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DENTAL RESIDENTS' PERCEPTION OF LEARNING ENVIRONMENT: EXPERIENCE OF A NIGERIAN TRAINING INSTITUTION

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ABSTRACT

Background: **Learning environment has been described as crucial in determining the success of medical and dental education. Continuous evaluation of this environment will help in maximizing the learning opportunities of the training program.**

Objective: **To assess the resident doctors' perception of their learning environment at a teaching hospital in Nigeria.**

Method: **The DREEM questionnaire was administered to participants undergoing residency training in the faculty of Dental Surgery at the University College Hospital, Ibadan.**

Result: **Thirty-nine resident doctors participated in the study (23 Males, 16 Females), mean age (±SD) was 35.7 (±4.22) ranging from 28 years to 46 years. Mean global score (±SD) was 105.3 (±26.8), 52.7%, out of a maximum of 200. The mean global score according to gender was significantly higher among males than females. The overall perception of the training environment by residents is more positive than negative and the male gender appears to have a more positive perception than the female gender. However, this perception is borderline as the environment was perceived as having many problems and residents' perception of their learning environment is mostly negative. Attention of the institution and trainers should be drawn to possibilities of combating the problem areas for better outcome of residency training in our environment.**

INTRODUCTION

Residency training program is a postgraduate medical education during which a medical or dental graduate is trained in a specialized field of medicine or dentistry. The program affords the trainee the opportunity to build on the knowledge laid down during the undergraduate period while focusing on a specialty. The Faculty of Dental Surgery residency program in Nigeria, consists of a three-year junior residency and subsequently a three-year senior residency period leading to an award of the fellowship of the postgraduate medical college.

An educational environment is everything that happens within the institution of training that is crucial in determining the success of medical or dental education[1,2]. This environment includes the trainer, trainee, teaching and learning methods, learning resources, monitoring and evaluation processes of the program, and the social life around the vicinity of learning. Clinical learning environments involve three key elements: clinical work; learning; and environment[3]. It is advocated that the clinical learning environment should nurture health care providers' wellbeing, encourage adequate supervision, support safe transition of care, inspires interprofessional collaboration and stimulate scholarly activities aimed at developing and maintaining lifelong learning skills. As educational environment strongly affects trainees' achievement, satisfaction and success, it is therefore essential to assess trainees' perceptions of the learning environment as these perceptions can influence their learning outcome and ultimately the success of the residency-training programme. It is important to get regular feedback from trainees' and students on how they experience the educational environment. It is therefore essential to assess trainees' perceptions of the learning environment as these perceptions can influence their learning outcome and ultimately the success of the residency-training programme[3,4]. The Dundee Ready Education Environment Measure (DREEM) is a highly generic non-culturally specific tool used to assess trainees' perception of their educational environment[5]. It can be used to evaluate the strength and weaknesses of a learning environment, compare learning institutions and assess the impact of a change in curriculum[1,6]. Understanding resident doctors' perceptions of their

learning environment may play a vital role in planning and implementing a holistic residency training curriculum. There is dearth of information on learning environment in the residency training programme in our environment. This article describes the perception of learning environment by dental residents at the University College Hospital, Ibadan. Our aim was to assess whether the year of residency, gender or specialty has an association with residents' perceptions of the learning environment.

MATERIAL AND METHODS

The Dundee Ready Educational Environment Survey (DREEM) consists 50 items distributed among five subscales (Table 1). Each item is answered with a 5-point Likert scale of 0-Strongly disagree, 1-Disagree, 2-Uncertain, 3-Agree and 4-Strongly agree. The maximum obtainable (global) score for the DREEM is 200.[1,7] The individual items are interpreted as ≤2.0 - points of problem areas, >2.0 but <3.0 - needs enhancement and ≥ true positive points 3.0[1,7]. The five subscales are interpreted according to Table 1[1].

