Nephrology Specialists and Resident's Perception towards Training Program at Sudan Medical Specialization Board (SMSB)

Nahla Allam[1], Almuntasir Taha[2], Hind Hassan[3], Gamarelanbia Yousif[4]

[1]Department of Pediatrics, Faculty of medicine Al Neleen University.
[2]Department of Pediatrics, Faculty of Medicine, the National Ribat University.
[3]Department of Medicine, Ahmed Gasim Hospital.
[4]Department of Obstetrics and Gynecology, Advanced Diagnostic Center Bahri
*Corresponding Author : Phone No: +249912423235

Received:- 28 August 2021/ Revised:- 10 September 2021/ Accepted: 18 September 2021/ Published: 30-09-2021

Abstract—

Background: *Optimum learning environments (LEs) are linked with positive training outcomes for residents. However, there is few data concerning how the residents perceive the learning environments in teaching hospitals. This study aims to analyze the residents' perceptions of their learning environments.*

Methods: *This cross-sectional, hospital-based study was carried out between November 2020 and January 2021, using a Postgraduate Hospital Educational Environment Measurement (PHEEM) questionnaire. Statistical analysis was conducted using SPSS 20.*

Results: *The total number was 45 participants, 40 of them successfully responded. The total Cronbach`s alpha score was 0.93, which reflects good reliability. The full-scale score was 128 out of 160, which indicates a good learning environment. The autonomy score was 44, the teachers' score was 50, and social support was 34. Finally, the overall mean score for females was 43.3 compared to 39.4 for males, with a P-value of 0.55. Furthermore, no significant difference in residents' perceptions of their learning environment according to their training was observed in this study.*

Conclusion: *Significant challenges in the LE were identified; more attention and effort should be given, especially to the poorly rated point in this study: the existence of an informative program, clear clinical protocols, and proper setting expectations. The lowest score was for catering, housing. A high social support score indicates a healthy workplace environment and job satisfaction.*

Keywords— Nephrology specialists, residents perception, learning environment, training program.

I. INTRODUCTION

The presence of high-quality healthcare services is an important factors that determine patient safety within health systems. Physician training, who are the primary service providers, is one of the primary aims of the health system for the public[1].

The educational environment has a unique contribution to the knowledge, thinking, and learning of medical students[2]. The educational environment hugely impacts the learning process, and this may have a profound effect on student's performance, their behavior, and the outcome of their learning process [3]. In general, students' success, satisfaction, and achievement have been linked to the educational environment [4]. An excellent educational environment is where teaching and learning opportunities are well planned and patient-focused with reasonable medical practices [5]

For better training, an effective training program and an encouraging educational environment where postgraduate trainees are nurtured, trained and supervised is essential. This learning environment would ultimately improve patient care [6]. Almost all of the training received by postgraduate residents is within the hospital program. So bedside teaching, if not properly

planned, can be a source of many mistakes. [7] A comprehensive evaluation of problems related to the quality of training provided and the learning environment is required for improved training and patient care [8]

The development and use of various instruments that evaluate training programs' quality in daily clinical practice is a step towards training perfection. Many validated instruments are developed in various countries targeting improvement in a training program—the Dundee Ready Educational Environment Measure (DREEM) for undergraduate health professional education[9]. Anesthetic Theatre Educational Environment Measure (ATEEM) [10] and Surgical Theatre Educational Environment Measure (STEEM), [11], etc., the Postgraduate Hospital Educational Environment Measure (PHEEM) is used. The PHEEM instrument, a validated 40-item questionnaire developed in the United Kingdom (UK) by Roff et al., was used to rate various aspects of the clinical learning environment for postgraduate training[12]. A significantly high level of reliability (Cronbach's alpha coefficient > 0.91) of the PHEEM inventory is documented[13]. The three domains measured by this inventory are: perception of autonomy (very poor to an excellent perception of one's job), perception of teaching (inferior quality through model teaching), and perception of social support (none too good supportive environment). However, little research in Sudan has studies residences in training.

