

ORIGINAL ARTICLE

Sudanese paediatric residents' perception towards training environment in Sudan Medical Specialisation Board, 2020

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ABSTRACT

The training environment is a determinant of learning outcomes. Paediatric residents spend most of their training programme activities in hospitals and related health centres. Measurement of the educational environment for residents is important to detect strengths and weaknesses and to ensure quality training. The overall aim is to determine the perception of postgraduate paediatric residents of a hospital educational environment. A descriptive cross-sectional study was conducted by using the modified Postgraduate Hospital Educational Environment Measure (PHEEM) to evaluate the training environment of paediatric residents in Sudan who spent 4 years of training after the curriculum was updated in 2014. PHEEM questionnaire was used to collect data from 150 final-year paediatric residents. Additional data about the programme were collected using checklists. Data were

analysed using Statistical Package for the Social Science version 23. Of 101 residents who completed the forms, 19 (18.8%) were male and 82 (81.2%) were female. The total Cronbach's alpha score was 0.894. The total scale score was 74/160, which indicated an overall suboptimal response. The overall score was 74.66, autonomy score was 25.75, teachers score was 29.17 and social support score was 19.73. The overall mean ranged between 0.9604 and 2.9109. There were no significant differences between male and female responses. The examination results showed high scores despite the suboptimal educational environment. Perception of the training environment by residents showed suboptimal responses. All subscales showed problems that needed attention and urgent interventions. The social subscale score was the lowest and needed special attention with regard to the large number of females. It is vital to evaluate the whole training in order

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to make decisions about the weaknesses for improvements and continuation.

KEYWORDS

Paediatrics; Residents; Postgraduate hospital educational environment measure; Sudan.

INTRODUCTION

Paediatric residents need to work in a comfortable training environment to achieve the required learning outcomes and provide optimal patient care. In an effort to promote quality care, the Accreditation Council for Graduate Medical Education Next Accreditation System includes an enhanced focus on resident and fellow involvement in patient safety and quality improvement [1].

The educational environment is defined as the setting and whole events experienced by learners, teachers and other staff members, including premises, equipment, cultural and psychological factors, organisational structures and other factors [2]. The educational environment has a substantial effect on trainers' motivation, achievement and career choices [3]. It reflects the curriculum's quality and effectiveness [4].

Postgraduate training in paediatrics is essentially an inter-professional training programme. Educational collaboration improves advocacy training and patient care. The Accreditation Council for Graduate Medical Education considered advocacy principles as Common Programme Requirements. The innovation in medical education has shifted towards an integrated outcome-based, trainee-centred curricula adopting innovative learning strategies, like the Student-centred, Problem-based, Integrated, Community-based, Elective uniform and Systematic models, and evidence-based medical education implementing principles of adult learning with formative and summative assessments. This type of curriculum supports the educational environment [2,4,5].

Many studies used the Postgraduate Hospital Educational Environment Measure (PHEEM), which was developed by Roff et al. [6]. It contains 40 items that evaluate various aspects

of the learning environment in teaching hospitals for postgraduate training. It measures three domains: perception of autonomy, perception of teaching and perception of social support. This inventory has been used for four major residency programmes: paediatrics, surgery, internal medicine and gynaecology and obstetrics [6,7].

The General Medical Council states: 'The learning environment and organisational culture value and support education and training so that learners are able to demonstrate what is expected in *good medical practice* and to achieve the learning outcomes required by their curriculum' [8]. The World Federation for Medical Education stated that a standard medical educational environment is essential for successful training and a prerequisite for accreditation [9].

The Sudanese Medical Doctorate (MD) for the paediatric residency curriculum is a competency-based postgraduate programme held in Sudan under the umbrella of the Sudan Medical Specialisation Board (SMSB) [10]. The programme adopts major trends and reforms in medical education and graduate training regionally and globally. The duration of the programme is 4 years with promotion exams in between the training years. It is a well-structured residency programme with different training contexts in Sudan, ranging from primary to tertiary healthcare units.

