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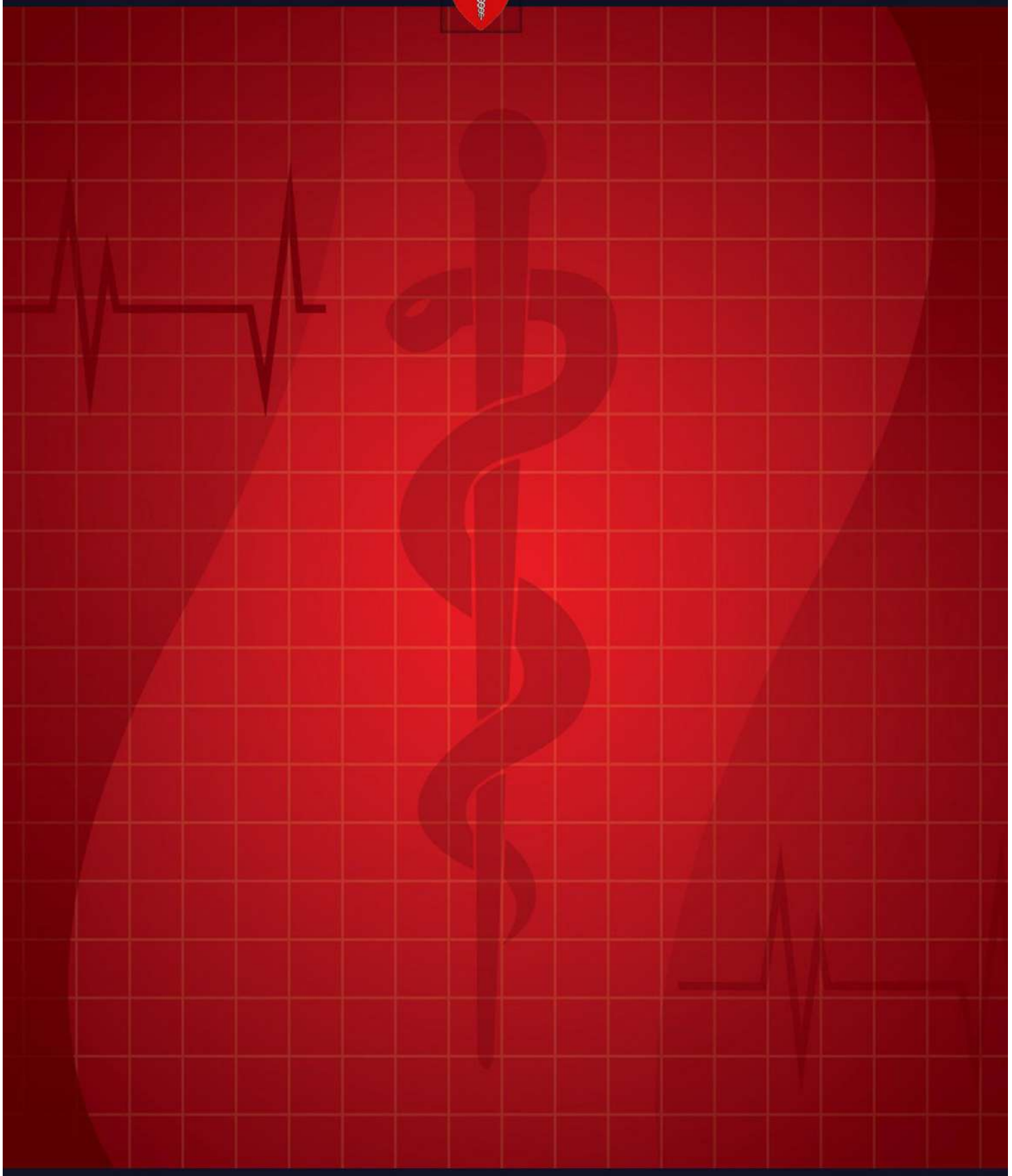

Volume-7, Issue-2, February 2021

Preface

We would like to present, with great pleasure, the inaugural volume-7, Issue-2, February 2021, of a scholarly journal, *International Multispeciality Journal of Health*. This journal is part of the AD Publications series *in the field of Medical, Health and Pharmaceutical Research Development*, and is devoted to the gamut of Medical, Health and Pharmaceutical issues, from theoretical aspects to application-dependent studies and the validation of emerging technologies.

This journal was envisioned and founded to represent the growing needs of Medical, Health and Pharmaceutical as an emerging and increasingly vital field, now widely recognized as an integral part of scientific and technical statistics investigations. Its mission is to become a voice of the Medical, Health and Pharmaceutical community, addressing researchers and practitioners in below areas

Clinical Specialty and Super-specialty Medical Science:

It includes articles related to General Medicine, General Surgery, Gynecology & Obstetrics, Pediatrics, Anesthesia, Ophthalmology, Orthopedics, Otorhinolaryngology (ENT), Physical Medicine & Rehabilitation, Dermatology & Venereology, Psychiatry, Radio Diagnosis, Cardiology Medicine, Cardiothoracic Surgery, Neurology Medicine, Neurosurgery, Pediatric Surgery, Plastic Surgery, Gastroentrology, Gastrointestinal Surgery, Pulmonary Medicine, Immunology & Immunogenetics, Transfusion Medicine (Blood Bank), Hematology, Biomedical Engineering, Biophysics, Biostatistics, Biotechnology, Health Administration, Health Planning and Management, Hospital Management, Nephrology, Urology, Endocrinology, Reproductive Biology, Radiotherapy, Oncology and Geriatric Medicine.

Para-clinical Medical Science:

It includes articles related to Pathology, Microbiology, Forensic Medicine and Toxicology, Community Medicine and Pharmacology.

Basic Medical Science:

It includes articles related to Anatomy, Physiology and Biochemistry.

Spiritual Health Science:

It includes articles related to Yoga, Meditation, Pranayam and Chakra-healing.

