethical approval from the Institutional Review Board of Prince Mansour Military Hospital, Taif, Saudi Arabia. Subjects who agreed to fill the questionnaire implied that they agreed to participate in the study. Confidentiality of the collected data and participant's privacy were assured, and the data were used only for research purpose.

Study design

A cross-sectional study design was adopted.

Participant's eligibility criteria

The target population of this study was residents of all specialties of Saudi board programs of military hospitals in Taif (Alhada Armed Forces Hospital and Prince Mansour Military Hospital) for all training years. Individuals with incomplete data and those refusing to participate were excluded from the study.

Sample size and sampling technique

All residents of all specialties of Saudi board programs of military hospitals in Taif were invited to participate in this study (n=219). A copy of the questionnaire and the instructions were distributed by hand to encourage their participation.

Setting and dates

The study was conducted in military hospitals in Taif governorate, which is located in the western region of Saudi Arabia, at a height of 2600 meters above sea level.

Data collection was done during the period from …… to ……..

Data collection instrument

With the purpose of reducing information bias, we measured our primary outcome, the learning environment of pediatric residents, using a validated and pretested questionnaire. The "Postgraduate Hospital Educational Environment Measure" (PHEEM) score is composed of 40 items grouped into 3 categories. Each category aims to measure the perception of a specific component of the educational environment, namely, perception of autonomy, perception of teaching, and perception of social support. It was calculated by making the summation of the 40 questions. The maximum score is 160. Respondents were asked to show their agreement using 5-point Likert scale. These range from strongly agree (4), agree (3), uncertain (2), disagree (1) to strongly disagree (0). However, items (Nos. 7, 8, 11, 13) are negative and have been reversed for scoring. Items that have a mean score of 3.5 or over are real positive points. Any item with a mean of 2 or less should be examined more closely as they indicate problem areas. Items with a mean between 2 and 3 are aspects of the climate that could be enhanced.

The following is a guide for interpreting the overall score:

0 – 40: very poor educational environment

41 – 80: plenty of problems

81 – 120: more positive than negative with room for improvement

121 – 160: excellent educational environment

Data entry and statistical analysis

Data were collected and verified. Variables were coded and entered to Statistical Package for Social Sciences (SPSS) software version 22. The reliability of the PHEEM score items was assessed by estimating Cronbach's alpha. Numerical variables (the score) were expressed as

means ± standard deviation, median and interquartile range (25th - 75th percentile). Differences between the groups were compared using Mann-Whitney test (if two groups) or Kruskal-Wallis test (if more than two groups). Categorical variables (including sex, residency year, and specialty) were summarized as frequencies and percentages and association between variables was tested using Pearson's Chi square or Fisher-Freeman-Halton Exact Tests as appropriate. A p-value of < 0.05 was considered statistically significant.

RESULTS

In this study, 191 residents responded to the questionnaire out of 219 residents (87.2%) who are included in the Saudi board program of the military hospital in Taif. Table 1 summarizes the characteristics of the respondents. Men slightly outnumbered women (55.4% vs 44.6%). The highest frequency of residents was in the first year (R1, 32.1%), followed by the second year (R2, 27.5%), then third (R3, 21.2%), fourth (R4, 13.5%), and the fifth (R5, 5.7%). Family medicine constituted the highest percentage of the respondents (29.5%), followed by pediatrics (18.7%), internal medicine (17.6%), and general surgery (11.4%).

Cronbach's alpha was 0.914 for the PHEEM questionnaire items, indicating a high level of internal consistency for the scale. For the subscales, role autonomy, teaching, and social support had Cronbach's alpha values of 0.772, 0.864, and 0.627 respectively - which are acceptable values. Table 2 shows the frequencies of responses to PHEEM questionnaire. A considerable proportion of the respondents agreed and strongly agreed that they are being paged inappropriately (28% and 23.8% respectively) and they perceived sex discrimination in this rotation (28.5% and 5.7% respectively). Table 3 demonstrates the summary statistics (median, IQR, mean, and standard deviation) for each item of the PHEEM questionnaire. None of the items achieved a mean score of 3.5 or over - which is an indicator of positive points. Most items had a mean between 2 and 3 - and thus represent aspects of the climate that could be enhanced. Items with a mean of 2 or less - which indicate problem areas that should be examined more closely - included being paged inappropriately, presence of adequate catering facilities and good quality accommodation for doctors when on call, as well as access to relevant educational programs.

