

SUDAN JOURNAL OF HEALTH SCIENCES



1- Premarital Counseling and
Screening Awareness and
Perception.

2- First Aid Awareness and
Practice of Highway Traffic
Police Officers

3- Medical Students'
Perception and Satisfaction
Towards Team-Based
Learning

4- Case report: Support for
Distal Extension Base Using
Corrected Cast Technique.

5- The Creation of man in the
Qur'an. "The Phenotype and
the Genotype"



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Editorial 1

The Sudan Journal of Health Sciences

Hasan Abuaisha, FRCP.

Editor-in-Chief

The Sudan Journal of Health Sciences is a new scientific journal sponsored by Al-Fajr College for Science and Technology, Khartoum, Sudan. The *Journal* is one of the most important products of *Al-Fajr Research and Development Center*.

Al-Fajr College was established in 2015 with a vision to achieve leadership and excellence in higher education, scientific research and social accountability. This is to be accomplished through producing highly qualified and competent graduates in various aspects of knowledge and expertise, equipped with morals and values that meet the needs of our society.

Since establishment, *Al-Fajr College* has focused on achieving the highest possible standards in education, research, innovations and accountability to the community. One of the strong areas of the *College* is its endeavor to follow and develop the most recent evidence-based trends in medical education. For this purpose, qualified staff are appointed and exposed to relevant training in learning, teaching and modern types of assessment.

The importance of research for the *College* needs no emphases as it fulfils many aspects of the *College* goals. To achieve good quality research both students and staff are exposed to training on research methodology by experts in the field. Furthermore, the staff was trained on students' supervision, guidance and monitoring. To strengthen all these activities, the Research and Development Center was established, and it developed a comprehensive plan to conduct excellent and competitive research.

The need for quality scientific journal as a vehicle for publishing knowledge and discoveries became very apparent. That is how the *Sudan Journal of Health Sciences* was born. The journey to produce the first issue was a great challenge, but the team entrusted with this task was up to it.

The *Journal* welcomes quality research from faculty staff and their peers from national and international research centers. The college staff is encouraged to help senior students by quality supervision of their graduation research projects; so that researches that meet the standards of the *Journal* will be considered for publication.

We hope that the *Sudan Journal of Health Sciences* will be a significant addition to the national, regional and international sources of scientific publications.

Editorial 2

Team-Based learning

Professor Mohammed Elbagir Ali Elameen, FRCP

Dean of Alfajr College for Science and Technology

There is enough evidence from pedagogical research and learning theories to support the advantage of small-group learning methods over traditional methods (lecture). Team-Based learning (TBL) is a type of small-group learning that possesses all the generic features that characterize small-group learning. Alfajr College for Science and Technology (ACST), established in 2015, adopted the TBL method in all its ten programs with very good outcomes.

ACST uses TBL as an instructional strategy described by its inventor professor Larry Michaelson in the late 1970s. He is a faculty member in the business school at Oklahoma University, USA.

The main issue of TBL is to help the student learn how to apply concepts, rather than simply learn about them. So, the focus in TBL is on learning rather than on teaching. TBL dictates the development of a small-group into a cohesive team with trust among the students. TBL involves transforming the process of the small group into a learning team. The achievement of these changes needs a significant shift in the *learning objectives and the role played by both instructors and students*. The primary learning objective in TBL is to ensure that students have the chance to practice using course concepts to solve real-life problems. This is why some of the TBL class-time is utilized on ensuring that students master the course content while a large part of the TBL class time is spent on using the course content in solving problems. Consequently, the instructor's role changes from just giving information to designing and managing the overall process of learning while the student's role shifts from just passive recipient of information into accepting the responsibility of learning about the objective to prepare themselves before the in-class activities. These changes are not easy to achieve, they require strict steps: the group needs to be properly formed and managed; students need to be accountable for the work quality including their

individual and teamwork; and the student must have immediate feedback. The team assignment must be challenging to promote learning and team development.

Steps of applying TBL:

For TBL to be effective redesigning of the course is needed to implement it in three phases as follows:

- Phase One:
 - Before coming to the classroom on the specified day (in-class activity), the instructor identifies the instructional goals and objectives (this implies what the student will be able to do). Then divides the course into macro units and identifies the key concept for each unit. The macro units are the instruction units that consist of activities that expose the students to the course content
 - The students should be prepared through the individual readings and comply with the planned activities (Lectures, Seminars, Assignmentsetc)
- Phase Two: (In-class activities):consists of the followings:
 - The Readiness Assuring Process (RAP) which consists of:
 - individual test (individual Readiness Assurance Test-iRAT)
 - group test (group Readiness Assurance Test-gRAT) using immediate feedback assessment technique (IF AT)
 - The Appeal process
 - The Instructor feedback (essential clarification presentation), which will be based on the results of the two tests and students appeal.
- Phase Three: The final stage of TBL is the team application (tApp); in this activity students will be provided with tasks to deepen their understanding of the concept by solving real-life problems. This part of the in-class activities uses most of the in-class time.

Alfajr College for Science and Technology practiced the TBL strategy after executing the necessary training and availed the required tools. The training involves the following:

- Training of the instructor on the concept of TBL, identifying their role and on-hand training on its application by series of workshops.
- Training the student on the concept of TBL and identifying their role.
- Training the administrating staff on their role

The College also conducted training workshops in TBL in other institutes, for example the Sudan Medical Specialization Board where TBL issues became one of the topics used frequently in the Master of Health Professional Education.

The College availed the required tools.

- The Immediate Feedback Assessment Tool (IF AT).
- Modifying the large lecture room in a way that allows group sitting.
- Upgrade the IF AT into an electronic device (Tablet) for the iRAT and the gRAT.

The college conducted researches and published several papers on the subject. In this issue of the *Journal*, there is a cross-sectional study entitled (Medical Students' Perception and Satisfaction towards Team-Based Learning at Alfajr College for Science and Technology, Sudan, 2022) authored by Sara Ali and her colleagues. The study showed that the overall positive opinion of students was strongly in favor of various aspects of TBL.

We consider ACST to be the first institution in Sudan to use TBL in its proper way. ACST harvested the fruit of this innovative learning strategy in the performance of its students during their studying in the College and waiting to see the result on the graduates.

Medical Students' Perception and Satisfaction towards Team-Based Learning at Alfajr College for Science and Technology, Sudan, 2022

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Abstract

Background: Team-based learning (TBL) is an active learning strategy that provides learners with opportunities to apply conceptual information through a series of activities that include individual work, group work and instant feedback. It is defined as an evidence-based cooperative learning educational strategy designed around modules that are taught in three stages; learners preparation; individual and group readiness assessment test; and finally, team application.