Each article in this issue provides an example of a concrete industrial application or a case study of the presented methodology to amplify the impact of the contribution. We are very thankful to everybody within

that community who supported the idea of creating a new Research with *IMJ Health*. We are certain that this issue will be followed by many others, reporting new developments in the Medical, Health and Pharmaceutical Research Science field. This issue would not have been possible without the great support of the Reviewer, Editorial Board members and also with our Advisory Board Members, and we would like to express our sincere thanks to all of them. We would also like to express our gratitude to the editorial staff of AD Publications, who supported us at every stage of the project. It is our hope that this fine collection of articles will be a valuable resource for *IMJ Health* readers and will stimulate further research into the vibrant area of Medical, Health and Pharmaceutical Research.

Dr. Kusum Gaur
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(Managing Editor)

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Dr. Kusum Gaur working as professor Community Medicine and member of Research Review Board of Sawai Man Singh Medical College, Jaipur (Raj) India.

She has awarded with WHO Fellowship for IEC at Bangkok. She has done management course from NIHFW. She has published and present many research paper in India as well as abroad in the field of community medicine and medical education. She has developed Socio-economic Status Scale (Gaur's SES) and Spiritual Health Assessment Scale (SHAS). She is 1st author of a book entitled " Community Medicine: Practical Guide and Logbook.

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He is working as Professor, Department of Surgery, Government Medical College, Chandigarh, India. He has done FMAS, FIMSA and FCLS along with MS (Gen Surgery).

He has about 50 international and national publications to his credit. He has held various positions in the Association of Minimal Access Surgeons of India (AMASI) from time to time. He has also acted as instructor of various AMASI skill courses held at different places in India. He has established Surgical Technique learning centre at GMCH Chandigarh for imparting training to the budding surgeons in the field of minimal access surgery. He is also the reviewer in the subject in various journals.

Research Area: Minimal Access Surgery.

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Research Area: Congenital Malformation, Developmental Anatomy.

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Dr. Praveen Mathur

Dr. Praveen Mathur is working as Professor- Pediatric Surgery and is recipient of Commonwealth Fellowship in Pediatric Laparoscopy from Uk and fellowship award in minimal access Surgery (FMAS). He has done Clinical observer ship in the Department of Pediatric Surgery, Johns Hopkins University, Baltimore, USA. (2008). He has presented and published a number of research articles at national and international level. He is reviewer of prestigious Journal of Pediatric Surgery (JPS) and World Journal of Gastroenterology, Journal of neonatal Surgery (JNS).

Research Area: Pediatric Surgery & Laparoscopy.

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Assessment of Undergraduate Medical Learners' Perception of the Learning Environment using Modified DREEM Questionnaire: A Cross Sectional Study

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Abstract—

Background: *The students' perception of the learning environment is important for proper learning to take place. Students' reflection in this regard is also crucial in the accreditation process. Sudan has witnessed huge expansion in higher education which resulted in many challenges facing the educational environment. This study aimed to assess the medical students' perception of the learning environment at a Sudanese University, October 2019.*

Methods and material: *The study was descriptive cross-sectional. Medical students from 2nd to 5th class were chosen proportionately, using systematic random technique. Calculated sample size was 330. Data was collected using self-administered modified Dundee Ready Educational Environment Measure. 17 questions with total mean score of 68 involved assessment of five domains of the educational environment namely, Students' perception of learning (SPL), Students' perception of teachers (SPT), Students' academic self perception (SAS), Students' perception of the atmosphere (SPA) and social self-perception (SSS). Data was analyzed using SPSS version 23.*

Results: *315 students participated in the study with 95% response rate. Males were almost as twice as females. The total mean score was 37.8 out of 68 that means more positive than negative. 2 out of 3 SPL, 2 out of 5 SPA items, and one out of 3 SSS items were identified as problem areas. In total, 5 out of 17 items were identified as problematic. There was no statistically significant difference between males and females regarding the sub-groups (P >0.05). As regarding the association between students' perception of the learning environment and academic achievement and class level; has shown significance only for the later with P values < 0.05 mainly between 5th and 3rd year.*

Conclusion: *Medical students' perception of the learning environment at a Sudanese university was positive more than negative. Some items of the learning environment were in need of improvement. There was significant ascending difference between some of the classes in relation to perception of the learning environment.*

Recommendations: *Adjustment of the learning environment and continuous evaluation of students' perception.*

Keywords: Medical, students, perception, learning, environment.

I. INTRODUCTION

The learning environment is the physical, social, and psychological context in which students learn. A supportive learning environment contributes to student well-being and enhances student empathy, professionalism, and academic success, whereas an unsupportive learning environment may lead to burnout, exhaustion, and distrust. Student's perceptions of the medical school learning environment may change over time and be associated with student's year of training and may differ significantly depending on the student's gender or ethnicity.(1)

Medical education in Sudan started long ago. In 1924, the first medical school in the Sudan, Kitchener School of Medicine (KSM) was founded.(2) Training of paramedical staff started shortly before establishment of KSM with startup of school of

medical assistants in 1918 and another school of modern midwifery in 1921.[3] Juba university medical school was established in 1977 and Gezira university medical school in 1978. In the 1990s, there was a huge expansion in higher education, particularly in colleges of medicine, with more than 30 being established.[4] Currently, Sudan has more than 60 colleges of medicine.[5] The intake of students to medical schools had increased from 300 to 1500 in one year 1991. Around 2009 more than 2500 students were admitted.[6] This expansion was accompanied by shortage in qualified staff and basic infrastructure.[4] The students' perception of the learning environment has been assessed globally, regionally and to some extent locally.