The nephrology fellowship program is one of the first subspecialty programs that started in 2010. Under Sudan, Medical Specialization Board (SMSB) umbrella included pediatric and Adult Medicine/Nephrology councils when pediatric sub-specialties were not well approved and developed. Recently, with the development and advances in the Pediatric and Child health council and the pediatric sub-specialties in particular and the expansion of pediatric nephrology services in Sudan. We have made significant amendments, curriculum development, and reframe the pediatric fellowship program under the pediatric and child health council.

Sudan's pediatric nephrology fellowship program is one of the oldest pediatric subspecialty training programs in Sudan. It started to accept two fellows per training center at a time. Currently, four training fellows, two training centers are accredited by the Sudan Medical Specialization Board. The goals produced well-trained and experienced pediatric nephrologists. This goal is achieved by combining broad clinical exposure in pediatric nephrology and related disciplines with tailored research experience and attentive structured and learning opportunities. Fellows are expected to acquire knowledge and skill, develop appropriate attitudes and behavior through their training program, and take personal responsibility in education.

The pediatric fellowship training program consists of an exemplary structure full-time supervised two years of training. This training includes core rotations, general pediatric nephrology, inpatient, and outpatient. Pediatric peritoneal dialysis, pediatric hemodialysis. Neonatal nephrology, pediatric renal transplant, pediatric urology, renal pathology, renal imaging. Elective rotation allows fellows the flexibility to gain whole experience in an area of interest. Training of physicians takes place at the different centers at Khartoum state, recently one center at Madani hospital. Pediatrics residents only have two centers for training at soba hospital .and Gaffer Ibn Ouf Hospital .there is no previous study on the subject in our country. Still, there are studies on the different areas around the world with the result showing that there are perfectible aspects in their training. [14, 15]

The nephrology fellowship training is based on the curriculum. Each training program creates fellow rotation schedules for patient care, organize a series of core lectures and conferences for nephrology core knowledge, ensures compliance with the procedures skill requirement, and provides a research environment for fellows.

Due to the increased incidence and prevalence of patients with chronic kidney disease, a significant challenge facing nephrology in Sudan, including a lack of advance in the field, and research, is the adequate training number of nephrologists to meet patients care and research needs. This process requires rehabilitation of training centers and improving the training environment. Furthermore, data on the clinical and research nephrology workforce is incomplete or absent. This study is the first in-country, which evaluated the perception of nephrology specialists and residents on their training. It is meant to answer the question: what are the main problems in the nephrology training environment.

II. MATERIAL AND METHODS

2.1 Study design

This is a descriptive, cross-sectional study.

2.2 Study area

Sudan Medical Specialization Board (SMSB) is specialty councils responsible for the implementation of all activities concerning the training of medical doctors, including the development and review of curricula. The nephrology fellowship

program is one of the first subspecialty programs that started in 2010. Under the umbrella of the Sudan Medical Specialization Board (SMSB), it included pediatric and Adult Medicine/Nephrology councils when pediatric sub-specialties were not well approved and developed.

2.3 Study duration

From November 2020 to January 2021, the overall study duration was three month.

2.4 Study population

They involve doctors who are in the training program in nephrology and who had graduated from it.

2.4.1 Inclusion criteria

- Nephrology specialist and nephrology residents at SMSB.
- All ages.
- Males and females.
- Sudanese nationality.

2.4.2 Exclusion criteria:

Residents who discontinued training for 6month or more.

2.5 Sample size and technique

Total coverage during the study period.

2.6 Data collection method and tools

The study was conducted by using the PHEEM questionnaire was modified to rephrase some of the questions according to the local setting. PHEEM is a five-point Likert standardized, self-administered questionnaire containing 40 closed-ended questions. These 40 items fall into three subscales: autonomy (14 items), teachers (15 items), and social support (11 items). Each of the forty statements was scored on a five-point scale, with the following labels: strongly agree (4), agree (3), uncertain (2), disagree (1), and strongly disagree (0). The scores for questions 8, 11, 13, which contain negative statements, were reversed coded. Modified of Three of the items were modified to suit the context in which the study was being carried out. Item 7(racism in this rotation) was not applicable, and the item was there for modification to read (there is social accountability). Item 11(I am paged inappropriately) was also modified because doctors are required to stay in the emergency department or on-call room when on duty—change this to read (I am called inappropriately). Also, item 17 was modified to read (my hours' work conform to SMSB certified agreement). The maximum score from the 40-statement survey is 160. To interpret the results of PHEEM, the following qualitative categories are used: 0–40 is very poor, 41–80 is plenty of problems, 81–120 is more positive than negative, but there is room for improvement, and 121–160 is excellent.