Table 4 shows the interpretation of the overall score of PHEEM questionnaire and its three main components. The overall (total) score of most respondents (73.1%) indicated that there are more positive points than the negative with a room for improvement. The remaining respondents perceived their educational training programs either as excellent (14%), or

having plenty of problems (13%). As regards their perceptions of role autonomy, most respondents (76.2%) had a score that indicates a more positive perception of one's job. Also, the perception of most respondents (76.7%) of social support was the presence of more pros than cons. However, their perception of teaching was more favorable than the other two components; as 53.4% viewed teaching as moving in the right direction and 32.1% viewed their trainers as model teachers.

Table 5 compares the overall score of PHEEM questionnaire and its three components between respondents of either sex and between different residency years. Men respondents had higher median scores the women; but significant difference was observed only in scores of social support (31 vs 27; $p = 0.014$). There was a significant difference between the residency years considering the overall score and all subscores. The lowest median scores were found in fifth year residents.

Table 6 reveals a significant difference in the overall score of PHEEM questionnaire and its three components between respondents from different specialties. The highest median scores were obtained from residents in internal medicine followed by pediatrics; while the lowest median scores were obtained from urology residents. residents from physical medicine and rehabilitation were excluded from the comparison due to its small number (two residents only).

Table 7 shows the results of a multiple linear regression for evaluating effect of confounding variables (sex, residency year, and specialty) on the overall PHEEM score. Only the year of residency affected significantly the score, when adjusted for sex and specialty; and increase of residency years resulted in a decrease in the score.

Table (1): Characteristics of the respondents (n = 191).

		n	%
Sex	Female	86	44.6%
	Male	107	55.4%
Year of residency	R1	62	32.1%
	R2	53	27.5%
	R3	41	21.2%
	R4	26	13.5%
	R5	11	5.7%
Specialty	Family Medicine	57	29.5%
	Pediatric	36	18.7%
	Internal Medicine	34	17.6%
	General Surgery	22	11.4%
	OB And GYN	12	6.2%
	ENT	9	4.7%
	Urology	8	4.1%
	Radiology	7	3.6%
	Community Medicine	6	3.1%
	Physical Medicine And Rehabilitation	2	1.0%

n:number

Table (2): Frequencies of responses to PHEEM questionnaire (n = 191).

	Strongly disagree	Disagree	Uncertain	Agree	Strongly agree
I have a contract of employment that provides information about hours of work.	4.1%	15.5%	25.9%	31.6%	22.8%
My clinical supervisor set clear expectations	1.6%	4.1%	36.8%	48.7%	8.8%
I have protected educational time in this rotation	4.1%	9.8%	10.9%	60.1%	15.0%
I had an informative orientation programme	4.7%	14.0%	15.5%	41.5%	24.4%
I have the appropriate level of responsibility in this rotation.	0.5%	5.7%	6.2%	71.0%	16.6%
I have good clinical supervision at all times	5.2%	10.4%	20.7%	36.8%	26.9%
There is racism in this rotation	34.7%	26.4%	28.0%	6.2%	4.7%
I have to perform inappropriate tasks	27.5%	29.0%	20.2%	16.6%	6.7%
There is accurate, unit specific written information available	0.5%	11.9%	34.7%	48.2%	4.7%
My clinical teachers have good communication skills	3.1%	4.7%	17.6%	47.2%	27.5%
I am paged inappropriately	3.6%	15.0%	29.5%	28.0%	23.8%
I am able to participate actively in educational events	1.6%	7.3%	7.3%	65.8%	18.1%
There is sex discrimination in this rotation	31.1%	17.6%	17.1%	28.5%	5.7%
There are clear clinical protocols in this rotation	3.1%	13.5%	21.2%	54.9%	7.3%
My clinical teachers are enthusiastic	3.6%	7.3%	37.8%	30.1%	21.2%
I have good collaboration with other junior	0.0%	3.1%	6.7%	50.3%	39.9%