The Dundee Ready Education Environment Measure (DREEM) questionnaire was found to be an important instrument for measuring students' opinions on the educational climate in Turkey. It was administered to undergraduate students from 11 different medical faculties all over Turkey and the scores were compared and positive scores with some questionable areas were found.[7]

Studies have also been done in the region. A study was conducted to investigate students' perception of the educational climate in a medical school in Dammam, Kingdom of Saudi Arabia. The result concluded that perception of medical students about the educational climate was more positive than negative and highlighted the importance of addressing the weak areas and addressing the issues raised by students.[8]

Another study was conducted in Basra (Iraq) to evaluate the educational environment. All results in every parameter of the educational environment inventory, whether total mean score or the five subscales, showed presence of low values probably related to the traditional system of teaching which needed consideration and solutions.[9] In Sudan, some studies have been done for example: evaluation of the students' perception of the learning environment of the faculty of medicine at Gezira university (Sudan) which revealed differences in perception related to year of study and academic performance.[10] With the explosion of higher education more studies are needed in Sudan to explore the needs of medical colleges and try to meet them as a step forward to attain accreditation.

The 1990s era had witnessed an explosion in medical education, as a result of which 25 new medical schools were established. Most of these are in Khartoum state.[11] Since then more and more medical colleges are being established. This explosion was associated with various problems such as an increased student intake without adequate resources for support. Due to the improper planning, the medical educational system suffered major impedance.[2] This together with the accreditation process through which medical colleges must pass, makes assessment of the learning environment an urgent and important issue. Being chartered, licensed and/or accredited by the appropriate Sudanese higher education-related organization is the most important step in ranking universities in Sudan.[12] Assessment of the students' perception of the learning environment plays important role.

Students' perception of the learning environment has great effects on their responses to learning processes. Even changing the physical structure of a classroom is one way to alter the environment of a classroom and influence students' perception.[7]

Understanding the changes in perceptions of the learning environment related to student characteristics and year of training could inform interventions that facilitate positive experiences in undergraduate medical education.[1] The Sudan Medical Council and the Ministry of Higher Education; the two regulatory bodies of medical education, have recognized the problems and constraints and the need for improvement in the quality of medical education in the country. They have developed standards and programs and they recommended feedback from stakeholders, students and trainers.[2]

The medical schools in Khartoum state are looking forward to be accredited. Ensuring a learning environment, which is comfortable, clean and safe for students is a very important step in the accreditation process.[13]

This study aimed to explore undergraduate learners' perception of the learning environment of a faculty of medicine of a Sudanese university in Khartoum in 2019. This was done through the following specific objectives which intended to:

- Evaluate the learners' perception of learning, teachers and academic self perception.
- Identify the learners' perception of the atmosphere and social self perception.
- Assess the association between the score of the learner's perception of the learning environment and (the gender, Grade Point Average (GPA), and year of training).

II. MATERIALS AND METHODS

2.1 Study design:

Descriptive cross sectional study.

2.2 Study area

The current study was done at the faculty of medicine at a Sudanese university, mainly to aid improvement in the way for accreditation.

The university is located in the urban setting of the metropolis of Khartoum. It offers courses and programs leading to officially recognized higher education degrees such as pre-bachelor degrees (i.e. certificates, diplomas, and associate or foundation degrees), bachelor degrees, master degrees, doctorate degrees in several areas of study. The faculty of medicine was established in the year 2000. The curriculum is innovative, problem based and integrated. Now after 20 years of its establishment, the faculty of medicine has expressed the need for assessment of perception of the medical students of the learning environment as a crucial step in improvement and hence, accreditation.

2.3 Study population

Officially registered medical students of the 2^{nd} - 5^{th} class in the study area. Students get exposed to patients starting at the 2^{nd} year. Their total number was 1144 student.

2.4 Sampling

A calculated sample of 330 students was taken proportionately from each batch by systematic random sampling technique.

2.5 Data collection methods and tools

The data was collected by self-administered questionnaire (modified DREEM i.e. the shortened DREEM). It is composed of 17 questions inquiring about the variables at the physical, social and psychological domains of the learning environment. The questionnaire was pretested for ambiguity and readability with a convenience sample. The questionnaire took about ten minutes to be completed. After this pretest the questions were adjusted to be clear and understandable.

Data collectors were well trained, a field supervisor was recruited, and in-office check was done immediately after receiving the data to ensure accuracy, correctness, completeness, and relevance.

2.6 Study variables

2.6.1 The independent variables

-Socio-demographic characteristics (age, gender, academic class, nationality, and last GPA).

2.6.2 The dependent variables fell within five domains

- Perception of learning, SPL (teaching).
- Perception of teachers, SPT (concentration on the patients, preparedness…etc).
- Academic self perception, SAS (relevance to future career, problem solving skills…etc).
- Perception of the atmosphere, SPA (social interaction, motivation, enjoyment….etc).
- Social self perception, SSS (support, social life and accommodation).

2.7 Data management

Data was analyzed using the Social Package for Social Science (SPSS). First descriptive statistics then bi-variate analysis (T-test for numerical data) and ANOVA to test for the associations between students' satisfaction compared to their college year in the university. 95% confidence level was used and P value<0.05 was taken as significant. Mean and standard deviation of total DREEM score and five subscales were reported.

TABLE 1
AN ADAPTED APPROXIMATE GUIDE TO INTERPRET, THE DREEM TOTAL AND INDIVIDUAL SCORES ADAPTED FROM (S. MCALEER AND S. ROFF, 2001).

Total score	Interpretation
0-17	Very poor
18-34	Significant problem
35-51	More positive than negative
52-68	Excellent
Individual item(mean score)	**Interpretation**
<2	Problem areas
2-3	Could be enhanced
≥3.5	Real positive points
Subscales	**Interpretation**
SPL	
0-3	Very poor
4-6	Negatively viewed teaching
7-9	A more positive perception
10-12	Teaching highly regarded
SAS	
0-3	Feelings of total failure
4-6	Many negative aspects
7-9	Feeling more on the positive side
10-12	Confident
SSS	
0-3	Miserable
4-6	Not a nice place
7-9	Not too bad
10-12	Very good socially
SPT	
0-3	Very poor
4-6	Negatively viewed teaching
7-9	A more positive perception
10-12	Teaching highly regarded
SPA	
0-5	Very poor environment
6-10	Many issues need changing
11-15	A more positive attitude
16-20	A good overall feeling

2.8 Ethical considerations

Ethical approval was obtained from the ethical review board of the Education Development Center (Sudan Medical Specialization Board). Permission from the university administration was taken and consent was obtained from the participants. Approval to use the shortened DREEM was obtained from the inventor. The questionnaire was anonymous. The data was kept confidential. No information that point to the identity of the participants was disclosed.