This is a cross-sectional study. The DREEM self-administered questionnaire was administered to all consenting residents undergoing rotation in the Faculty of Dental Surgery (FDS) at the University College Hospital (UCH), Ibadan, in the following specialties: Oral and Maxillofacial Surgery (OMS), Oral Pathology, Oral Medicine, Periodontology, Paediatric Dentistry, Orthodontics, Conservative Dentistry, Prosthetic Dentistry and Community Dentistry. These nine specialties were re-grouped into four categories based on specialty outlook and intervention techniques to enable statistical analysis: Group I: OMS, Group II: Diagnosis-based category (Oral Pathology, Oral Medicine and Periodontology), Group III: Restoration - based category (Paediatric Dentistry, Orthodontics, Conservative Dentistry and Prosthetic Dentistry) and Group IV: Community Dentistry.

The guide for interpretation of each domain was done following the recommendations of McAleer and Roff.[8] Data was analyzed using SPSS version 21. The mean scores for each subscale and each item were calculated and compared according to gender, specialty grouping and cadre using student T-test for comparison of two means and ANOVA for comparison of more than two means. Statistical significance was set at ≤0.05.

RESULTS

Respondents were 39 out of 45 residents (86.7% response rate). Mean age (±SD) was 35.7 (±4.22) ranging from 28 years to 46 years. There were 23 males

Table 1: Guide to interpretation of the global scores and scores for the five subscales (Riveros, Bakhshialiabad)

	Maximum score	Score range	Interpretation
Global score	200	0 - 50	Very poor
		51 - 100	Many problems
		101 - 150	More positive than negative
		151 - 200	Excellent
Subscale			
Perception of trainers	44	0 - 11	Abysmal
		12 - 22	In need of some retraining
		22 -33	Moving in the right direction
		34 - 44	Model trainers
Perception of learning	48	0 -12	Very poor
		13 - 24	Training is viewed negatively
		25 – 36	A more positive perception
		37 - 48	Teaching is highly thought of
Academic self-perception	32	0 – 8	Feelings of total failure
		9 – 16	Many negative aspects
		17 - 24	Feeling more on the positive side
		25 - 32	Confident
Perception of Atmosphere	48	0 – 12	A terrible environment
		13 -24	There are many issues which need changing
		25 -36	A more positive atmosphere
		37 - 48	A good feeling overall
Social self-perception	28	0 – 7	Miserable
		8 – 14	Not a nice place
		15 - 21	Not too bad
		22 -28	Very good socially

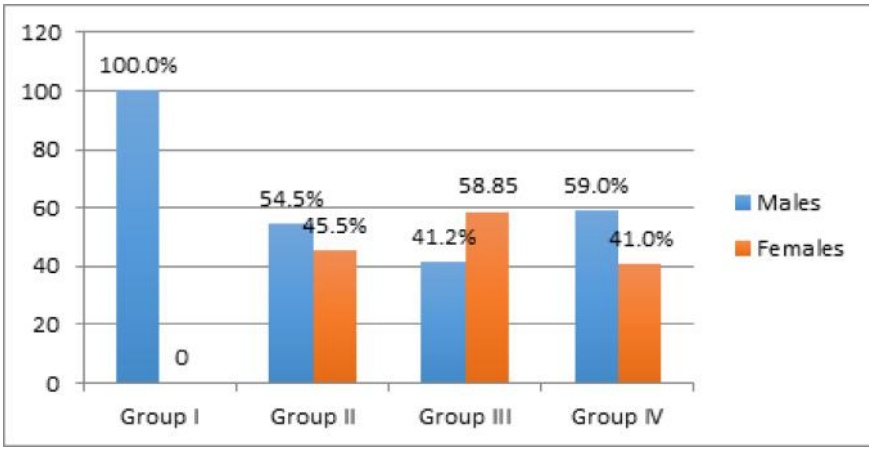

Figure 1: Gender distribution among the specialties

and 16 females, mean ages according to gender and specialty groups are as shown on Table 2. Group III specialties were the most represented accounting for 43.6% of the respondents. Two specialties' groups had more males than females while there were more females than males in II and only males in 1 (Figure 1). This was statistically significant (p= 0.047).