Aim: The study aimed to assess the perception and satisfaction of medical students towards TBL at Alfajr Collage for Science and Technology.

Methodology: The study was a cross-sectional study, conducted at Alfajr College for Science and Technology in the year 2022. The targeted group was students from the fourth and fifth levels; the data was collected through a self-administered online interview using a pretested structured questionnaire. The data were entered, cleaned, and analyzed using SPSS version 25. The chi-square test was used for categorical variables.

Results: Of 131 interviewed medical students, females were the majority constituting 61%. More than half (53%) of the students found that their performance on the examination is affected positively by their participation in TBL; and the fifth-year students stated that they benefited much from TBL specifically in the surgery course. Nearly 90% of students were satisfied with the TBL approach and they felt that they would recommend the TBL program to other universities in Sudan. There was a significant correlation between the female gender and the perception of the usefulness of TBL (p value = 0.009).

Conclusion: Medical students at Alfajr College had positive perception towards TBL and the majority of students were satisfied with the TBL approach. The number of TBL activities during the course was crucial to reinforce the students' benefit from this type of activity. This was reflected in the students' opinion of the benefits of TBL in the surgery course, which happened to have the largest number of activities compared to other courses.

Keywords: *Team-Based Learning, Medical Students, Perception, Satisfaction, Sudan*

Introduction:

Team-based learning (TBL), introduced by Larry Michaelsen in 1979, is defined as an evidence-based, active, cooperative learning educational strategy that provides learners with opportunities to apply conceptual information through a series of activities that include individual work, group work and instant feedback (1). TBL is designed around modules that are taught in three stages.

First Step: the learners are prepared for TBL study out of class and individually. The tutors prepare learning objectives and indicate reading materials from textbook chapters, articles, videos, or PowerPoint slides.(2)

Second Step: the learner's knowledge of the subjects studied in the first stage is assessed by individual Readiness Assessment Test (iRAT) in class through completing a 15-20 multiple-choice question (MCQ) test. This is followed by creating small groups for discussions between the classmates in-class; and repeating the same MCQ in a group Readiness Assessment Test (gRAT).(3)

For immediate feedback, a special type of scoring card known as an "Immediate Feedback Assessment Technique" is used; in which the answers are covered by opaque covering films. The teams must negotiate which answer to choose; the learners scratch off the chosen answer, and the correct answer is indicated by a star. If the learners do not find a star, they continue to discuss the question and pick other options sequentially. The gRAT is a high-energy learning event. To conclude the Readiness Assurance Process, the instructor clarifies for the students -in a mini-lecture- the concepts that they debated during the gRAT; and encourages teams to consider creating written appeals for questions they got incorrect(4). This forces students back into the reading materials where they

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having difficulties. Then the team searches for the right answer and may decide to complete the appeal forms with their rationale and defense for their answer. The appeal must consist of (a) a clear statement of the argument, and (b) evidence cited from the preparation materials. The instructor collects these forms and considers them after class.

Third Step: in this stage which is called “Team Application”, in-class/team, the learner goes through the presented scenario and applies deep knowledge and understanding by making interpretations, calculations, analysis, and synthesis of the given information; and makes a specific choice from a range of options. This is posted and explained to the class (5). The primary learning objective in TBL is to go beyond simply “covering” content and focus on ensuring that students can apply the course concepts to solve the problem (6). Moreover, TBL changes the classroom experience from acquiring knowledge in a lecture-based format to applying knowledge in a team format (7). Most of the class time is used for team assignments that focus on using course content to solve problems that students are likely to face in the future. Thus, TBL is designed to provide students with both conceptual and procedural knowledge (6,8). TBL is a student-centered and teacher-directed teaching strategy(9).It promotes self-directed learning(10) and improves student participation, motivation and engagement during class(11).

The four essential elements for TBL are shown in table (1):

Table (1) The four essential elements for TBL
1. The groups must be properly formed and managed
2. Students must be accountable for the quality of their individual and group work
3. Students must receive frequent and timely feedback
4. Group assignments must enhance learning and the development of the team

When these four essential elements are implemented in a course, the stage is set for student groups to evolve into cohesive learning teams (8,12–14).

Worldwide, a large number of institutions adopted TBL as a learning strategy, and Alfajr College for Science and Technology (ACST) in Sudan is one of them. Since TBL was introduced in 2001, no study was conducted in Sudan to explore the perception and satisfaction of medical students towards TBL. The present study aimed to assess the perception of Alfajr medical students regarding the effects of TBL on their academic performance. We hope that, it will be an added value to the global literature on the issue.

Methods:

This was a descriptive cross-sectional institution-based study, conducted at the program of medicine, ACST. Students start the TBL program in the first year, however, the bulk of TBL activities are covered in the clerkship courses in the fourth and fifth levels.

Sample Size and Sampling:

Sample size was calculated using the formula: $n=N/(1+Ne^2)$

Where n is the sample size; N is the total number of the medical students, (e) is the margin of error at 95th confidence interval = 0.05.

The total number of students was 197, distributed between the fourth level (93 students) and the fifth level (104 students). The calculated sample size was 131 students distributed proportional to the size of the fourth and fifth levels as 62 and 79 respectively. From each level the students were enrolled by convenient sampling technique. Regarding clerkship courses and the number of TBL sessions, the fifth level courses covered were: Paediatrics (6 sessions), Obstetrics and Gynaecology (7 sessions), Medicine (7 sessions) and Surgery (9 sessions). Whereas for the fourth level, only one course was included; Medicine (7 sessions). The data was collected through a self-administered interview using an online Google questionnaire. The questionnaire was adapted from previous

Perception and satisfaction of medical students towards TBL

studies (15) and validated by an expert. Then the questionnaire was distributed through the students' group leaders using WhatsApp. Courses covered were in semesters seven, eight, nine and ten; in which 17, 15, 13 and 13 TBL sessions were carried out respectively.

Data Analysis:

The data were entered, cleaned, and analyzed using SPSS version 25. The chi-square test was used for categorical variables. A p -value of 0.05 or less was considered statistically significant. The data was summarized and presented in tables and diagrams.

Ethical considerations:

Ethical approval was obtained from ACST Research Ethical Committee. Informed written consent was sent to the participants and attached to the Google form. Filling and sending back the questionnaire was considered as acceptance to participate in the study. Anonymous questionnaires were used and confidentiality was ascertained.