III. RESULTS

This study was conducted to identify undergraduate learners' perception of the learning environment of the faculty of medicine in a Sudanese university. The response rate was 95%

3.1 Alpha Coefficient reliability

Reliability Statistics	
Cronbach's Alpha	Number of Items
0.838	17

Cronbach's Alpha indicated that the data collection tool was reliable and with deleting any item it became smaller which indicated that all the items in the questionnaire were adding to the reliability.

TABLE 2
BASIC DEMOGRAPHIC STATISTICS OF RESPONDENTS TO THE STUDY OF MEDICAL STUDENTS' PERCEPTION OF THE LEARNING ENVIRONMENT 2019

Characteristics	Frequency	(%)
Gender		
Male	191	60.6
Female	122	38.8
Missing	2	0.6
Total	315	100.0
Age group		
20 and less	143	45.4
More than 20	169	53.6
Missing	3	1
Total	315	100.0
Nationality		
Sudanese	296	94.0
Other	19	6.0
Total	315	100.0
Year in school		
Second	72	22.9
Third	82	26.0
Fourth	75	23.8
Fifth	86	27.3
Total	315	100.0
Grade score		
3.5-4	40	12.7
3-<3.5	125	39.7
2.5-<3	95	30.2
2.0-<2.5	36	11.4
<2	8	2.5
Missing	11	3.5
Total	315	100.0

3.2 The Overall and Subscales Results

The mean of overall scores was 37.8 out of 68 that are more positive than negative. The mean SPL score was 5.97; mean SPT score, 7.40; mean SAS score, 7.03; mean SPA score, 10.87; and mean SSS score, 6.55.

According to the interpretation criteria in the adapted Roff's guideline, 2 out of 3 SPL, 2 out of 5 SPA items, and one out of 3 SSS items were identified as problem areas. In total, 5 out of 17 items were identified as problematic (Table 3).

TABLE 3
TOTAL AND SUBSCALE RESULTS OF M DREEM SURVEY OF MEDICAL STUDENTS' PERCEPTION OF THE LEARNING ENVIRONMENT 2019

Subscales of mDREEM (number of items)	Min	Max	Mean	SD	Number of problematic items
SPL (3)	0	12	5.97	2.647	2
SPT (3)	0	12	7.40	2.381	0
SAS (3)	0	12	7.03	2.307	0
SPA (5)	0	20	10.87	3.963	2
SSS (3)	0	12	6.55	2.402	1
Total 17 items			37.83	10.271	5

All responses were acquired using Likert scale (0–4).

m DREEM: modified Dundee Ready Educational Environment Measure.

SD: standard deviation.

SPL: students' perceptions of learning; SPT: students' perceptions of teachers; SAS: students' academic self-perceptions; SPA: students' perceptions of atmosphere; SSS: students' social self-perceptions.

TABLE 4
THE MEAN ITEM SCORES OF MEDICAL STUDENTS' PERCEPTION OF THE LEARNING ENVIRONMENT 2019

Item	Mean score
Student Perception of Learning (SPL): The teaching is well focused	2.10
The teaching helps to develop my confidence	**1.98**
The teaching time is put to good use	**1.89**
Student Perception of Teachers (SPT): The teachers concentrate on the patient's needs during consultations	2.50
The teachers give clear examples	2.52
The teachers are well prepared for their teaching sessions	2.38
Student Academic Self-Perception (SAS): Last year's work has been a good preparation for this year's work	2.09
My problem solving skills are being well developed	2.33
Much of what I have to learn seems relevant to a career in healthcare	2.61
Student Perception of Atmosphere (SPA): There are opportunities for me to develop proper interaction with others	2.49
I feel comfortable in class socially	2.53
The enjoyment outweighs the stress of the program	**1.87**
The atmosphere motivates me as a learner	**1.73**
I feel able to ask the questions I want	2.26
Student Social Self-Perception (SSS): There is a good support system for students who get stressed	**1.08**
My social life is good	2.68
My accommodation is pleasant	2.81

(Items with values under 2 are in bold).

3.3 Subgroup Analysis

TABLE 5
m DREEM MEAN SCORE ACCORDING TO GENDER AMONG MEDICAL STUDENTS 2019

Subscales	Male mean(SD)	Female mean(SD)	*t*	*p* value
SPL	5.88 (2.92)	6.04(2.43)	.519	0.604
SPT	7.32(2.51)	7.48(2.26)	.592	0.554
SAS	6.83(2.39)	7.17(2.26)	1.289	0.198
SPA	10.99(3.97)	10.85(3.95)	-.302	0.763
SSS	6.75(2.49)	6.43(2.35)	-1.144	0.254

There was no statistically significant difference between males and females regarding the sub-groups.

m DREEM: modified Dundee Ready Educational Environment Measure.

Statistics are expressed as mean (standard deviation SD). **P < 0.05 considered significant**

TABLE 6
ASSOCIATION BETWEEN PERCEPTION OF LEARNING ENVIRONMENT SUBSCALES AND ACADEMIC ACHIEVEMENT AMONG MEDICAL STUDENTS 2019

Subscales	Grade scores of the previous semester (academic achievement)				
	Low score <2.5	Middle score 2.5 -<3.5	High score >3.5	Total	P-value
SPL	5.7(2.874)	5.94(2.64)	6.25(2.73)	5.94(2.68)	0.648
SPT	6.98(2.454)	7.40(2.39)	8.03(2.24)	7.42(2.39)	0.129
SAS	7.07(2.546)	6.90(2.30)	7.50(2.15)	7.01(2.32)	0.323
SPA	10.05(4.38)	10.84(3.89)	12.00(3.81)	10.88(3.97)	0.076
SSS	6.2(2.97)	6.59(2.30)	6.73(2.35)	6.55(2.41)	0.555
Total DREEM Score	5.7(2.87)	5.94(2.64)	6.25(2.73)	5.94(2.68)	0.130

There was no statistically significant association between perception of the learning environment and academic achievement (P-values >0.05).