Mean global score (±SD) was 105.3 (±26.8), 52.7%, out of a maximum of 200. Mean scores of two out of the five subscales had values with negative interpretations; the perception atmosphere and the social self-perception scored 18.86 and 13.26 which translated to "There are many issues which need changing" and "not a nice place" respectively (Figure 2). The mean global score according to gender was significantly higher among male than females with a p-value of 0.037. However, the mean scores of the subscales between the two genders were not statistically

Table 2: Mean ages in years

		Mean	SD	Minimum	Maximum	P value
Gender	Male (23, 59.0%)	36.44	±4.86	28.0	46.0	0.48
	Female (16, 41.0%)	34.75	±2.96	29.0	40.0	
Specialty groups	Group I (8, 20.5%)	36.50	±5.40	30.0	46.0	0.88
	Group II (11, 28.2%)	35.36	±3.53	31.0	43.0	
	Group III (17, 43.6%)	35.88	±4.58	28.0	44.0	
	Group IV (3, 7.7%)	34.33	±0.56	28.0	46.0	

SD – Standard deviation.

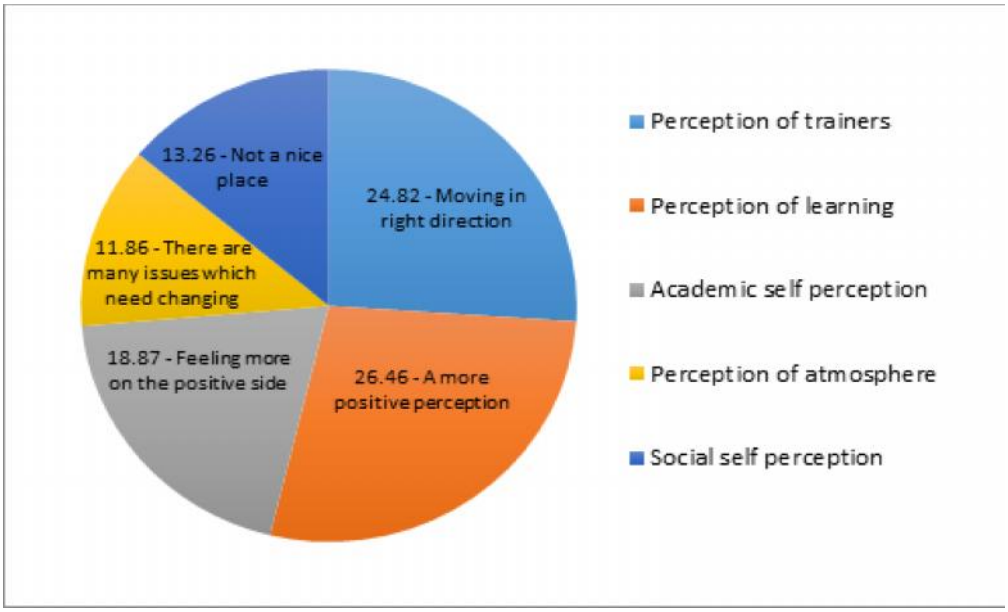

Figure 2: Interpretation of the mean subscale scores among the study participants.

Table 3: Comparison of mean scores of the five subscales according to gender, specialty groups and cadre (±SD)

	Global mean score	Perception of trainers	Perception of learning	Academic self perception	Perception of atmosphere	Social self perception
Males	106.22 (17.67)	25.49 (6.07)	26.70 (5.41)	18.87 (4.45)	21.78 (7.51)	13.40 (4.06)
Female	103.88 (36.83)	23.88 (9.39)	26.13 (9.69)	18.88 (7.16)	21.94 (10.35)	13.06 (5.34)
P-value	0.037*	0.147	0.122	0.246	0.165	0.514
Group I	95.88 (20.45)	26.50 (7.15)	25.25 (6.07)	17.75 (5.01)	15.50 (7.48)	10.88 (5.44)
Group II	99.10 (35.13)	22.91 (9.13)	23.55 (8.57)	18.36 (7.71)	20.73 (9.20)	13.55 (5.45)
Group III	115.29 (23.41)	26.12 (6.51)	29.18 (7.13)	20.65 (4.17)	25.88 (7.85)	13.47 (3.34)
Group IV	96.00 (8.66)	20.00 (8.00)	25.00 (2.66)	13.67 (2.31)	20.00 (0.00)	17.33 (2.52)
P-value	0.234	0.431	0.277	0.200	0.033*	0.200
Junior registrar	112.4 (19.63)	27.50 (4.97)	28.00 (6.34)	19.90 (4.09)	23.30 (8.27)	13.70 (6.00)
Senior registrar	102.79 (28.74)	23.90 (8.10)	25.93 (7.71)	18.52 (6.10)	21.34 (8.87)	13.10 (4.07)
P-value	0.699	0.223	0.668	0.377	0.838	0.082
≤ 3 years	111.00 (20.28)	27.78 (5.19)	27.89 (6.72)	19.33 (3.91)	22.44 (8.29)	13.56 (6.35)
> 3 years	103.53 (28.53)	23.93 (7.97)	26.03 (7.60)	18.73 (6.11)	21.67 (8.66)	13.17 (4.02)
P-value	0.738	0.326	0.861	0.289	0.924	0.032*