doctors					
My hours conform to the Certified Agreement	0.5%	14.5%	51.8%	28.0%	5.2%
I have the opportunity to provide continuity of care	0.5%	6.2%	16.6%	69.4%	7.3%
I have suitable access to careers advice	2.1%	8.3%	24.9%	58.0%	6.7%
This hospital has good quality accommodation for doctors, especially when on call	25.4%	13.5%	20.7%	36.8%	3.6%
There is access to an educational program relevant to my needs	19.7%	20.7%	18.1%	37.8%	3.6%
I get regular feedback from seniors	3.1%	15.5%	15.0%	44.6%	21.8%
My clinical teachers are well organized	2.1%	11.4%	37.3%	42.5%	6.7%
I feel physically safe within the hospital environment.	0.0%	5.2%	12.4%	49.7%	32.6%
There is a no-blame culture in this rotation	3.6%	13.0%	22.3%	54.9%	6.2%
There are adequate catering facilities when I am on call	24.9%	16.1%	23.3%	34.2%	1.6%
I have enough clinical learning opportunities for my needs	2.6%	14.5%	16.1%	63.7%	3.1%
My clinical teachers have good teaching skills	2.1%	8.3%	19.2%	45.6%	24.9%
I feel part of a team working here	1.6%	12.4%	7.3%	49.7%	29.0%
I have opportunities to acquire appropriate skills in practical procedures	2.1%	7.8%	21.8%	59.1%	9.3%
My clinical teachers are accessible	.5%	5.2%	20.2%	49.2%	24.9%
My workload in this job is fine	1.0%	13.5%	29.5%	46.1%	9.8%
Senior staff utilize learning opportunities effectively	.5%	6.2%	23.3%	61.1%	8.8%
The training in this rotation makes me feel ready for the next step	2.1%	5.7%	28.0%	43.5%	20.7%
My clinical teachers have good mentoring skills	1.0%	9.3%	25.4%	58.0%	6.2%
I get a lot of enjoyment out of my present job	3.1%	6.7%	18.7%	62.7%	8.8%
My clinical teachers encourage me to be an independent learner	2.6%	6.7%	15.0%	66.8%	8.8%
There are good counselling opportunities for junior doctors who experience difficulty regarding their training in this rotation	4.7%	9.3%	19.7%	45.1%	21.2%
The clinical teachers provide me with good feedback on my strengths and weaknesses	5.2%	18.1%	21.2%	35.2%	20.2%
My clinical teachers promote an atmosphere of mutual respect	4.1%	8.8%	18.7%	47.2%	21.2%

Table (3): Summary of the scores (mean, standard deviation, median, interquartile ranges) for each item in PHEEM questionnaire.

	Median	IQR	Mean	Standard deviation
I have a contract of employment that provides information about hours of work.	3	2 - 3	2.5	1.1
My clinical supervisor set clear expectations	3	2 - 3	2.6	.8
I have protected educational time in this rotation	3	3 - 3	2.7	1.0
I had an informative orientation program	3	2 - 3	2.7	1.1
I have the appropriate level of responsibility in this rotation.	3	3 - 3	3.0	.7
I have good clinical supervision at all times	3	2- 4	2.7	1.1
There is racism in this rotation	3	2 - 4	2.8	1.1
I have to perform inappropriate tasks	3	2 - 4	2.5	1.2
There is accurate, unit specific written information available	3	2 - 3	2.4	.8
My clinical teachers have good communication skills	3	2 - 4	2.9	1.0
I am paged inappropriately	1	1 - 2	1.5	1.1
I am able to participate actively in educational events	3	3 - 3	2.9	.8
There is sex discrimination in this rotation	2	1 - 4	2.4	1.3
There are clear clinical protocols in this rotation	3	2 - 3	2.5	.9
My clinical teachers are enthusiastic	3	2 - 3	2.6	1.0
I have good collaboration with other junior doctors	3	3 - 4	3.3	.7
My hours conform to the Certified Agreement	2	2 - 3	2.2	.8
I have the opportunity to provide continuity of care	3	3 - 3	2.8	.7
I have suitable access to careers advice	3	2 - 3	2.6	.8
This hospital has good quality accommodation for doctors, especially when on call	2	0 - 3	1.8	1.3
There is access to an educational programme relevant to my needs	2	1 - 3	1.8	1.2
I get regular feedback from seniors	3	2 - 3	2.7	1.1
My clinical teachers are well organized	2	2 - 3	2.4	.9
I feel physically safe within the hospital environment.	3	3 - 4	3.1	.8
There is a no-blame culture in this rotation	3	2 - 3	2.5	.9
There are adequate catering facilities when I am on call	2	1 - 3	1.7	1.2
I have enough clinical learning opportunities for my needs	3	2 - 3	2.5	.9
My clinical teachers have good teaching skills	3	2 - 3	2.8	1.0
I feel part of a team working here	3	3 - 4	2.9	1.0
I have opportunities to acquire appropriate skills in practical procedures	3	2 - 3	2.7	.8
My clinical teachers are accessible	3	2 - 3	2.9	.8
My workload in this job is fine	3	2 - 3	2.5	.9
Senior staff utilize learning opportunities effectively	3	2 - 3	2.7	.7
The training in this rotation makes me feel ready for the next step	3	2 - 3	2.8	.9
My clinical teachers have good mentoring skills	3	2 - 3	2.6	.8
I get a lot of enjoyment out of my present job	3	2 - 3	2.7	.8
My clinical teachers encourage me to be an independent learner	3	3 - 3	2.7	.8
There are good counseling opportunities for junior doctors who experience difficulty regarding their training in this rotation	3	2 - 3	2.7	1.1
The clinical teachers provide me with good feedback on my strengths and weaknesses	3	2 - 3	2.5	1.2
My clinical teachers promote an atmosphere of mutual respect	3	2 - 3	2.7	1.0
Overall score	104	93-120	103.3	18.7
Role autonomy	37	31 - 41	35.7	6.7
Teaching	41	33 - 47	39.5	8.5
Social support	29	25 - 32	28.1	5.1