TABLE 7
m DREEM SCORE ACCORDING TO YEARS IN COLLEGE AMONG MEDICAL STUDENTS 2019

Subscales	College years				
	Second year Mean(SD)	Third year Mean(SD)	Fourth year Mean(SD)	Fifth year Mean(SD)	TOTAL Mean(SD)
SPL	6.19(2.66)	5.27(2.91)	5.61(2.51)	6.76(2.27)	5.97(2.65)
SPT	7.35(2.20)	6.98(2.54)	7.04(2.41)	8.17(2.19)	7.40(2.38)
SAS	7.10(1.92)	6.62(2.60)	6.64(2.38)	7.71(2.11)	7.03(2.31)
SPA	11.82(3.43)	10.00(3.95)	10.29(4.27)	11.42(3.92)	10.87(3.96)
SSS	6.96(2.51)	6.65(2.23)	6.13(2.43)	6.49(2.41)	6.55(2.40)

m DREEM: modified Dundee Ready Educational Environment Measure.
Statistics are expressed as mean (standard deviation).

TABLE 8
DIFFERENCE BETWEEN THE SUBGROUPS MEANS AMONG MEDICAL STUDENTS 2019

Independent Samples Test						
	t-test for Equality of Means					
	t	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Perception of Learning (SPL)	.519	.604	.165	.317	-.460	.790
Perception of Teachers (SPT)	.592	.554	.162	.274	-.377	.701
Academic Self-Perception (SAS)	1.289	.198	.345	.268	-.182	.872
Perception of Atmosphere (SPA)	-.302	.763	-.138	.459	-1.041	.764
Social Self-Perception (SSS)	-1.144	.254	-.320	.279	-.869	.230

No statistically significant differences between the means in each subgroup area.

TABLE 9
ANOVA ANALYSIS OF STUDENTS' SATISFACTION COMPARED TO THEIR COLLEGE YEAR

Details	F	P-value	Note
Perception of Learning (SPL)	5.282	0.001	The difference is mostly clear between fifth year students compared to third year students. As students progress their satisfaction most probably increases.
Perception of Teachers (SPT)	4.641	0.003	The difference is mostly clear between fifth year students compared to third year students. As students progress their satisfaction most probably increases.
Academic Self-Perception (SAS)	4.199	0.006	The difference is mostly clear between fifth year students compared to third year students. As students progress their satisfaction most probably increases.
Perception of Atmosphere (SPA)	3.878	0.010	The difference is mostly clear between second year students compared to third year students. There seems to be no clear trend across the college years.
Social Self-Perception (SSS)	1.523	0.208	No statistically significant difference.

The significant differences were found between 5th and 3rd years

IV. DISCUSSION

This study was conducted to assess the undergraduate medical students' perceptions of the learning environment at a Sudanese university in 2019. 315 self-administered questionnaires (m DREEM) were analyzed.

Almost two thirds (60.6%) of the participants were males. This result may be due to the fact that stratification by gender was not done at the sampling phase, however this point was paid attention to during data analysis and gender was not a statistically significant factor in perception of the learning environment. Some of the studies had done locally found dominance of females in the Sudanese medical schools. In the study done by Awad Mohamed Ahmed, it was argued that; the majority of students in the medical schools in Sudan are females (more than 60%) and he discussed how this can affect the medical profession in the future. [(4)] Another study mentioned that the higher education revolution in Sudan has opened the door for more females to engage in higher education institutions.[(14)] A study conducted in Egypt also found two thirds of the participants as females.[(15)] The reverse of this gender proportion was found in a study conducted in Riyadh Saudi Arabia, where more than two thirds of the students were males.[(16)]

The mean of overall scores was 37.8 out of 68 that is more positive than negative. This is an encouraging result regarding accreditation. Most of the studies found similar result, the students' perception of the learning environment being more positive than negative overall, in a study conducted in Spain, where podiatric medical students declared that in general the educational environment was more positive than negative in their school, according to the DREEM questionnaire. However, although the results were on the whole good, some areas need to be revised to make improvements.[(17)] In a medical college in Mumbai (India), the students reported an overall positive perception of the medical educational environment. Problem areas including the research priorities were identified and this has led to preparation of an action plan to improve the situation.[(18)] In a study conducted in Malaysia, the medical students positively perceived their learning environment. Some low-scoring areas of the learning environment were also identified, which required improvement.[(19)] DREEM was used to assess students' perception of the learning environment at Habib medical school in Uganda and the mean overall score was also more positive than negative.[(20)]

Regarding the subscale results 5 out of the 17 subscales were problematic and were in need for improvement. This pointed out the specific needy areas in order to concentrate the efforts and resources towards the improvement of these areas. The areas needing improvement were found within: students' perceptions of learning, students' perceptions of the atmosphere, and students' social self-perceptions. The exact items included teaching aid to develop students' confidence, teaching time-management, enjoyment, motivation and stress management mechanisms. The above mentioned studies from Spain[(17)], India [(18)] and Malaysia also highlighted needy areas that needed improvement and in India an actual action plan yielded from the study done.

This result also coincides with the remarks from local studies: Ahmed Hassan Fahal highlighted in a study, some of the weaknesses facing medical education in Sudan and which may have affected the learning environment of medical schools. He gave examples such as problems of limited number of qualified trainers, the admission policies and the budget. [(2)] Awad Mohamed Ahmed had also given some reasons for constraints in the medical learning environment such as issues related to

teaching and others related to the teachers.[4] Yasin Abdalla Eltayeb Elhadary related issues of the learning in Sudanese universities to the huge expansion in higher education.[14] So the weaknesses in the subscale areas may be attributed to the rapid expansion in higher education which makes the concentration focused on the teaching process without paying attention to the above mentioned important issues from the students' stand point.