different. The mean scores of the subscales were generally higher for group III though these differences were not statistically significant except for the atmosphere subscale which was least for the group I and highest for group III as shown on Table 3 (p=0.033). The subscales' scores were generally higher for the registrars compared with the senior registrars with the highest score being 28.0 for the perception of learning and least 13.10 for the social self-perception. These differences were not statistically significant. Respondents who have been in residency training for 3 years and below scored the subscales higher than those who have been in residency for above 3 years (Table 3). This was not statistically significant. Exploration of the individual items revealed nine problem areas listed on Table 4 and 14 items that differed statistically significantly among gender, specialty groups and cadre (Table 5). The most negative of the problem areas implies that trainers ridicule the residents while the most significant difference was found among the specialty groups with item "The atmosphere is relaxed during teaching sessions" where group II scored highest (2.00, ±1.0) and group III scored the least (0.68, ± 0.17).

Table 4: Items identified as problem areas (Scored ≤ 2.0)

	Item number	Mean score (±SD)
1.	The trainers do not ridicule the residents	1.69 (1.28)
2.	The trainers are not authoritarian	1.82 (1.25)
3.	The residents do not irritate the trainers	1.56 (1.10)
4.	The teaching is sufficiently structured to develop my self-confidence	1.85 (1.11)
5.	The teaching is sufficiently structured to develop my competence	1.97 (0.99)
6.	The teaching is resident centered	1.87 (1.03)
7.	The teaching does not over-emphasize abstract learning	1.77 (1.16)
8.	I am able to memorize all I need	1.82 (1.12)
9.	I feel I am being well prepared for my profession	1.90 (1.12)

Table 5: Comparison of mean item score that showed statistically significant differences according to gender, specialty groups and cadre (±SD)

Gender	**Male**		**Female**		**P-value**
The trainers are knowledgeable	3.09 (0.43)		2.81 (0.98)		0.024
I am encouraged to participate in teaching sessions	2.95 (0.72)		2.69 (1.30)		0.025
Specialty groups	**Group I**	**Group II**	**Group III**	**Group IV**	
I am clear about the learning objectives of the teaching sessions	2.38 (0.92)	1.91 (0.94)	2.71 (0.69)	1.67 (0.58)	0.049
The teaching does not over-emphasize abstract learning	1.25 (1.04)	1.82 (1.25)	2.40 (0.83)	1.00 (0.00)	0.043
The frequency of teaching sessions are adequate for training	1.13 (1.25)	0.82 (0.75)	2.00 (1.12)	2.33 (1.53)	0.024
The atmosphere is relaxed during teaching sessions	1.63 (1.30)	2.27 (1.01)	2.69 (0.87)	1.00 (0.00)	0.022
I am able to concentrate well	0.75 (1.04)	1.73 (1.01)	2.29 (0.85)	1.33 (0.58)	0.004
The atmosphere is relaxed during teaching sessions	0.71 (0.95)	2.00 (1.00)	0.68 (0.17)	1.33 (0.58)	0.000
Cadre	**Registrars**		**Senior Registrar**		
The trainers are good at providing feedback to residents	2.80 (0.79)		2.10 (1.05)		0.022
The trainers have good communication skills with patients	3.10 (0.57)		2.48 (0.99)		0.018
The trainers do not get angry during teaching sessions	2.30 (0.95)		1.97 (1.27)		0.044
Much of what I have to learn seems relevant to my specialty	2.80 (1.03)		2.17 (1.26)		0.050
The residency program is well time tabled	1.80 (1.40)		1.03 (0.98)		0.041
I do not find the experience disappointing	2.10 (0.74)		1.68 (1.16)		0.018

Table 6: Comparison of DREEM percentages of mean scores of the different subscales with other studies (mean scores).