Results:

This study involved 131 medical students from ACST with 100% response rate. The age range was 20 – 30 (mean 23 years). Females represented the majority (61%). Table 2 shows that female gender correlated best with positive perception about the usefulness of TBL ($p= 0.009$).

Table (2) shows the Statistical correlation between the perception of the students about the usefulness of TBL with other variables, including Age, Gender, Academic years, and Academic grade.

Table (2) Correlation between the Perception of the Students about the Usefulness of TBL with other Variables.

(*Significant correlation)

		TBL is Very Useful					Total	p value
		Strongly agree	Agree	Neutral	Disagree	Strongly Disagree		
Gender	Female	33	42	3	0	1	79	0.009*
	Male	16	23	4	6	3	52	
Age	20_23 years	11	28	2	1	1	43	0.347
	24_26 years	18	20	1	2	1	42	
	more than 26 years	20	17	4	3	2	46	
Academic year	4th year	24	28	5	5	0	62	0.064
	5th year	25	37	2	1	4	69	
Academic grade	Excellent	18	8	1	0	0	27	0.062
	Good	15	34	2	5	3	59	
	Pass	3	8	1	0	0	12	
	Very good	13	15	3	1	1	33	

Most of the participants were residents of Khartoum State.

Students' opinion on the effect of TBL on their personal educational achievements are shown in Table 3. Thus all the nine attributes of educational gain were reported positively by the vast majority of the students.

Perception and satisfaction of medical students towards TBL

Table (3) Students' opinion about the usefulness of TBL at personal educational achievements level.

STATEMENT	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
	n (%)	n (%)	n (%)	n (%)	n (%)
1. TBL is useful as a medical educational tool	49 (37.4)	65 (49.6)	7 (5.3)	6 (4.6)	3.1 (4)
2. TBL had a positive impact on my learning attitude	37 (28.2)	65 (49.6)	13 (9.9)	2 (1.5)	10.7 (14)
3. TBL is an effective, motivating learning process.	43 (32.8)	61 (46.6)	11 (8.4)	3 (2.3)	9.9 (13)
4. TBL helped me to obtain a higher level of knowledge	31 (23.7)	65 (49.6)	18 (13.7)	3 (2.3)	10.7 (14)
5. TBL promoted increased reading of textbooks by students.	29 (22.1)	60 (45.8)	24 (18.3)	9 (6.9)	6.9 (9)
6. TBL challenged me to give my best.	21.4(28)	66 (50.4)	21 (16.0)	7 (5.3)	6.9 (9)
7. TBL helped me to assess present knowledge.	26.0(34)	75 (57.3)	10 (7.6)	4 (3.1)	6.1 (8)
8. Student-to-student discussion helped me to learn concepts covered during TBL exercise better than if studied independently.	26.0 (34)	63 (48.1)	19 (14.5)	7 (5.3)	6.1 (8)
9. TBL facilitated long-term retention of information covered in the TBL exercise.	14.5 (19)	77 (58.8)	26 (19.8)	4 (3.1)	3.8 (5)

The overall positive opinion of students on *personal gains from TBL* is shown in Figure 1, where the scores of ‘strongly agree and agree’ were amalgamated together; and those of ‘disagree and strongly disagree’ were similarly added together. The two groups of scores were separated by “neutral” score. As shown, the positive score was above 70% for most attributes.

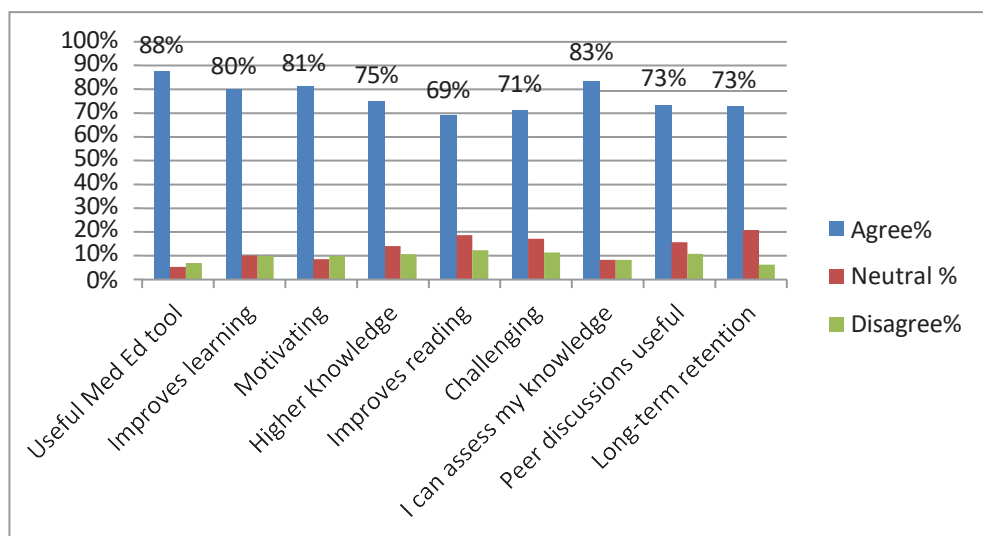


Figure 1: Students' opinion on the impact of TBL on their educational process

Perception and satisfaction of medical students towards TBL

Table (4) Students' opinion about the usefulness of Team Based Learning at gains in time-management, cognitive achievements and team collaboration, Alfajr College for Science and Technology.

STATEMNT	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
	n (%)	n (%)	n (%)	n (%)	n (%)
1. The amount of material learned while preparing for TBL is worth the time of investment.	17 (13.0)	64 (48.9)	22 (16.8)	21 (16.0)	5.3 (7)
2. TBL sessions foster the use of critical reasoning and clinical problem-solving skills.	22 (16.8)	73 (55.7)	25 (19.1)	4 (3.1)	4.6 (6)
3. All team members made an effort to participate in the discussion.	17(13.0)	67 (51.1)	23 (17.6)	17 (13)	5.3 (7)
4. The tutor helped me to focus on discussions and learning.	22 (16.8)	71 (54.2)	22 (16.8)	8 (6.1)	6.1 (8)
5. I received useful and timely feedback from the tutor.	18 (13.7)	59 (45.0)	29 (22.1)	17 (13)	6.1 (8)
6. Student's performance on the examination is affected by participation in the TBL program.	18 (13.7)	69 (52.7)	26 (19.8)	12 (9.2)	4.6 (6)
7. Overall, I am very satisfied with the TBL approach.	42 (32.1)	71 (54.2)	13 (9.9)	3 (2.3)	2 (1.5)
8. I will recommend the TBL program to other universities in Sudan.	59 (45.0)	58 (44.3)	10 (7.6)	2 (1.5)	2 (1.5)