The educational environment is a determinant of educational outcomes and career choices [2]. Clinical training in a hospital setting, together with providing service and patient care, needs strict programme arrangements and special resources to create an optimal training environment. Based on the observation, paediatric residency training in Sudan is facing several problems that stress out trainees, which may have negative impacts on the learning outcomes and patient care. A stressful environment results in poor outcomes [10]. Therefore, extensive studies, strict rules and continuous supervision and monitoring of the training programme are essential for maintenance and improvement.

Rationale: The educational environment is an important determinant of the training quality and learning outcomes; studying residents' perception of their educational environment will provide

valuable information about existing problems that need to be addressed for improvement and continuation. The paediatric residency programme is the sole programme that graduates qualified paediatricians in Sudan, and this study is expected to avail information to scale up the educational environment to achieve the pre-set goals. The number of studies with regard to the postgraduate educational environment was limited; however, this study is expected to enrich the information about the subject.

This study is meant to answer two questions. How do paediatric residents perceive the training environment, and what are the main problems in the training environment as perceived by the residents?

General objective: To study Sudanese paediatric residents' perception towards the training environment in the Sudan Medical Specialisation Board.

Specific objectives

1. To measure residents' perception towards autonomy.
2. To assess residents' perception towards teaching.
3. To identify residents' perception towards social support.

MATERIALS AND METHODS

The present study is a descriptive, cross-sectional, institution-based study. It was conducted in the SMSB and related paediatric training centres; in five paediatric training centres: Omdurman, Bahri, Soba, Khartoum and Wad Medani. The study population were final-year residents, from all training centres in paediatrics, inside and outside Khartoum, who completed 4 years training according to the updated curriculum. Residents who discontinued training for 1 year or more were excluded.

Data collection instruments

The PHEEM questionnaire was modified to rephrase some of the questions according to

the local setting. PHEEM is a five-point Likert standardised, 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), unsure (2), disagree (1) and strongly disagree (0). Reversed coding was required for items 7, 8 and 13; item 7 was 'There is racism in this post', item 8 was 'I have to perform inappropriate tasks' and item 13 was 'There is sex discrimination in this post'[11].

Thus, higher scores indicated a more positive evaluation. The inventory was modified to fit the local set-up. Two questions, 11 and 17 (item 11: 'I am bleeped inappropriately', and item 17: 'my hours conform to the new Deal'), in the autonomy section were rephrased (item 11: 'I work according to a fixed timetable' and item 17: 'my hours of work conform to the curriculum'). The results of the PHEEM can be considered at three levels: individual items, subscales and overall PHEEM.

Checklists were developed to collect data on male to female ratio among residents between 2015 and 2019, examination results in the last 5 years of the programme, promotion examination results of the years 2015–2017 and final examination results of the years 2015–2019.

The questionnaire was distributed in paper form to residents after the final written MD exam to 150 final-year residents. Of these, 110 residents responded, giving a rate of 74%. Absent residents were approached personally. Ten incomplete forms were rejected, whereas 101 were analysed.

Data were analysed using the Statistical Package for the Social Science version 23. The tests used were descriptive statistics for the means and standard deviations, reliability test, Pearson's correlation test and Analysis of variance.

Limitation

The major limitation of this study was that it was not possible to find a comparison group. All the residents in the paediatric training programme at the time of the study started their training according to the new updated curriculum.

RESULTS

A total of 150 residents completed 4 years of training from the date of application of the updated curriculum that applied the 4-year calendar, with promotion exams at the end of years 1, 2 and 3. Of these, 111 residents responded to the PHEEM inventory scale with a response rate of 74%. Ten incomplete forms were rejected and, hence, 101 forms were finally analysed. Among the total, 19 (18.8 %) were male and 82 (81.2 %) were female. Females were steadily outnumbering males in the period between 2015 and 2019, and their numbers were steadily surpassing that of males (Figure 1).