2.7 Study variables

The independent variables: Socio-demographic: characteristics (age, gender, place of work).

The dependant variables: fell with three domains:

- Perception role of autonomy.
- Perception role of teaching.
- Perception role of social support.

2.8 Data analysis

Quantitative data were analyzed by software package of social science (SPSS, 24) in association with a biostatistician. Double data entry, spacing, and coding for more verification.

2.9 Methods of data presentation

Data is presented through tables, figures, and numerical summaries.

Numerical summaries for descriptive statistics include measures of central tendency: mode and Measures of dispersion: range, variance, standard deviation, interquartile range, and variability.

2.10 Ethical considerations

- Approval obtained from the Ethical Committee: EDC SMSB.
- Obtained Informed consent from participants.
- Maintained Confidentiality throughout the study.
- Well preserved complete autonomy and anonymity of the participants.

III. RESULTS

3.1 Socio-demographic

The total number was 45 participants (nephrology specialists and nephrology residents). Forty of them successfully responded to the inventory with a response rate of 88%. Females were predominant 67.5%, while males were 32.5%, as. The mean age is 41.7± (SD 6.3). Married nephrology residents represent 77.5%. Receiving training at soba hospital 47.5%, Ibn sienna hospital 32.5%, Ibnouf 2.5%, and 12.5% receiving training in the center outside Khartoum. 32.5% receiving training outside Sudan. South Africa 10%, Egypt 10%, USA 5% and 2.5% in KSA and Pakistan. 45% were pediatricians, and physicians represent 55%. The 32% who complete training program while 20% still on training, from this 20%, 17.5% on the first year of their training program.

3.2 Reliability and Validity

The Cronbach's alpha was scored at 0.93 for 40 statements that reflect good reliability and internal consistency of the items in the questionnaire. Validity testing was performed using factor analysis and correlational studies to measure the strengths of the relationships of the items to each other and to measure how the PHEEM behaved.

3.3 PHEEM

For the perception role of autonomy mean score was 0.95 SD (±0.37) in Table 1 and 3. The lower score was 1.47 and, the higher score was 3.85. Item 30 recorded a higher score: (I have the opportunity to acquire appropriate skills in practice procedure), while lower was item 9 (there is accurate, unit-specific written information available). For the perception role of teaching, the mean score was 0.69 SD (±0.34) showed in table 1and 4, item 31 recorded a higher score (my clinical teacher are accessible) and Lower score 2.8 was item 2 (my clinical supervisor set clear expectations). Regarding social domain mean 0.88 SD (±0.28) in table 1 and 6, higher scores were item 19 (I have suitable access to careers advice) ,while the Lower score was 1.1 item 7 (there is social accountability) .

The lowest recorded item score was 1.1 (item 7: there is social accountability), and the highest was 3.85 (item 30 I have opportunity to acquire appropriate skills in practical procedures). Item 8 ,9 and 11 scored less than 2 in the perception of autonomy domain table 4, item 7, relating to social support, was also less than 2 table 5. All other items had scored within the range of 2-3 and more than 3.

The PHEEM score was 128, with a score of 44 for the perception of autonomy, 50 for the perception of teaching, and 34 for the perception of social support table 2 The three subscales scores reported a more positive perception of autonomy, the perception of teaching move in the right direction, and the perception of social support showed more pros than cons. The means scores and SDs of the 40 items of the PHEEM questionnaire are shown in table 3.4.5.