Further subgroup analysis did not reveal statistically significant results between males and females as regarding perception of the learning environment in its five domains (P values > 0.05), as mentioned earlier. This absence of differences with regard to gender may be due to the fact that the needy areas raised are of equal importance to both sexes. The study done at Victoria University, Melbourne, Australia agreed with this argument, actually the results from that study were quite interesting, no statistically significant difference was demonstrated between genders for the total DREEM score or subscale scores ($p > 0.13$). The effect size was $d = 0.04$. However, statistically significant differences were noted at the item level for gender,[21] this may be due to different issues raised in that study and further analysis of the data down to the item level.

There was no statistically significant association between perception of the learning environment and grade point average (GPA) which reflects academic achievement. This may be due to the fact that most of the students were having average GPAs which was reflected in the absence of extreme variations in perception of the learning environment when comparison was done from this view. This result agreed with a result from a study conducted in Malaysia, which concluded that, no relationship between the students' perception of the academic environment and their academic performance was found, p-value was >0.05.[19]

Analysis of students' satisfaction compared to their year in college revealed that the significant differences were found between 5th and 3rd years. This result also revealed growth through the years as regarding perception of the learning environment. This may be due to the fact that students get used to the campus in which they learn. This contradicts the Spanish study, which did not find any association with regard to students' academic level, this may be attributed to differences in context.[17]

V. LIMITATIONS OF THE STUDY

- Single center study: Although it's a diagnostic study for the sake of shedding light upon the strengthen to augment them and the weaknesses to amend them. Despite this, a multicenter study would provide more information and enable inter-center comparison.
- Using the modified DREEM: many people are familiar with the original DREEM especially the total score as it has been used since a long time ago. More concentration is needed to the interpretation of the modified DREEM.

VI. CONCLUSION

Undergraduate medical students' perception of the learning environment at a Sudanese university was positive more than negative. There were some areas in need for improvement. There was no significant gender difference of perception at subscale level. Differences in academic achievement were not significantly associated with differences in perception of the learning environment. The most significant difference in perception of the learning environment was between fifth and third year with probable growth across the academic years.

VII. RECOMMENDATIONS

- The administration of the university to consider amendment of the needy areas.
- The students to work in collaboration with the administration to improve the learning environment.
- Further research is needed including qualitative data to study the learning environment problems in more depth.
- Studies including more than one center were recommended to facilitate comparison.

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Epidemiological Trends of Lower Limb Amputation in Artificial Limb Centre

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Abstract— *Main aim of our study was to compose an inclusive report on the "Epidemiological Trends of the lower limb amputation in two different population groups". This is a retrospective study carried out at Artificial Limb Centre (ALC), Pune from 1st February 2012 to 31st January 2016. A total of 3402 patients who had undergone the prosthetic rehabilitation at the ALC, Pune were included in our study. All the patients after initial assessment were divided into two groups, 1. Defence Personnel's & Dependents 2. Civilian patients.*

The patients were evaluated with respect to age, sex, aetiology, site, level and prevalence of amputation among the sexes at different ages and surgical interventions performed and It was found that the physical trauma was still one off the leading cause of major Lower Limb Amputation in developing countries, but new emerging causes like "Metabolic and Vascular" were showing the continuously increasing trends. The reason for this change was rise in the diabetes & its associated complications. This study is therefore intended to provide an insight into epidemiological trends of major lower limb amputation in army personal, dependents and general population.

Keywords— Lower Limb Amputation, Trauma, Prosthesis, Defense Personnel, Artificial Limb Centre.

I. INTRODUCTION

The major limb amputation has been performed for injured/traumatic/neurologically and vascular compromised body parts for over 2,500 years from now. Previously Physical Trauma, Peripheral Vascular Diseases and Cancer were the prominent disorders, but now a day's causative pattern has been shifted to Metabolic/Vascular disorders. Amputation which is being done for a wide range of nonhealing/infective/rapidly spreading disorders is affiliated with marked disability, morbidity and mortality.

The word "Amputation" originally came from a Latin word "amputare "which means "to excise/cut out" is generally described as the "removal of a part of the extremity or complete body part/parts covered with the skin".[1]Amputation is associated with profound psychological, social and adverse outcome for the patient & his/her family members. It is also associated with marked disability, morbidity and early mortality particularly in countries where the acceptance and knowledge about the prosthesis is generally poor [2], [3]. In most of the underdeveloped countries prosthesis is generally not easily available, costly and not conducive to patient at home and his/her work environment. Above all poor prosthetic management leads to so many secondary complications like (Stump Edema, Pain, Infection and secondary vascular/neurological complications).

In developing countries particularly in younger population group Physical trauma, Infections and Malignancies [4] are few of the leading cause of amputation whereas in elderly population Uncontrolled Diabetes Mellitus induced Vascular/Neurological complications, Infections and malignancies are the principle reasons for major lower limb amputation. Whereas in developed countries Peripheral Vascular Disease (PVD), either alone or as a secondary complication of Diabetes

Mellitus and other metabolic/vascular disorders, contributes almost half of all amputations [4], [5]; physical trauma generally comes next.

Regardless of the cause of Major limb amputation, loss of part/complete limb bears a compelling and drastic affects on the patient and his/her family, as one progress from the stages of impact, to acceptance, and lastly adjustment with himself and his environment [6]. Horne et al. [7] during his study in 2009 pointed out that loss of any body part can lead to a threefold insult to the patient's growth, like loss of activity level, loss of perception, and damage or change to his/her own body image.

Numerous studies have reported a gradual increase in the occurrence of lower limb amputations in developing nations primarily the result of metabolic/vascular disorders, whereas in developed nations incidence is falling over the years for differing manifestations including foot gangrene resulting as a bad result of uncontrolled diabetes mellitus, physical trauma and traditional bone setters' gangrene.