Cronbach's alpha was carried out to measure internal consistency. Cronbach's alpha score >0.7 was considered excellent for all domains, and a score of 5 or less was considered unacceptable. Cronbach's alpha score for the overall scale was 0.894. Item analysis was carried out to test whether the items were sound and measured the concept for which they were intended to measure, and all items were within the acceptable range. Regarding the corrected item-total correlation, none of the items was negative or less than 0.15–0.50. The value of Cronbach's alpha for an item was deleted ranged from 0.90 to 0.87. The highest score was 133/160 (one participant), while the lowest score was 36/160 (one participant). The mean score was 74.6634 ± 4.21 (95% CI = 70.5–78.9).

Overall mean and domain mean responses

The overall mean and all domain means were less than 2, which indicated that the low scores needed special attention [>3 is good, 2–3 can be improved and <2 needs special attention (low)]. Individual item means were between 0.96 and 2.91. The lowest score was the item 'There are adequate catering facilities when I am on call' (0.96) in the social domain, while the highest score was the item 'I have good collaboration with other junior doctors' (2.91) in the autonomy domain. Two items (Table 1) scored means <1 : the item about catering (0.96) and 'My work load in this job is fine' (0.98).

The overall mean for the 40 items are as follows: $>3 = 0$; 2–3 = 16; and $<2 = 24$ items. Two items were less than 1. The domain mean responses are

shown in Figure 2. The lowest mean was 0.98 and the highest was 2.64 ($>3 = 0$; 2–3 = 5; and $<2 = 9$ items). One item scored less than 1. The item 'I feel part of a team working here' achieved the highest score, while the item 'My workload in this job is fine' achieved the lowest score. The teacher domain included 15 items: $>3 = 0$; 2–3 = 7; and $<2 = 8$ items, and no item scored less than 1. The item 'My clinical teacher encourages me to be an independent learner' achieved the highest score, while the item 'I have protected educational time in this rotation' achieved the lowest score. Regarding the social domain, 11 items' results were as follows: $>3 = 0$; 2–3 = 4; and $<2 = 7$ items. One item scored less than 1. The item 'I have good collaboration with other junior doctors in social domain' achieved the highest score, while the item 'There are adequate catering facilities when I am on call' achieved the lowest score.

Regarding academic achievement, the residents who started training in 2015 were the first batch to start training according to the updated curriculum. They had three promotion examinations: between levels 1 and 2 at the end of 2015, between levels 2 and 3 at the end of 2016 and the last one at the end of 2017 between levels 3 and 4. They sat for the final examination in March 2019. Data collected about the residency programme promotion examination between 2015 and 2019 showed results for the batch participating in this study. This batch had three promotion examinations in 2015, 2016 and 2017. The pass rates of the paper examination results were 99.4%, 97.9% and 96.4% for the 3 years, respectively. The percentages of the clinical examination results were 97.5%, 95.9% and 92.3%, respectively (Figure 3).

With regard to the final MD examination between 2015 and 2018, the percentages of the paper examination result were between 53.6% and 85%. The percentages of the clinical examination result were between 50.6% and 70.3%. The batch who participated in this study sat for the final MD examination in 2019. The paper exam result was 80.2% and the clinical exam result was 64% (Figure 4). There were no significant differences in response between males and female in autonomy, teaching or social domains. Autonomy; (P value = 0.647), teaching ($P = 0.874$) and social ($P = 0.626$).