The mean for the perception of teaching for females was 51.1 compared to 48.6 for males, with a p-value of 0.53. The overall mean perception of role autonomy for females was 44.2 and 40.2 for males, with a P-value of 0.41. The overall mean for the perception of social support for females was 34.6 and 29.5 for males with a P-value of 0.69. Finally, the overall mean score for females was 43.3 compared to 39.4 for males, with a P-value of 0.55. In addition, no significant difference in residents' perceptions of their LE according to their training was observed. *P* values were greater than 0.05.

TABLE 1
PHEEM DOMAINS MEAN SCORES

Subscale	Score	Frequency	Percent
Perception role of autonomy	14.00 - 29.00	1	2.5%
	30.00 - 33	21	52.5%
	34+	18	45.0%
Perception role of Teaching	14.00 - 28.00	1	2.5%
	29.00 - 42	4	10.0%
	43++	35	87.5%
Perception role of social support	11 - 21.00	2	5.0%
	22.00+	38	95.0%
Total score	41.00 - 80.00	1	2.5%
	81.00 - 120.00	11	27.5%
	121.00+	28	70.0%

Perception role of autonomy: 14-29: a negative view of one role
30-33: more positive
34+: excellent.

Perception role of teaching: 14-28: need some training
29-42: move in right direction
43+: model teacher

Perception role of social support: 11-21: not a pleasant please.
22+: more pros than cons

Overall score: 41-80: plenty of Problems
81-120: more positive than negative.
121+: excellent.

TABLE 2
INTERPRETATION RESULT OF PHEEM (GENERAL SCORES AND SUBSCALE)

Subscale	Mean	Maximum score	Interpretation
Perception of autonomy	44	56	More positive perception
Perception of teaching	50	60	Model teachers
Perception of social support.	34	44	A good supportive environment
Total	128	160	Excellent

TABLE 3

PERCEPTION OF ROLE AUTONOMY MEAN SCORES AMONG NEPHROLOGY SPECIALISTS AND NEPHROLOGY RESIDENTS AT SMSB: ASCENDING PATTERN FROM LOWER ITEM SCORE TO HIGHER ITEM SCORE.

Perception of role autonomy	N	Minimum	Maximum	Mean	SD
[9. There is accurate, unit specific written information available.]	40	.00	4.00	1.4750	1.30064
[11. I am on call inappropriately.]	40	.00	3.00	1.5000	.98710
[8. I have to perform inappropriate tasks.]	40	.00	3.00	1.6000	1.00766
[4. I had an informative orientation programme]	40	1.00	4.00	2.6500	1.12204
[1. I have a contract of employment that provides information about hours of work.]	40	1.00	4.00	2.7500	1.14914
[14. There are clear clinical protocols in this rotation]	40	1.00	4.00	3.0750	.91672
[32. My workload in this job is fine.]	40	2.00	4.00	3.2500	.86972
[17-My hours conform to the SMSB Certified Agreement]	40	.00	4.00	3.2750	1.03744
[40. My clinical teachers promote an atmosphere of mutual respect.]	40	1.00	4.00	3.5000	.78446
[5. I have the appropriate level of responsibility in this rotation.]	40	2.00	4.00	3.5250	.71567
[18. I have the opportunity to provide continuity of care]	40	1.00	4.00	3.5500	.87560
[29. I feel part of a team working here]	40	1.00	4.00	3.6000	.81019
[34. The training in this rotation makes me feel ready for the next step]	40	2.00	4.00	3.7000	.64847
[30. I have opportunities to acquire appropriate skills in practical procedures]	40	2.00	4.00	3.8500	.48305

TABLE 4

PERCEPTION ROLE OF TEACHING MEAN SCORES AMONG NEPHROLOGY SPECIALISTS AND NEPHROLOGY RESIDENTS AT SMSB: ASCENDING PATTERN FROM LOWER ITEM SCORE TO HIGHER ITEM SCORE.