It is very important that center-specific prevalence, indications and design be determined as an introduction to setting up strategies to locally and globally scale down this risk. For this reason, our study is intended to provide essential information regarding recent epidemiological trends of lower limb amputation in army personal, dependents& general population.

II. METHODS

2.1 Subjects

A retrospective analytical study was carried out at this center on lower limb amputees, who had undergone prosthetic rehabilitation at this center. A total of 3408 patients who had visited this center during the period of 1st February 2012 to 31st January 2016 were included in our study. All the patients after initial assessment were separated into different groups as per patient's profile. Main Groups were 1. Serving Personnel's, 2. Ex-Serviceman (ECHS), 3. Dependents, 4. Civilian patients.

2.2 Data collection

Data collected digitally as well as manually at this center were utilized for this study. Since this was a retrospective analytical study involving the old medical records only, no informed consent was required either from the patient's/Their family members. Data included were primarily demographic components and general patient traits including age, sex, extremity involved and primary reason for amputation.

2.3 Data analysis

The patients were evaluated with respect to age, sex, etiology, side & level of amputation, prevalence of amputation among the sexes at the different ages and surgical interventions performed. The results were analyzed by SPSS software.

III. RESULTS

During these four years 4614 patients with amputation at different levels visited this center. Out of these 4614 patients, 3408 (73.86%) were Lower limb amputees and rest 1206 (26.14%) were at other levels. Out of these 3408 cases 1724 (50.51%) were from defense category and rest 1684 (49.41%) were civilians.

TABLE 1
NUMBER OF CASES AT DIFFERENT LEVELS VISITED THIS CENTER

	No. of Cases
Serving/ECHS/Dependents	1724 (50.51%)
Civilians	1684 (49.41)

TABLE 2
NUMBER OF CASES WITH DIFFERENT AGE GROUP VISITED THIS CENTER

Age Group	Serving/ECHS/Dependents	Civilians
1-10 Years	21 (1.21%)	208 (12.35%)
11-20 Years	168 (9.74%)	181 (10.75%)
21-30 Years	718 (41.65%)	624 (37.05%)
31-40 Years	472 (27.38%)	413 (24.52%)
41-50 Years	136 (7.89%)	186 (11.04%)
51-60 Years	171 (9.92%)	45 (2.67%)
61-70 Years	21 (1.21%)	19 (1.13%)
71 Years and Above	17 (.98%)	08 (.47%)

TABLE 3
NUMBER OF CASES WITH DIFFERENT CAUSE OF INJURY VISITED THIS CENTER

Cause of Injury	Total No. of Cases	
	Serving/ECHS/Dependents	Civilians
RTA + Crush Injuries + FFH	477 + 9 + 20 (29.35%)	551 + 13 + 23 (34.86)
MBI + Frostbite	415 + 46 (26.74%)	13 + 2 (.89%)
Train Accident	206 (11.95%)	167 (9.91%)
Gangrene	134 (7.77%)	193 (11.46%)
Congenital (Since Birth)	17 (.98%)	344 (20.43%)
Electric Shock	23 (1.33%)	36 (2.14%)
Machine Accident	21 (1.21%)	83 (4.92%)
Others	359 (20.82%)	256 (15.20%)

RTA: Road Traffic Accident FFH: Fall from Height MBI: Mine Blast Injury

In defense and dependent population 3 leading causes of lower limb amputations in decreasing order was:

1. RTA + Crush Injuries + FFH
2. MBI + Frostbite
3. Others

Whereas in civilian population 3 leading causes of amputation are:

1. RTA + Crush Injuries + FFH
2. Congenital (Since Birth)
3. Others

Road Traffic Accidents was the leading cause of LLA in both the population groups. Mine Blast Injury and Frostbite is 2nd common causes of Lower Limb Amputation in Defense Personnel's whereas congenital deformities are the 2nd leading source of lower limb amputation in civilian population. Train Accidents and Vascular Gangrene was a common cause of Lower Limb Amputation in both the population groups. Vascular causes (Diabetes Mellitus and its complications, Hypertension) and Malignancies were the 3rd most common cause of lower limb amputation in both the population groups and they are now showing explosive growth.

In both the population groups' comparatively active age group (21-40 years) was accounting for more than 2/3rd of the cases of lower limb amputation.

IV. DISCUSSION

As per Metz, the worldwide prevalence of disability due to Amputation was 7% in industrialized countries [8] and 4% in developing countries [8]. As per statistical report of 2001, the prevalence of disability in India is 1.8–2.2%[9].

Who report on disability showed that there are huge regional variations in the etiology of major lower limb amputation in different population groups. Sansam et al described in 2009 that physical trauma is the leading cause for majority of amputations in India, whereas poor vascularity was the dominant cause in most industrialized nations [10]. Sujatha [11] in her analysis at the Government Institute of Rehabilitation Medicine, K.K. Nagar, Chennai, reported that most of the patients be deprived of their limbs because of road traffic accidents. Amputation due to vascular complications secondary to diabetes is ranked second.

This grouping is very similar to Obalum and Okeke study, which investigated only lower limb cases and disclosed that the peak age for amputation was 21–30year age group [12].

The chief reason for the amputation in a particular region is influenced by the degree of industrialization, the local transport structure, and the standard of local health care system. In Indian subcontinent, physical trauma is still the dominant reason for lower limb amputation because of its quick transformation into a greater industrial and mechanized nation since 1947, and the rapidly increasing volume of traffic, along with increased speed. This is almost identical to the clinical findings of Lento [13], who came to an end that traumatic amputations were far more frequent than vascular amputations in developing nations in comparison to developed nations, likely because of the lesser number of cases with obesity and other metabolic disorders in such regions, in addition to the high exposure to agricultural machinery, which many a times can lead to lower limb amputations. Traumatic limb amputations can also be the result of the use of electric power saws and other heavy machineries, as well as electric burns or electrocution. Motor vehicle accidents (Car, Motorcycles, Other vehicles), Fall from Height and Gunshot wounds from any cause may also contribute to the traumatic limb amputations.