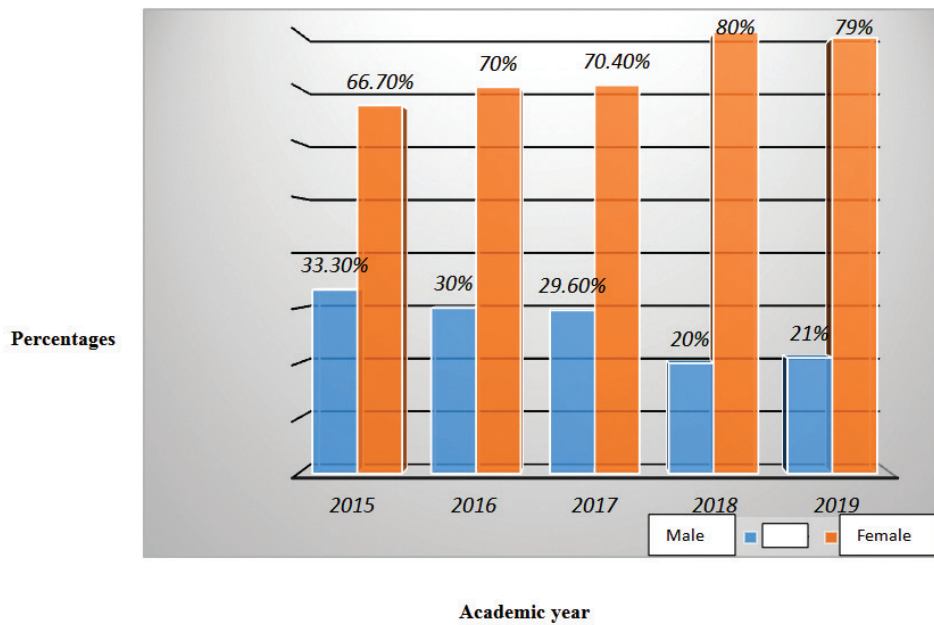


Figure 1. Percentages of males and females in the paediatric residency programme (2015–2019). Note that the number of males is decreasing, while the number of females is increasing steadily.

Table 1. Overall total responses and domain responses ($n = 101$).

Autonomy ($n = 14$)	Minimum	Maximum	Mean	Std. Deviation
My workload in this job is fine	0.00	4.00	0.98	1.26
I have a contract of employment that provides information about hours of work	0.00	4.00	1.12	1.35
I have to perform inappropriate tasks	0.00	4.00	1.58	1.36
There is accurate, unit specific written information available	0.00	4.00	1.59	1.24
My hours conform to the curriculum	0.00	4.00	1.61	1.29
I work according to a fixed timetable	0.00	4.00	1.64	1.50
I had an informative orientation programme	0.00	4.00	1.75	1.37
There are clear clinical protocols in this rotation	0.00	4.00	1.86	1.36
The training in this rotation makes me feel ready for the next step	0.00	4.00	1.89	1.29
I have the appropriate level of responsibility in this rotation	0.00	4.00	2.12	1.32
I have the opportunity to provide continuity of care	0.00	4.00	2.20	1.32
I have opportunities to acquire appropriate skills in practical procedures	0.00	4.00	2.33	1.17
My clinical teachers promote an atmosphere of mutual respect	0.00	4.00	2.43	1.08