Perception role of teaching	N	Minimum	Maximum	Mean	SD
[2. My clinical supervisor set clear expectations.]	40	1.00	4.00	2.8000	1.24447
[3. I have protected educational time in this rotation.]	40	1.00	4.00	2.9000	1.00766
[39. The clinical teachers provide me with good feedback on my strengths and weaknesses.]	40	1.00	4.00	3.2500	.98058
[10. My clinical teachers have good communication skills.]	40	.00	4.00	3.2750	1.03744
[22. I get regular feedback from seniors]	40	2.00	4.00	3.3000	.85335
[6. I have good clinical supervision at all times.]	40	1.00	4.00	3.3750	.92508
[21. There is access to an educational programme relevant to my needs]	40	2.00	4.00	3.4000	.77790
[33. Senior staff utilise learning opportunities effectively.]	40	1.00	4.00	3.4250	.93060
[27. I have enough clinical learning opportunities for my needs]	40	1.00	4.00	3.4250	.93060
[15. My clinical teachers are enthusiastic]	40	1.00	4.00	3.4750	.84694
[37. My clinical teachers encourage me to be an independent learner.]	40	.00	4.00	3.5000	1.15470
[23. My clinical teachers are well organised.]	40	1.00	4.00	3.5500	.81492
[12. I am able to participate actively in educational events.]	40	1.00	4.00	3.6250	.70484
[28. My clinical teachers have good teaching skills]	40	1.00	4.00	3.7000	.64847
[31. My clinical teachers are accessible]	40	1.00	4.00	3.8000	.60764

TABLE 5
PERCEPTION ROLE OF SOCIAL SUPPORTS MEAN SCORES AMONG NEPHROLOGY SPECIALISTS AND NEPHROLOGY RESIDENTS AT SMSB: ASCENDING PATTERN FROM LOWER ITEM SCORE TO HIGHER ITEM SCORE

Perception role of social support	N	Minimum	Maximum	Mean	SD
[7- there is social accountability]	40	.00	3.00	1.1250	1.18078
[13. There is sex discrimination in this rotation.]	40	.00	3.00	2.0250	.89120
[26. There are adequate catering facilities when I am on call]	40	1.00	4.00	2.7500	1.05612
[20. This hospital has good quality accommodation for junior doctors, especially when on call.]	40	1.00	4.00	2.8500	1.07537
[24. I feel physically safe within the hospital environment.]	40	1.00	4.00	3.1750	.93060
[25. There is a no-blame culture in this rotation.]	40	1.00	4.00	3.2000	.91147
[35. My clinical teachers have good mentoring skills]	40	1.00	4.00	3.4000	.74421
[36. I get a lot of enjoyment out of my present job.]	40	1.00	4.00	3.4250	.84391
[16. I have good collaboration with other junior doctors]	40	1.00	4.00	3.5000	.93370
[38. There are good counselling opportunities for junior doctors who experience difficulty regarding their training in this rotation.]	40	1.00	4.00	3.5250	.84694
[19. I have suitable access to careers advice.]	40	2.00	4.00	3.5500	.71432

IV. DISCUSSION

This is the first study to assess nephrology specialists and residents' perception of the training received at SMSB. It would provide feedback to stakeholders in this program to be improved the quality and functionality of the activity.

This study showed a high female-to-male ratio similar to a survey conducted in Pakistan by Bari et. al [17], where females reported 65%, compared to males who reported 40%. Another study from Saudi Arabia found a high male to female ratio [18].

In this study, the perception of role autonomy was more optimistic, similar to studies conducted in Iran and Pakistan [19, 20]. It has been reported the positive perception of role autonomy is vital for personal development, lifelong learning, and carrier enhancement [21, 22].

In the role autonomy domain, question number 8, 9 and 11 were ranked the lowest, suggesting a lack of clear clinical protocols and informative information.

The participant reported their perception of teaching 50. This finding illustrated the model teachers. This result does not coincide with another study conducted by Taha et al. addressing factors affecting the quality of training [14].

In term of teaching perceptions statement number 2, which ask about teacher expectation, obtained the lowest score in comparison to other items, all others items of this domain were highly rated more than 3. In a survey conducted by Clapham et al., the educational environment of intensive care medicine in the United Kingdom had room for improvement. In regards to teaching, the results indicated being in the right direction. Participants perceived the role of autonomy as more positive, and there was more positive than negative social support in their educational climate [23].