The overall positive opinion of students on *general attributes of TBL* is better shown in Figure 2, where the scores of 'strongly agree and agree' were amalgamated together; and those of 'disagree and strongly disagree' were similarly added together. The two groups of scores were separated by "neutral" score. As shown, the positive score was 60% or above for all attributes,

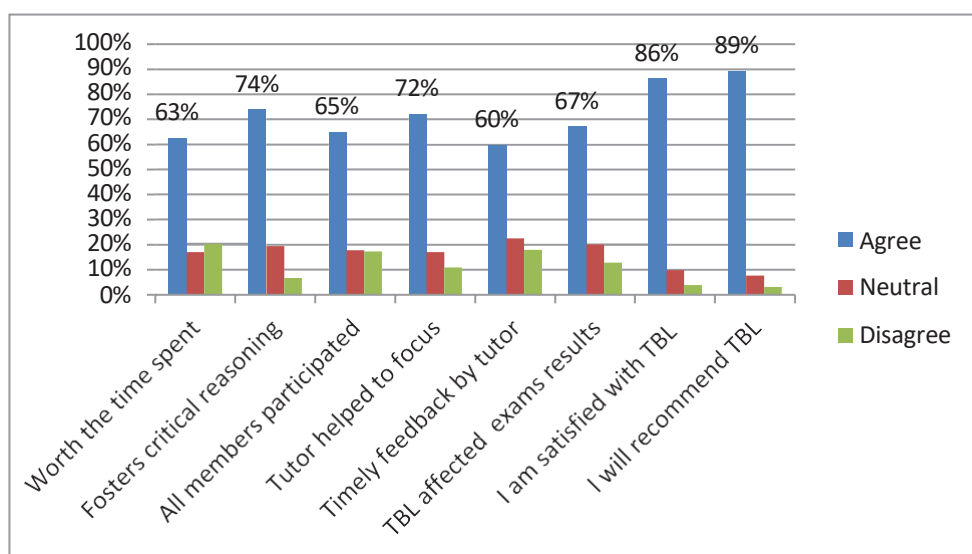


Figure 2 Students' opinion about general attributes of TBL, Alfajr College for Science and Technology

The most positive perception (strongly agree plus agree) was about recommending the TBL program to other universities in Sudan and satisfaction with the TBL approach (89.3% and 86.3% respectively).

Table (5) shows the distribution of the students' positive opinion about effectiveness of TBL according to different courses in the fifth level.

Note that the highest score was achieved by the surgery course, because they had the highest number of TBL activities.

Specialties	No of sessions of TBL carried out	Percent of Students' who approved of TBL usefulness
Surgery	9	44%
Medicine	7	14%
Pediatrics	6	8%
Obse and Gynae	7	3%

Perception and satisfaction of medical students towards TBL

Regarding the frequency of the TBLs to be conducted each month, half of the fifth-year students recommended that TBL should be conducted every two weeks, (40%) recommended one per week, and (8.7%) preferred it to be once each month.

Figure (3) represents that (86%) of the fifth-year students agreed on advising the next batch to pay more attention to TBL.

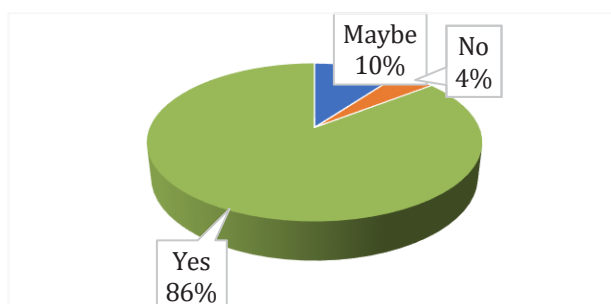


Figure (3) Distribution of the fifth-year students' opinions “that they will advise the next batch to exert efforts and attention to TBL”, Alfajr College for Science and Technology, Sudan, 2022

Discussion:

Medical education in many countries increasingly focuses on developing teaching strategies that help students achieve higher levels of learning. The present study aimed to explore the perception and satisfaction of fourth and fifth-level medical students toward Team-based learning. The study revealed that the most strongly agreed statement of perception that they will recommend the TBL program to other universities in Sudan, followed by, they are very satisfied with the TBL approach, Santana et al., 2019; Vasan et al., 2009(16,17) reported such findings. About 53% of students found that performance on the examination is affected by participation in TBL, and several studies reported that TBL participation strongly correlated with final examination score (18). Approximately 49% felt that student-to-student discussion helped them to learn concepts covered during TBL exercise better than if studied independently and

this is comparable to the study done by Jabbar et al., 2018 and Parthasarathy et al., 2019(13,19). In contrast to Vasan et al., 2009(17), there was a positive correlation between the agreements of the statement “TBL is an effective, motivating learning process” and gender, while no significant correlation with the academic score. Fifty six percent of students agreed that TBL sessions foster the use of critical reasoning and clinical problem-solving skills, and this result is consistent with Ahmed et al., 2022(20), and likewise Inuwa, 2012. About 64% of fifth-year students revealed they benefited much from TBL in surgery, and 64% of fourth level students were satisfied with internal medicine clerkship TBL. This is probably due to frequency of TBL conducted for those courses. The least student satisfaction (less than 60%) was related to the usefulness of feedback they receive from the tutors. Medical school is a very hard and tough period for the doctor, a student could benefit from the help of his peers as much as from his teacher. Also, the TBL creates a social environment between the students and helps to make the learning process much simpler. Team-Based learning enhances the academic performance of students with a deeper knowledge of course concepts, higher cognitive skills, and retention of academically weaker students (21).

Conclusion:

In this study, medical students at ACST had a positive perception of Team-Based Learning and the majority were satisfied with the Team-Based Learning approach.