Continued

Autonomy (n = 14)	Minimum	Maximum	Mean	Std. Deviation
I feel part of a team working here	0.00	4.00	2.64	1.11
Teaching (n = 15)	Minimum	Maximum	Mean	Std. Deviation
I have protected educational time in this rotation	0.00	4.00	1.20	1.20
I have enough clinical learning opportunities for my needs	0.00	4.00	1.42	1.18
There is access to an educational programme relevant to my needs	0.00	4.00	1.51	1.17
My clinical supervisor set clear expectations	0.00	4.00	1.71	1.24
I have good clinical supervision at all times	0.00	4.00	1.75	1.23
I get regular feedback from seniors	0.00	4.00	1.77	1.26
Senior staff utilise learning opportunities effectively	0.00	4.00	1.93	1.20
My clinical teachers are well organised	0.00	4.00	1.97	1.24
The clinical teachers provide me with good feedback on my strengths and weaknesses	0.00	4.00	2.05	1.15
I am able to participate actively in educational events	0.00	4.00	2.16	1.37
My clinical teachers are enthusiastic	0.00	4.00	2.24	1.10
My clinical teachers are accessible	0.00	4.00	2.24	1.15
My clinical teachers have good communication skills	0.00	4.00	2.30	1.13
My clinical teachers have good teaching skills	0.00	4.00	2.36	1.09
My clinical teachers encourage me to be an independent learner	0.00	4.00	2.56	1.12
Social (n = 11)	Minimum	Maximum	Mean	Std. Deviation
There are adequate catering facilities when I am on call	0.00	4.00	0.96	1.23
I feel physically safe within the hospital environment	0.00	4.00	1.16	1.21
There is a no-blame culture in this rotation	0.00	4.00	1.31	1.16
This hospital has good quality accommodation for junior doctors, especially when on call	0.00	4.00	1.35	1.28
I get a lot of enjoyment out of my present job	0.00	4.00	1.61	1.17
I have suitable access to careers advice	0.00	4.00	1.61	1.20
There are good counselling opportunities for junior doctors who experience difficulty regarding their training in this rotation	0.00	4.00	1.84	1.32
My clinical teachers have good mentoring skills	0.00	4.00	2.19	0.99
There is sex discrimination in this rotation	0.00	4.00	2.38	1.47
There is racism in this rotation	0.00	4.00	2.41	1.31
I have good collaboration with other junior doctors	0.00	4.00	2.91	1.01

DISCUSSION

This study is aimed at answering the question about how the paediatric residents perceive their educational environment. Between 2015 and 2019, the number of females was steadily surpassing that of males, This high female to male ratio is similar to a study conducted in Pakistan by Bari et al. [12], where females represented 60% in comparison to males who represented 40%. On the contrary, another study in the eastern area of Saudi Arabia found a high male to female ratio [13].

The overall responses score was 74/160. This is considered as a score with plenty of problems. Two studies were found with similar scores: a study in Saudi Arabia by Al-Sheikh et al. [11] reported a score of 82.2/160 and Bari et al. [12] in Pakistan reported a score of 88.2/160. The training environment in Saudi Arabia may be more favourable than that of Sudan, whereas Pakistan may have a comparable training environment. A project in an Australian setting reported a higher score of 110/160 [14].

The overall PHEEM mean is 1.864. When this mean is less than 2, then it indicates several problems that need urgent attention. Higher

means were found by other researchers; for example, Danish residents scored 2.6–3.8 [15], Saudi Arabians scored 1.63–3.23 [13] and South Africans scored 3.51 [16]. The lowest reported means ± SD were 1.015 ± 1.137–2.79 ± 0.802 [16] and 1.35 ± 1.2–2.69 ± 0.9 [11].

The mean of the autonomy domain in this study was less than 2, compared to other studies [12]. Nevertheless, some studies reported higher scores: 1.35–2.53, 3.64, 1.63–2.93, and 2.6–3.8 in [11, 13, 15 and 16], respectively. The item ‘I feel part of a team working here’ scored the highest mean. Team work does not require a lot of resources; however, doctors are doing their best to provide optimal patient care despite the stressful environment. This is similar to a study in Saudi Arabia [11], while the item ‘My workload in this job is fine’ scored the lowest. Residents usually run the services in all governmental hospitals because of the extensive doctor migration, performing challenging tasks with a huge work load. This is similar to the studies in South Africa, Pakistan and Iran [12,16,17].