IQR: interquartile range

Table (4): Interpretation of the overall score of PHEEM questionnaire and its three components (n = 191).

		n	%
Overall score	0 - 40 very poor	0	0.0%
	41 - 80 plenty of problems	25	13.0%
	81 - 120 more positive than negative but room for improvement	141	73.1%
	121 - 160 excellent	27	14.0%
Perceptions of role autonomy	0 - 14 very poor	0	0.0%
	15 - 28 a negative view of one's role	25	13.0%
	29 - 42 a more positive perception of one's job	147	76.2%
	43 - 56 excellent perception of one's job	21	10.9%
Perceptions of teaching	0 - 15 very poor quality	0	0.0%
	16 - 30 in need of some training	28	14.5%
	31 - 45 moving in the right direction	103	53.4%
	46 - 60 model teachers	62	32.1%
Perceptions of social support	0 - 11 non-existent	0	0.0%
	12 - 22 not a pleasant place	25	13.0%
	23 - 33 more pros than cons	148	76.7%
	34 - 44 a good supportive environment	20	10.4%

n:number

Table (5): Comparison of the overall score of PHEEM questionnaire and its three components between respondents of either sex and between different residency years (n = 191).

		Sex		Residency year				
		Female	Male	R1	R2	R3	R4	R5
Overall score	Median	102	111	113	104	102	106	80
	Mean ranks	89	103	107	95	95	102	44
	p	0.091		0.015*	R1-R2 =1.000 R1-R3 = 1.000 R1 - R4 = 1.000 R1 - R5 = 0.005* R2 -R3 = 1.000		R2 - R4 = 1.000 R2 - R5 = 0.057 R3 - R4 = 1.000 R3 - R5 = 0.079 R4 - R5= 0.038*	
Role autonomy	Median	35	38	37	37	38	38	31
	Mean ranks	92	101	102	96	97	106	49
	p	0.274		0.051				
Teaching	Median	41	43	44	41	42	41	31
	Mean ranks	91	102	109	96	96	93	50
	p	0.157		0.030*	R1-R2 =1.000 R1-R3 = 1.000 R1 - R4 = 1.000 R1 - R5 = 0.013* R2 -R3 = 1.000		R2 - R4 = 1.000 R2 - R5 = 0.134 R3 - R4 = 1.000 R3 - R5 = 0.164 R4 - R5= 0.335	
Social support	Median	27	31	30	29	31	29	22
	Mean ranks	86	106	103	98	99	98	45
	p	0.014*		0.033*	R1-R2 =1.000 R1-R3 = 1.000 R1 - R4 = 1.000 R1 - R5 = 0.014* R2 -R3 = 1.000		R2 - R4 = 1.000 R2 - R5 = 0.036* R3 - R4 = 1.000 R3 - R5 = 0.042* R4 - R5= 0.076	

* significant at p <0.05.

Table (6): Comparison of the overall score of PHEEM questionnaire and its three components between respondents from different specialties (n = 191).

		Community medicine	ENT	Family medicine	General surgery	Internal medicine	OB and GYN	Pediatric	Radiology	Urology
Overall score	Median	81	95	102	98	120	99	114	96	78
	Mean ranks	34	75	90	64	147	62	128	43	34
	p	<0.001*	pediatrics vs urology, community medicine, Radiology, obstetrics & gynecology, surgery Internal medicine vs urology, community medicine, Radiology, obstetrics & gynecology, surgery, ENT, family medicine							
Role autonomy	Median	32	32	36	32	41	31	39	37	26
	Mean ranks	53	56	90	55	143	54	136	72	38
	p	<0.001*	pediatrics vs urology, community medicine, obstetrics & gynecology, surgery, ENT, family medicine Internal medicine vs urology, community medicine, obstetrics & gynecology, surgery, ENT, family medicine							
Teaching	Median	24	39	39	41	47	40	45	33	28
	Mean ranks	24	83	85	87	151	67	120	36	26
	p	<0.001*	pediatrics vs urology, community medicine, Radiology Internal medicine vs urology, community medicine, Radiology, obstetrics & gynecology, surgery, ENT, family medicine							
Social support	Median	25	30	28	23	32	27	31	26	25
	Mean ranks	53	102	97	40	140	61	120	49	70
	p	<0.001*	Surgery vs family medicine, ENT, pediatric, internal medicine, pediatrics vs surgery Internal medicine vs urology, community medicine, Radiology, obstetrics & gynecology, surgery, ENT, family medicine							

* significant at p <0.05.