Looking at the causes of amputation as per age group, Lento [13] and Ephraim and Duncan [14] reported that peripheral vascular disease (PVD) mainly involved the elderly age group, especially age group of 60 years and above. These reports are consistent with our study, which also exhibit that amputations because of Road Traffic Accidents occurred much more often in the young age groups, while cases secondary to peripheral vascular diseases were more common in the age groups 60 years and older.

Cases of lower limb amputation secondary to malignancy are far more common in the teen age in comparison to the other age groups. This primarily seemed to be because of osteogenic sarcoma, a malignancy that primarily appears mainly in young age [15].

Lower limb amputation generally accounts for 94.8% of all amputations. This is very similar to the figures reported by Obalum and Okeke [12] and Lento [13], which also stated that the lower limb amputations are performed much more common than upper limb amputations. Among lower limb's amputations, transtibial is the most common site. Because of the common tendency of the distal portion of a limb is generally more likely to be injured in any traumatic event, and surgeons generally tries to amputate as distally as possible to preserve functional activity, whereas, in amputation cases secondary to malignancy, transfemoral amputation was the most common site of amputation.

The complications and the mortality rate from accidents involving land mines are high in armed force personnel. Half of the mine victims die within minutes of the blast and 85% of child victims die before they reach the hospital. The principle reason of death in these cases is mainly infection and crush injuries in the patients who survive the initial shock blast wave. In an international series from Russia, frequency of complications was reported as high as 70% with total lethality going up to 5.2% [16, 17]. In Iran, most fatalities (36%) occurred in the pre-hospital settings during a study for a period from 1989-1999 [18].

V. CONCLUSION

Traumatic amputations was the leading causes of amputation in both army and civil population particularly in younger population in the past but now Metabolic and Neoplastic causes are replacing the existing traumatic cause. Metaobolic and Neoplastic causes are also appearing in young population group, so there is a strong need to control these problems at an early age to prevent future complication and irreversible loss of organs.

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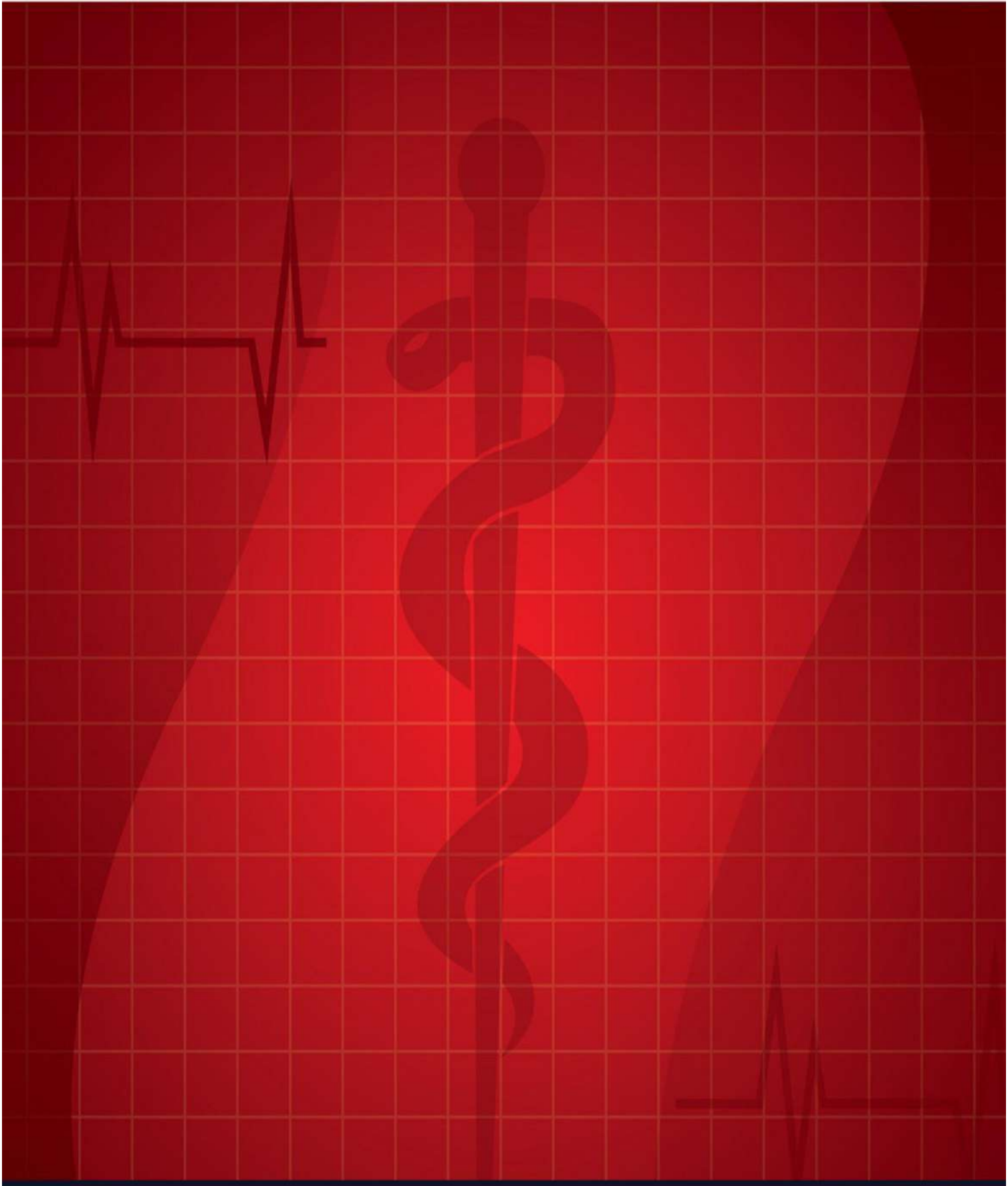

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