The teaching domain mean was less than 2 and was the highest domain in this study. This was compared

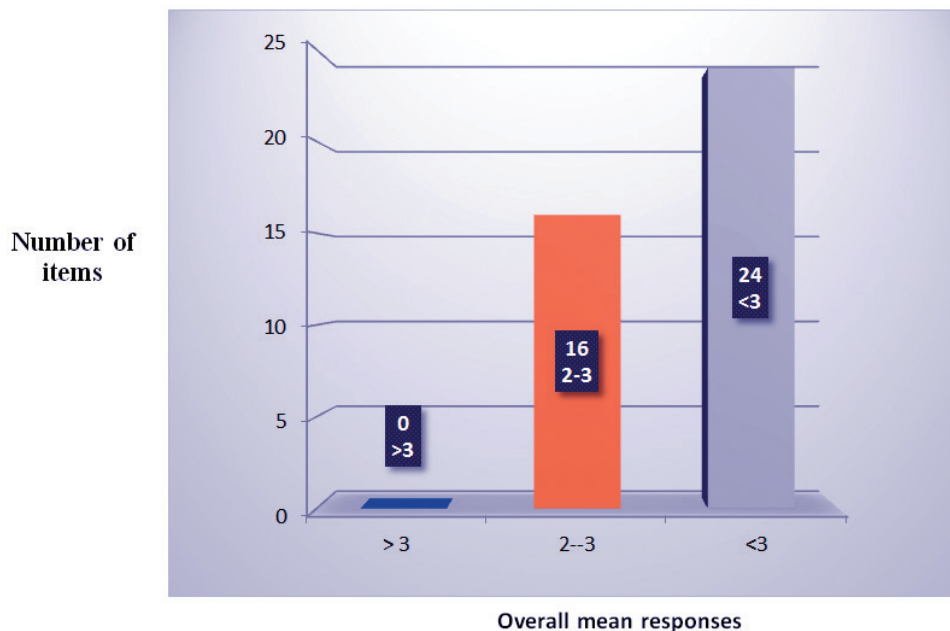


Figure 2. Representation of the overall mean responses to the postgraduate hospital educational environment measure.

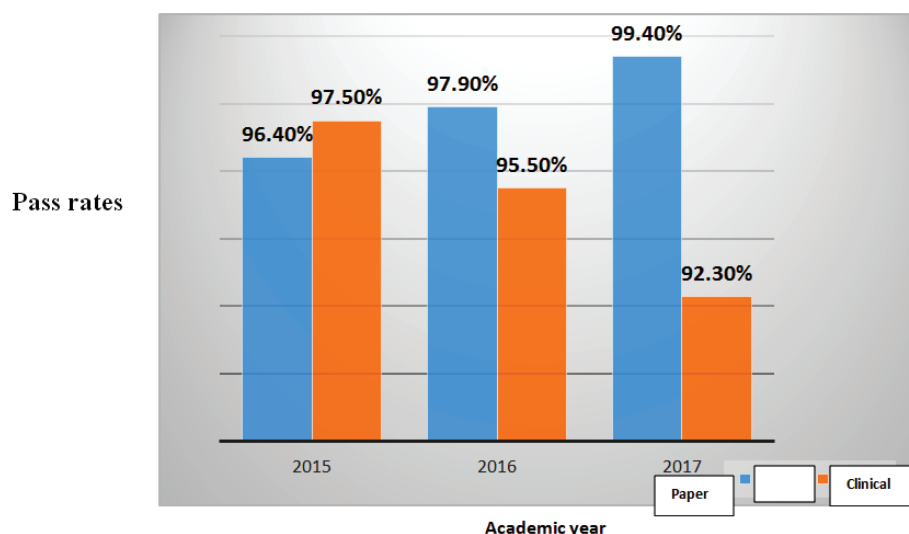


Figure 3. Pass rates of the promotion examinations from 2015 to 2017.