Table (7): Multiple linear regression for evaluating effect of confounding variables on overall PHEEM score.

	Unstandardized coefficients		t	p	95.0% Confidence interval for B	
	B	Std. error			Lower bound	Upper bound
(Constant)	101.358	5.383	18.829	<0.001*	90.739	111.977
Sex	4.584	2.741	1.672	0.096	-0.823	9.991
Year of residency	-2.419	1.110	-2.179	0.031*	-4.609	-0.229
Specialty	0.091	0.620	0.147	0.884	-1.132	1.314

DISCUSSION

The learning environment has a great impact upon the quality of training of medical trainee, which could affect their future career development. Many studies have been conducted to assess the learning environment in various medical specialties. In Saudi Arabia, similar studies were carried out on medical interns (Algaidi, 2010), urologists (Binsaleh et al., 2015),

pediatrics (BuAli et al., 2015), family medicine (Khoja, 2015), and residency programs in general (Al-Marshad and Alotaibi, 2011).

We found that PHEEM questionnaire items had a high level of internal consistency among our study sample (Cronbach's alpha was 0.914). The subscales also demonstrated acceptable values of Cronbach's alpha (role autonomy, teaching, and social support had values of 0.772, 0.864, and 0.627 respectively). The PHEEM score is widely utilized in different learning settings as a useful tool to identify the strengths and weaknesses of an educational environment (Chan et al., 2016). The Cronbach's alpha values obtained in the present study are comparable to those reported by previous studies worldwide (Vieira, 2008, Koutsogiannou et al., 2015, Sheikh et al., 2017) (Khoja, 2015).

Analysis of the frequencies of responses to each item in the PHEEM questionnaire and their mean values in this study showed that the most problematic aspects of the residency program - as perceived by the respondents - included being paged inappropriately, sex discrimination, presence of adequate catering facilities and good quality accommodation for doctors when on call, as well as access to relevant educational programs.

Interpretation of the overall score and its subscales showed that most respondents perceived that there are more positive points than the negative with a room for improvement. This agrees with Al-Marshad et al. (2011) who stated that the medical residents of the King Fahad Hospital, Dammam, considered their educational environment good with potential aspects for improvement. In the current study, the respondents' perception of teaching was more favorable than the other two subscales; as 53.4% viewed teaching as moving in the right direction and 32.1% viewed their trainers as model teachers. These points of weaknesses are consistent with reports of harassment and discrimination among residents in Saudi hospitals (Fnais et al., 2013, Al-Sheikh et al., 2014).

Factors that were likely to affect responses to the scale were studied. Univariate analysis revealed that men respondents had higher median scores the women; but significant difference was observed only in scores of social support. Also, residents from the fifth (last) year displayed significantly lower median scores. Specialties that had the highest median scores in this study were internal medicine and pediatrics; while urology had the lowest median scores.

On the other hand, multivariate analysis showed that only residency year affected the PHEEM score significantly, when we adjusted for sex and specialty. This is consistent with previous studies have found no effect of sex (Algaidi, 2010, Al-Sheikh et al., 2014, Roff et al., 2005, Aspegren et al., 2007, BuAli et al., 2015), or residency years (Binsaleh et al., 2015, BuAli et al., 2015) on PHEEM scores. These findings contradict other studies that reported that male residents ranked the environment significantly higher than the females (Al-Marshad and Alotaibi, 2011) and that the first year residents perceived the learning environment more favorable than the higher years (Al-Marshad and Alotaibi, 2011, Clapham et al., 2007). These disparities between the various studies could be attributed to differences in the studied sample as regards the training specialty and the hospitals in which training is offered. In addition, most of these studies did not adjust for other confounding factors, which may have affected their results.

In conclusion, most residents perceived their learning environment as favorable. Some points of weakness were highlighted. We recommend reform measures that target the weak points in the residency program and enhance the strong aspects. Recommended measures include establishing well-defined job descriptions to minimize exploitation; improving catering facilities; and avoiding sex discrimination.

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