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Conflict of Interest: None

Reference:

1. Koles PG, Stolfi A, Borges NJ, Nelson S, Parmelee DX. The impact of team-based learning on medical students' academic performance. *Acad Med.* 2010 Nov;85(11):1739–45.
2. Parmelee D, Michaelsen LK, Cook S, Hudes PD. Team-based learning: A practical guide: AMEE Guide No. 65. *Med Teach.* 2012;34(5):275–88.
3. Whitley HP, Bell E, Eng M, Fuentes DG, Helms KL, Maki ED, et al. Practical team-based learning from planning to implementation. *Am J Pharm Educ.* 2015;79(10).
4. Punja D, Kalludi SN, Pai KM, Rao RK, Dhar M. Team-based learning as a teaching strategy for first-year medical students. *Australas Med J.* 2014;7(12):490–9.
5. Burgess AW, McGregor DM, Mellis CM. Applying established guidelines to team-based learning programs in medical schools: A systematic review. *Acad Med.* 2014;89(4):678–88.
6. Zulkifli NF, Othman A, Abd Rahman H, Rahim NS, Abdullah NK. Team-Based Learning: Benefits on Learning and Students' Perception. *Educ Med J.* 2019;14(4):61–9.
7. Vasan NS, Defouw DO, Compton S. Team-based learning in anatomy: An efficient, effective, and economical strategy. *Anat Sci Educ.* 2011;4(6):333–9.
8. Michaelsen LK, Sweet M. The essential elements of team-based learning. *New Dir Teach Learn.* 2008;DEC(116):7–27.
9. Cevik AA, Elzubeir M, Abu-Zidan FM, Shaban S. Team-based learning improves knowledge and retention in an emergency medicine clerkship. *Int J Emerg Med.* 2019;12(1):12–6.
10. Carmichael J. Team-based learning enhances performance in introductory biology. *J Coll Sci Teach.* 2009;38(4):54–61.

11. McMullen I, Cartledge J, Levine R, Iversen A. Team-based learning for psychiatry residents: A mixed methods study. *BMC Med Educ.* 2013;13(1):1–8.
12. Deardorff A, Moore J, Borges N, Parmelee D. Assessing first year medical student attitudes of effectiveness of Team-Based Learning. *Med Sci Educ.* 2010;20(2):67–72.
13. Jabbar HA, Jarrahi AH, Vamegh MH, Moh'd Alhabahbeh DA, Mahmoud NA, Eladl MA. Effectiveness of the team-based learning (TBL) strategy on medical students' performance. *J Taibah Univ Med Sci.* 2018;13(1):70–6.
14. Malone E, Spieth A. Team-Based Learning in a Subsection of a Veterinary Course as Compared to Standard Lectures. *J Scholarsh Teach Learn.* 2012;12(3):88–107.
15. Huang Z, Li M, Zhou Y, Ao Y, Xin W, Jia Y, et al. () Modified Team-Based Learning in an Ophthalmology Clerkship in China. *PLoS ONE* 2016; 11(4): e0154250. oi:10.1371/journal.pone.0154250
16. Santana VC, Oliveira CR, Ramos RB. First-year students' perceptions of team-based learning in a new medical genetics course. *Rev Bras Educ Med.* 2019;43(3):170–7.
17. Vasan NS, DeFouw DO, Compton S. A survey of student perceptions of team-based learning in anatomy curriculum: Favorable views unrelated to grades. *Anat Sci Educ.* 2009;2(4):150–5.
18. Carrasco GA, Behling KC, Lopez O. Weekly team-based learning scores and participation are better predictors of successful course performance than case-based learning performance: role of assessment incentive structure. *BMC Med Educ.* 2021;21(1):1–9.
19. Parthasarathy P, Apampa B, Manfrin A. Perceptions of team-based learning using the Team-Based Learning Student Assessment Instrument: An exploratory analysis amongst pharmacy and biomedical students in the United Kingdom. *J Educ Eval Health Prof.*

Perception and satisfaction of medical students towards TBL

2019;16(September):23.

20. Ahmed M, Athar S, Zainab S, Akbani S, Hasan B, Hameed U. Does team-based learning affect test scores of the basic medical sciences students in a modular curriculum? *Int J Heal Sci.* 2022;16(2):12–6.
21. Tahereh Faezi S, Amr Mor Adi KA, Ghafar Ahimi Amin AR, Hlaghi MA, Emeh Kesh I R I FM, Keshmiri F, et al. Team-based learning in a course of rheumatology. *Orig Artic J Adv Med Educ Prof Rheumatol J Adv Med Educ Prof.* 2018;6(1):22–30.

Premarital Counseling and Screening Awareness and Perception among Alfajr College for Science and Technology Medical Students, Khartoum, Sudan, 2021

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Abstract

Background: Premarital counseling and screening is an intervention that helps couples to start a healthy marital life. The screening involves examinations and tests that are performed before marriage to detect certain genetic blood disorders and infectious diseases to prevent and decrease the incidences of these conditions.

Aim: To assess the awareness and perception of premarital counseling and screening among Alfajr College for Science and Technology medical students in 2021.

Method: The study was an observational, descriptive, cross-sectional, institutional-based study conducted in Alfajr College for Science and Technology medical students, Khartoum, Sudan.

The calculated sample size was 300 students. They were distributed by stratified sampling technique between medical students from levels 2 to 5. The study collected data from medical students registered at the College through telephone interview using an adapted questionnaire. The questionnaire covered the socio-demographic characteristics, student awareness about premarital counseling and screening program's components, importance, time and sources of their awareness as well as the perception of the students regarding the program in form of their beliefs and willingness to practice and advocate for the program. Data was analyzed using SPSS software version 16.0. Descriptive and Inferential statistics were used. Ethical considerations were observed throughout the study.

Results: A 100% response rate was obtained from the targeted students. Participants who had an idea about Premarital Counseling and Screening constituted 78.7% of the sample. The commonest source of information (49.6%) was social media, followed by college staff (27.1%) and friends (22%). The health care services were the least common source of information (1.3%).

Two-thirds of the study participants knew the importance of Premarital Counseling and Screening. The knowledge score was high in 36.7% of the participants, moderate in 34% and low in 29.3%. There was a statistically significant association between the knowledge score and age (p -value $<.0001$) which indicates that young age students need to be addressed to increase their awareness. Also, there was a statistically significant association between knowledge score, willingness to practice and advocacy for Premarital Counseling and Screening (p . value $<.0001$). Furthermore, the study showed equal (50%) positive and negative perception scores despite the majority (71.3%) of the students believed that the Premarital Counseling and Screening is important.

Conclusion: knowledge is a strong determinant of students' willingness to practice Premarital Counseling and Screening. Moreover, knowledge score was significantly associated with the student's willingness to advocate for the program. In this regard, comprehensive and broadly scaled health education programs should address Premarital Counseling and Screening among young adults who are the targeted population to benefit from such programs. The study also indicates that health education programs can be best delivered through social media to young population.