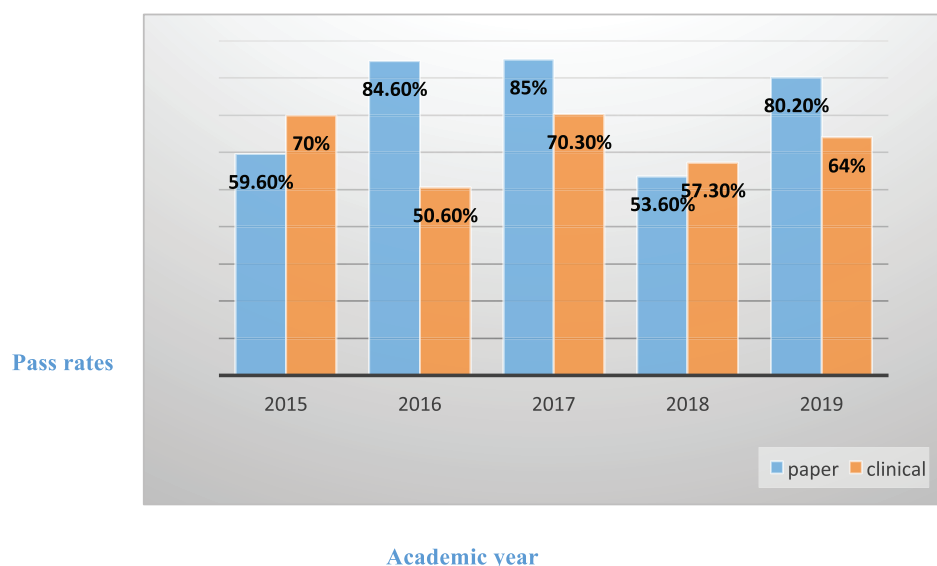


Figure 4. Pass rates of the final MD examination results from 2015 to 2019.

to another report (1.92–2.69) [11]. Higher scores were reported as 2.29–3.08, 2.9–3.5 and 3.85 in [13, 15 and 16], respectively. The item ‘My clinical teacher encourages me to be an independent learner’ scored the highest. Individual teacher’s efforts can clearly provide some compensation with regard to the difficult training environments. This is similar to Al-Sheikh et al.’s study [11]. Conversely, the item ‘I have protected educational time in this rotation’ had the lowest score, indicating that residents’ activities did not conform to the curriculum, raising

the question of curriculum implementation and the need for urgent studies on this issue. This is similar to Pakistani and Danish studies [12, 15].

The social support domain scored the lowest. This is compared to a Pakistani study (1.015–2.79) [12]. The item ‘I have good collaboration with other junior doctors’ had the highest score. This was similar to studies in Saudi Arabia and Pakistan [13, 12]. The item ‘There are adequate catering facilities when I am on call’ had the

lowest score. This is similar to other studies [11-13, 15, 17].

Programme examinations between 2015 and 2019 showed astonishing promotion examination results for the batch participating in this study, with regard to the low mean responses in the educational environment. The examination results are not given as individual scores, but expressed as either as pass or fail. Paper and clinical examination pass rates were above 90%, for the 3 years, respectively. This indicates that the residents struggled to achieve their pre-set goals in spite of the suboptimal educational environment. Regarding the final MD examinations between 2015 and 2018, the percentages of the paper examination result were between 53.6% and 85%. The percentages of clinical examination result were between 50.6% and 70.3%. The examination results were not expressed as the average grade point, but expressed as either pass or fail, resulting in difficulty in comparing the perception of the educational environment and academic achievement based on the marks.

Responses with regard to gender showed no significant differences between the two categories in all domains. This was similar to other studies [11, 13, 17]. Only one study showed that males rated higher than females in 80% of the items, especially in the autonomy and social support domains [14].

CONCLUSION

There are problems in the training environment that need attention and action for improvement. Social activities were poor. Sponsorship is a problem, as well as lack of protected educational time, since the services are run by residents in all training hospitals. The number of females keeps increasing throughout the years. The examination results are acceptable with regard to the challenges regarding the educational environment.

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CONFLICT OF INTEREST

The authors declare that they have no conflicts of interest.

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ETHICAL APPROVAL

Ethical approval was obtained from the Institutional Review Board, Alneelain University and the Sudan Medical Specialisation Board, Khartoum, Sudan. Informed consent was obtained from the level four paediatric residents participants. Study data/information were used for research purposes only. Confidentiality was ensured at all stages.

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