This study also highlighted that perception about social support was 34, which indicates an excellent supportive educational environment. This score was different from that found in a survey conducted by atta et al. in Pakistan [20] and lower than that found by several studies globally [21, 22].

Regarding social support subscale questions, numbers 7, 13, 20 and 26 were rated poorly compared to others. These questions are about social accountability, discrimination between doctors, suitable quality accommodation for doctors, and adequate catering facility respectively.

In another study by AL-Marshad at Dammam university Saudia Arabia had perceptions of three domains. As following, they believed that teachers needed some retraining and more positive perceptions of role autonomy. They found the environment not to be a pleasant place concerning social support. This study is similar to our result. It seems that culture can influence perceptions of the clinical environment [7].

The participants in this study perceived their learning environment with a global mean score of 128 out of 160, which indicates significant perception and is not consistent with algaidais 2017 study conducted in Saudi Arabia, which was 77.7, but higher than the value found in khoja 2015 research in Saudi Arabia measured as 67.1. Several studies reported global mean scores ranging from 80- 102 [25].

Wall et al. demonstrated that scores on three domains co-related to each other as the good educational environment were highly rated in all subscales, as observed in our study[24].

The three subscales scores were as follows: perception of role autonomy, a more positive, and perception of social supports more negative.

The lowest recorded score was 1.1 for item 7 (there is social accountability). These severe problems need to be recognized and should plan remedial action. The highest score was 3.85 for item 30. (I have the opportunity to acquire appropriate skills in practical procedures).

The results can be used to improve the hospital training environment, and priority areas include catering and accommodation.

The Cronbach's alpha value scored at 0.93, which reflected good reliability and validity and was comparable with previous studies [25].

The mean score of questions in all three subclasses provides us with the opportunity. To look into the weakness and also to strengthen the education environment.

V. LIMITATIONS OF THE STUDY

No previous study in this field in Sudan reflected in lack of relevant literature to build upon it.

It is a single center study.

Qualitative data need to be added to be more inclusive and productive study.

VI. CONCLUSION

This result showed that it is essential for the nephrology council at SMSB to make more efforts to create an appropriate educational environment to reduce deficiencies in providing a better learning environment with more facilities and support systems. Area of weakness should be identified and follow up with a regular assessment of the educational environment using PHEEM as a means of quality control.

VII. RECOMMENDATIONS

- The Nephrology Counsel should carefully examine the issues addressed by PHEEM and utilized this evidence to improve the training environment.
- The Nephrology Counsel should introduce a valid practical system and feedback.
- Further qualitative studies should be conducted in the future.

REFERENCES

[1] Koutsogiannou P, Dimoliatis IDK, Mavridis D, Validation of the Postgraduate Hospital Educational Environment Measure (PHEEM) in a sample of 731 Greek residents. BMC Res Notes. 2015; 8:734.

[2] Durning SJ, Artino AR. Situativity theory: a perspective on how participants and the environment can interact: AMEE Guide no. 52. Med Teach. 2011; 33:188-99.

[3] Jalili M, Hijri SM, GalandariM, Moradi LM, Mirzadeh A, Roff S. Validating Modified PHEEM Questionnaire for Measuring Educational Environment. Arch Iran Med. 2015; 17:372-7.

[4] Al-Mohaimeed A. Perceptions of the educational environment of a new medical school, Saudi Arabia. Int J Health Sci (Qassim). 2013; 7:150-9.

[5] Auret KA, Skinner L, Sinclair C, Evans SF. A formal assessment of the educational environment experienced by interns placed in rural hospitals in Western Australia. Rural Remote Health. 2013; 13:2549.

[6] Flaherty GT, Connolly R, Brien OT. Measurement of the Postgraduate Educational Environment of Junior Doctors Training in Medicine at an Irish University Teaching Hospital. Ir J Med Sci. 2016; 185:565-71.

[7] Al-Marshad S, Alotaibi G. Evaluation of Clinical Educational Environment at King Fahad Hospital of Dammam University Using the Postgraduate Hospital Education Environment Measure (PHEEM) Inventory. Educ Med J 2011; 3: e6-e14.