Keywords: *premarital counseling, premarital screening, perception, awareness, medical student.*

Introduction

Premarital counseling and screening (PMCS) is an intervention that helps couples to start a healthier marriage.(1)The screening involves examinations and tests that have to be performed before marriage. The aim is to detect genetic blood disorders and infectious diseases that have health implications on the potential couples and their offspring. Screening coupled with counseling helps to prevent and decrease the incidences and prevalence of these conditions.(2)In the Middle East and North Africa region, consanguineous marriages (especially first-cousin marriages) are common. Recent statistics showed that such marriages constituted 42-67% of all marriages in the Kingdom of Saudi Arabia, 54% in Qatar, 40-54 % in the United Arab Emirates, 29-64% in Jordan, 21-33% in Egypt, 44-63% in Sudan, and 40-45% in Yemen.(3) The World Health Organization (WHO) estimated that at least 2.6% of the world's population are genetic carriers for hemoglobinopathies (2.9% for thalassemia and 2.3% for

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sickle cell disease).(4) The Global Report on Birth Defects, issued by March of Dimes Birth Defects Foundation, New York, 2006, ranked Sudan as the highest country with birth defects (82.0 per 1,000 live births), in comparison to the lower rate in France of 39.7 per 1,000 live births.(5) On the other hand, the majority of Sexually Transmitted Infections (STIs) have no or only mild symptoms that may not be recognized as STIs.(6) Hepatitis B is one of the most common causes of liver disease worldwide, Sudan was classified as a country with high seroprevalence exposure estimated at 47%-78%.(7) Premarital screening is, therefore, an essential tool to control, minimize, and prevent genetic and infectious disorders, with all the health, social and psychological complications that are likely to affect couples and their children.(2) Hence, it is important to explore the knowledge, beliefs and behavior of the population towards the PMCS program. Medical students are the prospective healthcare providers, who are supposed to provide health services and convince their surrounding communities regarding the importance of preconception care and utilization of the available health services. Those students need to obtain more information on reproductive health including premarital counseling, as well as encouragement to utilize premarital counseling services, which should be an essential part of the primary health care services.(8)

This study aimed to assess the awareness and perception of medical students of Alfajr College for Science and Technology (ACST) towards PMCS and to identify some factors which may influence its acceptance among them in 2021.

Materials and Methods

The study was an observational, descriptive, cross-sectional study, conducted during the period from April to June 2021 in ACST. The study population included medical students registered at ACST from the second to the fifth academic year.

Sample size and Sampling

The sample size estimated at 300 students obtained by using the formula:

$$n = \frac{Z^2(pq)}{e^2}$$

where n was the sample size, z = confidence level at 95% and value of 1.96, p = the estimated proportion of the students' knowledge/awareness about PMCS taken from a previous study,(9) as 73.4% ; $q = 1-p = 26.6$; e : margin of error =0.05.

The sample size was distributed to the different levels proportional to their size, thus 17% (51) were taken from students of the fifth level, 27% (81) from the fourth level, 24% (72) from the third level and 32% (96) from the second level. The sampling technique to enroll the participants followed a systemic random selection.

Data collection tools and techniques:

The study collected data through telephone interview using an adapted questionnaire, (4,9,10) which consisted of open and close-ended questions distributed in three sections. The first section was the socio-demographic data including gender, age, academic year and marital status. The second section contained student awareness about PMCS program's components, importance, time and sources of their awareness. The perception of the students regarding PMCS program in form of their beliefs and willingness to practice and advocate for PMCS program was also obtained in this section. The last section was about the determinant factors that enhance awareness and perception of students towards PMCS program. The questionnaire was reviewed and approved by an expert supervisor.

Data analysis:

Data was analyzed using SPSS software version 16.0. Descriptive statistics were carried out and inputs summarized as frequencies and proportions at a

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95% confidence level. Inferential statistics using chi-square test was used to test the association between the socio-demographic characteristics and the knowledge and perception scores, willingness to practice and to advocate for PMCS. Statistical significance was taken as $p \leq 0.05$. The knowledge score was valued by categorizing the outputs as: high knowledge for scores 7-9 out of nine, moderate knowledge for 4-6, and low knowledge for 0-3 scores. The same was done for the perception score where those who answered 0-2 or 3-4 of the four perception questions were regarded as having negative and positive perception respectively.

Ethical approval:

Ethical and technical approval were obtained from the department of community medicine at ACST. Written consent was obtained from each student with clarification that their participation is voluntary and the information obtained will be treated with confidentiality.

Results

Sample Coverage and Characteristics of the Study Population

A total of 300 students were interviewed revealing a 100% response rate. The majority of them (97.7%) were Sudanese; almost half of them (55.3%) were females. Fifty-nine percent were in the age group of 15-25 years; while only 2.3% were aged 36 years and above. About one sixth (17%) of the students were married and 52% were living in urban areas. (Table 1)

Table 1: Medical Students Characteristics, Alfajr College for Science and Technology, 2021

Demographic data	Frequency- n=300	Percent
Age		
15-25	177	59.0%
26-35	116	38.7%
36-45	6	2.0%
46-55	1	.3%
Marital status		
Single	246	82.0%
Married	53	17.7%
Divorced	1	.3%
Living area		
Rural area	142	47.35
Urban area	158	52.7%

More than three-quarters of the students (78.7%) had an idea about PMCS. The commonest source of information was social media (49.6%) the second source was from the university (27.1%), while friends were the source for 22% of the participants. Health care services were the least common source for PMCS (only 1.3%).

Around two-thirds (64.3%) of the study participants knew the importance of PMCS in reducing the occurrence of genetic disorders while 50.7% knew that the PMCS program targets genetics and hereditary disorders as well as STIs. About half of the participants knew the place where PMCS services can be provided, it is important for preparation of marriage and it should be done in six months or more before marriage. However, only one third knew that PMCS involves both physical examination and blood testing. (Table 2)

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Table (2) Medical Students Knowledge about Premarital Counseling and Screening, Alfajr College for Sciences and Technology, 2021

Knowledge Component: correct statement	Frequency- n=300	Percent
PMCS is important to know about.	214	71.3%
PMCS reduces the occurrence of genetic disorders	193	64.3%
PMCS reduces the occurrence of genetic disorders and STIs	152	50.7%
PMCS services are part of hospital and Primary Health Care settings	143	47.6%
PMCS involves physical examination and blood testing	97	32.3%
The PMCS screening program should involve both partners	206	68.7%
PMCS is important for preparation of marriage	136	45.3%
PMCS, should be done in six months or more before marriage	131	43.7%

Table 3 shows that a low percentage of the students who were willing to practice PMCS; and those who were not willing indicated that their decision was either due to lack of adequate knowledge or due to social and cultural factors.