Author (Year)	Population (Location)	Mean Global Score (200)	Perception of trainers (44)	Perception of learning (48)	Academic self perception (32)	Perception of Atmosphere (48)	Social self-perception (28)
Chhabra (2016)	Medical residents (India)	69.9% (139.8)	67.5% (29.7)	70.0% (33.6)	73.6% (23.6)	70.8% (34.0)	67.1% (18.8)
Oliveira (2005)	Medical residents (Brazil)	54.8%	57.1%	60.8%	59.0%	63.7%	50.1%
Riveros-Perez (2016)	Anaesthesiology residents (USA)	65.0% (2.6)	57.5% (2.3)	67.5% (2.7)	75.0% (3.0)	62.5% (2.5)	62.5% (2.5)
Farahmand (2014)	Medical interns (Iran)	66.9% (133.72)	72.3% (31.83)	64.1% (30.75)	63.5% (20.32)	71.4% (34.29)	63.2% (17.69)
Edgren (2010)	Medical students (Sweden)	72.5% (145)	68.2% (30)	68.8% (33)	75.0% (24)	77.1% (37)	75.0% (21)
Roff (2001)	Medical students (Nigeria)	59.0% (118)	72.3% (26)	68.8% (33)	65.6% (21)	56.3% (27)	46.4% (13)
Okoye (2017)	Medical students (Nigeria)	50.9% (101.82)	55.5% (24.40)	54.1% (25.97)	62.4% (19.96)	39.6% (19.02)	42.4% (11.86)
This study	Dental residents (Nigeria)	52.7% (105.3)	56.4% (24.82)	55.1% (26.46)	59.0% (18.87)	45.5% (21.85)	47.4% (13.26)

DISCUSSION

The results of this inventory indicate that the overall dental residents' perception of the learning environment is more positive than negative and the male residents' posted a more positive outlook of the learning environment. Perception of the residents' evaluation of the learning environment is an important component of institutional or program evaluation processes[9,10]. This study explored resident doctors'

perception of their learning environment in a Nigerian tertiary medical facility using the Dundee Ready Education Environment Measure (DREEM) questionnaire. The DREEM was developed in 1997 by a Delphi panel of medical and health profession educators from about 20 countries to evaluate the educational environment in undergraduate medical institutions[11]. Since its development it has been used with other categories of trainees such as interns and residents[6,7,9,12]. It has been used previously in 20 countries including Nigeria[11–13] and has been translated into at least eight languages[12]. It is considered to be a useful tool for the evaluation and diagnosis of the strengths and weaknesses of a learning environment[6,12]. It has been observed that DREEM discriminated gender-related perceptions of teachers and also discriminates between institutions, specialties and programs[9].

The respondent rate of 86.7% observed in this study was comparable with previous reports of 82% among anaesthesiology residents in USA but lower than 92.0%, 92.1% and 93.5% for emergency medicine residents in India[7], medical students in Nigeria[13] and students in medical science courses in Iran[1]. In this study some of the residents were unavailable to participate in the study as they were on leave or rotating through postings outside the study facility at the time of the study thus accounting for the relatively lower response rate.

Perceptions of the training environment are important predictors of training outcomes and therefore should be frequently assessed to identify problem areas that should be resolved for improvement[5,6,10]. In this study, participants considered their training environment to be more positive than negative (global score of 101-150) albeit the mean global score of 105.3 was at the lower limit of this category of interpretation, bordering on the 'many problems' categories range of 51-100. This finding can be considered as a red flag in the training of dental residents and attention should be drawn to investigate components of the training environment towards ensuring positive modifications. In a similar study among interns conducted at an emergency department of a hospital in Iran, the global mean score was 135.79/200[4]. This higher score is compatible with modern education environment[4,14,15]. Studies from India also reported higher scores than this study with mean global scores of 139.8 and 123[7]. It is difficult to compare these cohorts because there were more specialties involved in that study and also due to the fact that there are cultural and curricular differences between residency programs in different countries, however, we believe that this finding reflects a more positive perception of learning environment in these countries when compared with Nigeria. An educational environment that is not conducive to learning does not only impede trainee's ability to acquire new skills and knowledge, thus hindering their growth as professionals, but also adversely affects their social life and contribution to the community. The availability of a learner-friendly environment is even more essential in disciplines that are directly related to health care delivery and patient [16].