[8] BuAli WH, Khan AS, Al-Qahtani MH, Aldossary S. Evaluation of hospital-learning environment for pediatric residency in the eastern region of Saudi Arabia. J Educ Eval Health Prof. 2015; 12:14.

[9] Roff S. The Dundee Ready Educational Environment Measure (DREEM) — a generic instrument for measuring students' perceptions of undergraduate health professions curricula. MedTech. 2005; 27: 322-5.

[10] Holt MC, Roff S. Development and validation of the Anaesthetic Theatre Educational Environment Measure (ATEEM). Med Teach. 2004; 26: 553-8.

[11] Dimoliatis ID, Jelastopulu E. Surgical Theatre (Operating Room) Measure STEEM (OREEM) Scoring Overestimates Educational Environment: the 1-to-L Bias. Univers J Educ Res. 2013; 1: 247-54.

[12] 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: 326-31.

[13] Shokoohi S, Hossein Emami A, Mohammadi A, Ahmadi S, Mojtahedzadeh R. Psychometric properties of the postgraduate Hospital educational environment measure in an Iranian hospital setting. Med Educ Online. 2014; 19: 24546.

[14] Taha M.H., Ahmed Y, Abdalla M.E. GA.Exploring factors affecting the quality of postgraduate medical education in Sudan residents perspective. Int J Med Sci Res Pract .2019; 6 (2):1–9.

[15] Clinical MD in internal medicine curriculum [Internet]. Sudan Medical Specialisation Board (SMSB). 2017 [cited 2021 april 15]. Available from: https://smsb.gov.sd/en/specializations/inter nal-medicine/#eluid2c54b4c5_1_3.

[16] Menaka DS, Sachini PW. Students' perception of the educational environment in a medical faculty with an innovative curriculum in Sri Lanka. South-East Asian Journal of Medical Education. 2010; 4 (1):9-16.

[17] Bari A, Khan RA, Rathore AW. Postgraduate residents' perception of the clinical learning environment; use of postgraduate hospital educational environment measure (PHEEM) in Pakistani context. J Pak Med Assoc. 2018; 68(3):417– 22.

[18] BuAli WH, Khan AS, Al-Qahtani MH, aldossary S. Evaluation of hospital-learning environment for pediatric residency in the eastern region of Saudi Arabia. J Educ Eval Health Prof. 2015; 12:14.

[19] Shahrzad Shokoohi, Amir Hossein Emami, Aeen Mohammadi. Psychometric properties of the postgraduate hospital educational environment measure in an Iranian hospital setting. Med Educ Online. 2014; 19: 245-46.

[20] Shiraz S, Bhavita K, Munazza O, Noman K. Assessment of postgraduate educational environment in public and private hospitals of Karachi. J Pak Med Assoc [Internet]. 2017; 67(2):171. Available from: http://jpma.org.pk/articledetails/ 8072? article_id=8072.

[21] Sandhu A, Liaqat N, Waheed K, Ejaz S, Khanum A, Butt A, et al. evaluation of educational environment for postgraduate residents using postgraduate hospital educational environment measure. J Pak Med Assoc. 2018; 68(5):790–2.. (PHEEM) in Pakistani context. J Pak Med Assoc. 2018; 68(3):417–22.

[22] SadhuA, LiaqatN,WaheedK,et al: Evalution for post graduate residents using PHEEM.jPak Med Assoc2018;68:790-2.

[23] Rathi Mahendran, Birit Broekman, John C. M. Wong. The educational environment: comparisons of the British and American postgraduate psychiatry training programs in an Asian setting. Med Teach. 2013; 11: 959-961.

[24] David Wall, Mike Clapham, Arnoldo Riquelme, Joaquim Vieira, Richard Cartmill, Knut Aspegren, Sue Roff. Is PHEEM a multidimensional instrument? An international perspective. Med Teach. 2009; 31:11, e521-e527.

[25] BinsalehS, BabeerA, AlkhayalA, et al.: Evaluation of the learning environment of urology residency training using the PHEEM inventory Adv Med Educ Pract 2015; 6:271-7.