Table (3) Medical Students Perception about Practice of Premarital Counseling and Screening, Alfajr College for Sciences and Technology, 2021

Perception of actual practice of PMCS	Number of students	Percent
Number of students willing to practice PMCS tests,	117	(39%)
Unwillingness to participate in PMCS was due to lack of adequate knowledge	134	(44.5%)
Unwillingness to participate in PMCS was due to social and cultural factors	99	(33%)

Around one third of students (36.7%) had high knowledge score. Those who had moderate and low knowledge scores were (34%) and (29.3%) respectively. However, the participants were evenly divided between positive and negative perception of PMCS, at scores of 50% for each.

There were significant associations ($p < 0.0001$) between *knowledge score* and age. However, there was an insignificant association between *knowledge score* and sex ($p = 0.215$), marital status ($p = 0.792$) and Living area ($p = 0.421$). On the other hand, *Perception score*, was significantly associated with marital status ($p = 0.005$), but insignificantly associated with age, sex, and living area (0.182, 0.106, and 0.427 respectively).

The result showed a significant association between the *knowledge score* and willingness to practice PMCS and willingness to advocate for PMCS ($p < 0.0001$). Similarly, there was a significant association between the *perception score* and willingness to practice PMCS and willingness to advocate PMCS ($p < 0.0001$).

Discussion

The importance of PMCS cannot be underestimated, as many countries have confirmed its importance in minimizing the incidence of genetic diseases.(11) In a program like PMCS, there is a need to focus on the target population, mostly young adults like high school and university students because their attitudes will affect their choice of a partner. Most of the international studies were conducted

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on young adults.(11) This is comparable to the age of the study population where 59% of the participants' age ranged from 15-25 years. Most of the participants)82%(were single as in Ibrahim Kabbash's study in 2018, which was conducted on the Medical Students of Tanta University, Egypt that revealed 97.7% of participants were single.(12) This is an expected finding since the participants were still students. Our study revealed that the commonest source of information for those who had an idea about PMCS was social media (49.6%) while friends were the source for 22% of the participants. This was unlike a study in Oman which revealed that the main source of information about the PMCS program were family and friends (34.4%) followed by school subjects (30.3%), media and newspaper reports (18.5%) and healthcare services and school nurses 16.8%. (13,14) This indicates that the healthcare services are not as efficient as expected in spreading information on PMCS and more effort is required in this regard.

The findings in other studies regarding various aspects of knowledge related to PMCS were comparable to our study. However, it is possible that respondents from the two Muscat studies were better informed than our study sample about whom to screen and when to screen before marriage. (13, 15). (Table 4)

Table (4) The Score of knowledge about Premarital Counseling and Screening among Students in the Study Sample compared to Findings in Other Similar Studies from the Literature

Correct Statement About Knowledge	Percent in this study (KH)	Data from others studies
PMCS is important to know about.	71.3%	Al-Aama: 86.5% of the participants believed that PMCS is important (16)
PMCS reduces the occurrence of genetic disorders	64.3%	Saudi Arabia: Faisal Saeed Al-Qahtani, 69% of respondents knew that PMCS reduces the occurrence of genetic disorders (9)
PMCS reduces the occurrence of genetic disorders and STIs	50.7%	Muscat Study, Al-Kindi <i>et al</i> (13): 59.8% of the respondents knew that PMCS program targets genetic blood disorders as well as STIs.
PMCS services are part of hospital and Primary Health Care settings	47.6%	Jeddah Study, Ibrahim NK <i>et al</i> (14): 60% of their sample were aware that the hospital was a place for PMCS services.
PMCS involves physical examination and blood testing	32.3%	Muscat-2 study, Al Zeedi <i>et al</i> : 40.2% knew PMCS program includes blood tests and physical examinations.(15)
The PMCS screening program should involve both partners	68.7%	Muscat-2 study, Al Zeedi <i>et al</i> :92.8% knew that the screening test should involve both partners.(15)
PMCS is important for preparation of marriage	45.3%	A region in Oman study, Al-Farisi: Found that 84.5% of the participants believed that PMCS was necessary,(10)
PMCS, should be done in six months or more before marriage	43.7%	Muscat-2 study, Al Zeedi <i>et al</i> : 75.5% of participants knew the exact time.(15) Muscat-1 study, Al-Kindi: 87.9% knew that it must be done before marriage.(13)

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Regarding perception of **Premarital Counseling and actual willingness to take part in the screening process, there was reluctance to do so by half of the study sample:** The study showed equal (50%) positive and negative perception scores despite the majority (71.3%) believing that the PMCS is important.

Willingness to actively participate in PMCS was clearly higher in Al-Kindi and coworkers study.(9) Compared to our study sample (Table 5). A common factor for reluctance to participate in PMCS was lack of adequate knowledge and socio-cultural factors (Table 5). Thus, there was a significant association between knowledge score and willingness to practice and advocate for PMCS (p-value .0001). Similarly, there was a significant association between perception score and willingness to practice and advocate for PMCs (p-value .0001).

Table (5) The Score of Perception about Practice of Premarital Counseling and Screening among Students in the Study Sample compared to Responses of Participants in other Similar Studies

Perception of actual practice of PMCS	Percent in this study (KH)	Data from others studies
Number of students willing to practice PMCS tests,	(39%)	Muscat-1 study, Al-Kindi (13) and Saudi Arabia study: Faisal Al-Qahtani (9): about 87% in both studies agreed to undergo the PMCS
Unwillingness to participate in PMCS was due to lack of adequate knowledge	(44.5%)	Sadia Noor: (50.5%) unwillingness to participate in PMCS was due to lack of knowledge,(17)
Unwillingness to participate in PMCS was due to social and cultural factors	(33%)	A region in Oman study, Al-Farisi: 30.5% of the participants were unwilling to practice pre-marital testing, the reluctance was associated with the participants socio-demographic characteristics (10)

Conclusion

We conclude that the knowledge score is a strong determinant of students' willingness to practice PMCS. At the same time, knowledge can be regarded as an underlying factor of the students' willingness to advocate for the program. In this regard, comprehensive and broadly scaled health education programs to address PMCS among young adults as the most targeted population who will benefit from such programs is crucial. Health education programs can be inflected through social media, being the main source of information as revealed by the study.