The female gender perceived the training environment more negatively than the male gender though their perception of the training environment was slightly higher than for the male gender. This relatively negative perception of the environment by the female gender has been similarly reported by some other studies[11] but differs from the findings of Al-Naggar *et al.*[17] the reason for this difference is probably due to more physical contributory role of the female gender in child care and family activities compared to their male colleagues though the reason should be further explored[16].

The nine specialties in this study were categorized into four groups based on perceived similarities of the specialties in terms of healthcare intervention techniques. This categorization was done to facilitate statistical analysis such as comparisons between the groups. Group III (restoration based specialties) had the highest number of specialties in a single group thus accounting for the highest number of participants. All the groups had more males than females except group III and the female gender was not represented in group I. The reason for this is unknown however the long working hours demanded by the specialty may be a deterrent to the female gender as this is perceived to have a negative impact on family time [16].

Further analyses showed that the subscale of the perception of atmosphere was marred with negative perceptions. The respondents in groups I, II and IV of oral and maxillofacial surgery, community dentistry and diagnosis – based specialties have means of 15.5 (32.3%), 20.73 (43.2) and 20.0 (41.7%) respectively for perception of learning atmosphere, this was statistically significant (p= 0.033). For some unknown reasons it appears the respondents in group III were more positive than respondents in other groups, this difference needs to be further evaluated. The junior registrars rated the item on trainers giving feedback higher than the senior registrars and it appears as a trainee progresses in the programme his/her perception about the programme becomes more negative as the global mean score of respondents in the residency programme for less than or equal to three years was higher than those in the programme for more than

three years. This decline has been similarly reported in some previous studies[4,6]. Riveros-Perez *et al*[6] also noted lower scores for senior residents Anaesthesiologists but reported no association between years of training and both the DREEM overall and subscale scores as the findings were not statistically significant. A shift in scores was also noted as the highest score changed from the perception of trainers subscale in the registrar cadre to the perception of their academic activities subscale in the senior registrar cadre. The perceptions of the trainees with least years in training is generally better than their seniors this is contrary to the result of study of Riveros-Perez *et al* [6] who found no association between the year of training and the DREEM questionnaire score. Another study concluded that the more year in medical school, the more positive perceptions of learning environment. This seems to be the reverse in our study and it is similar to the report of Raiz *et al* [18] who reported lower scores in final year undergraduate students. Some of the reasons advanced for this, includes higher expectations at the time of gaining admission into the programme, gradual loss of interest over time, and increased stress secondary to involvement in clinical activities, workload, trainees' perceived unpreparedness secondary to inadequate knowledge and skills and lack of support in the care of patients have been factors identiûed as reasons for stress after involvement in clinical activities[17,19].

The mean scores of the subscales according to gender were not significantly different except for the perception of learning process where the males scored significantly higher than the females.

Findings of this study are comparable to previous studies in Nigerian undergraduate populations as shown on Table 6. The Nigerian studies had generally lower scores compared with previous reports in both non-Nigerian undergraduate and postgraduate populations especially for the subscales of perception of atmosphere and social self-perception. Similar studies in Nigerian postgraduate populations for comparison were not found in literature by the authors. Such studies are needed to better understand the training environment of residency in Nigeria as this may inform possible modification of the residency programme with the aim of improving training outcomes. Also, positive interventions to the present state of residency training may avert negative consequences such as seeking training outside the shores of Nigeria and subsequent loss of medical personnel.

CONCLUSION

The overall perception of the training environment by residents is more positive than negative and the male gender appears to have a more positive perception than the female gender. However, this perception is borderline as the environment was perceived as having many problems and dental residents' perception of their learning atmosphere in particular is mostly negative. The attention of the institution and trainers should be drawn to possibilities of improving on the problem areas, this will help in ensuring that our residency graduates develop an enduring spirit of lifelong learning, empathy, and scholarship, which will empowers them to lead changes in our health care system.

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