Funding:

Authors own resources

Conflict of interest

None

References

1. Med JMK. Innovations in Clinical and Educational Interventions Tales of a Therapist. *Journal of Couple & Relationship Therapy* :2013;6(2):37–41.
2. Al-Shafai M, Al-Romaihi A, Al-Hajri N, Islam N, Adawi K. Knowledge and Perception of and Attitude toward a Premarital Screening Program in Qatar: A Cross-Sectional Study. *Int J Environ Res Public Health*. 2022;19(7).
3. Modell B, Darlison M. Global epidemiology of haemoglobin disorders and derived service indicators. *Bull World Health Organ*. 2008;86(6):480–7.
4. Tadmouri GO, Nair P, Obeid T, Al Ali MT, Al Khaja N, Hamamy HA. Consanguinity and reproductive health among Arabs. *Reprod Health*. 2009;6(1):1–9.

Premarital Counseling and Screening Awareness and Perception

5. Christianson A, Howson CP, Modell B. March of Dimes releases premature birth report card: Kentucky receives “F”--KMA joins healthy babies coalition.” *J Ky Med Assoc.* 2008;106(12):557–8.
6. Da Ros CT, Da Silva Schmitt C. Global epidemiology of sexually transmitted diseases. *Asian J Androl.* 2008;10(1):110–4.
7. Mudawi H. Epidemiology of viral hepatitis in Sudan. *Clin Exp Gastroenterol.* 2008;1:9-13
8. Odelola JO, Adisa O, Akintaro O. Attitude towards pre-marital genetic screening among students of Osun State Polytechnics in Nigeria. *Int J Educ Adm Policy Stud.* 2013;5(4):53
9. Al-Qahtani FS, Alfahad MI, Alshahrani AM, Almalih HS, Al-Malki AS, Alshehri TK, Alqhtani AA, Al-Qahtani AM, Alfaifi SH, Alasmari RF, Bharti RK. Perception of premarital counseling among King Khalid University students. *Journal of Family Medicine and Primary Care.* 2019 Aug;8(8):2607.
10. Al-Farsi OA, Al-Farsi YM, Gupta I, Ouhtit A, Al-Farsi KS, Al-Adawi S. A study on knowledge, attitude, and practice towards premarital carrier screening among adults attending primary healthcare centers in a region in Oman. *BMC Public Health.* 2014;14(1):1–7.
11. Belhoul KM, Abdulrahman M, Alraei RF. Hemoglobinopathy carrier prevalence in the United Arab Emirates: First analysis of the dubai health authority premarital screening program results. *Hemoglobin.* 2013;37(4):359–68.
12. Kabbash I. A, Attalla AO, Abd S, Atlam E. Perception of Importance of Premarital Counseling among Medical Students of Tanta University, Egypt. *Egypt J Community Med.* 2019;37(2):66–75.
13. Al-Kindi RM, Kannekanti S, Natarajan J, Shakman L, Al-Azri Z, Al-Kalbani NI. Awareness and attitude towards the premarital screening programme among high school students in Muscat, Oman. *Sultan Qaboos Univ Med J.* 2019;19(3):e217–24.

14. Ibrahim NK, Bashawri J, Al Bar H, Al Ahmadi J, Al Bar A, Qadi M, et al. Premarital Screening and Genetic Counseling program: Knowledge, attitude, and satisfaction of attendees of governmental outpatient clinics in Jeddah. *J Infect Public Health* [Internet]. 2013;6(1):41–54. Available from: <http://dx.doi.org/10.1016/j.jiph.2012.05.001>
15. Al Zeedi MASA, Al Abri ZG. Attitudes and impact among people with abnormal premarital screening test results in Muscat governorate's primary healthcare centers in 2018. *J Community Genet*. 2021;12(1):163–9.
16. Al-Aama JY. Attitudes towards mandatory national premarital screening for hereditary hemolytic disorders. *Health Policy (New York)* [Internet]. 2010;97(1):32–7. Available from: <http://dx.doi.org/10.1016/j.healthpol.2010.02.009>
17. Sadia Noor Mithila. A Study on Knowledge, Perception and Attitude towards Premarital Carrier Screening (PMCS) Among Students Attending Universities. East West University, 2017 (thesis report)

First Aid Awareness and Practice of Highway Traffic Police Officers from Three States in Sudan, 2021

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Abstract

Background: Road Traffic Accidents (RTAs) are considered one of the main causes of death worldwide. Most RTAs deaths occurred before reaching the hospital. First Aids are lifesaving skills that are essential to road traffic police officers (TPOs) since they are often the first responders to those who are affected by RTAs on the highways.

Aim: the study aimed to assess the awareness and practice of Highway TPOs regarding First Aid procedures.

Methods: A descriptive cross-sectional study was conducted among TPOs working in the three most affected States by RTAs in Sudan, as reported by the Ministry of Interior. The data was collected by face-to-face interviews using a structured pretested questionnaire that covered the TPOs' characteristics, awareness and practice towards traffic accident victims. Permission to carry out the study was obtained from the concerned Federal and State institutions. Informed consent was obtained from the participants. Statistical Package for Social Sciences was used for both descriptive and inferential statistics.

Results: Only one person of the 134 targeted officers didn't respond giving a response rate more than 99%. Fifty-seven percent of the participants stated that they had sufficient knowledge about First Aid and 45% of the TPOs had attended first aid courses. The First Aid awareness score of the Highway TPOs indicated that almost half of them (48 %) had a good level of awareness about the First Aid. Almost all (99.2%) Highway TPOs knew the correct action to be taken in cases of fractures and all of them knew the correct actions to stop bleeding. The least correct action (only 2.3%) was in the case of dealing with a comatose patient. There was no association between the TPOs practice in regard to correct positioning of a comatose patient and their First Aid training (p-value 0.67). Years of experience were found to significantly affect improvement of first aid awareness and practice (P-value 0.01).

Conclusion: We conclude that the knowledge and practice of The Highway TPOs regarding the procedures needed in case of fractures and bleeding was adequate.

Dealing with comatose patients was the weakest point in the first aid procedures (97.7%), even among trained officers. More than half of the officers (55%) never had the chance to attend training courses in First Aid. This situation confirms the need for emphasis in training and workshops on all components of First Aid especially dealing with comatose patients; and the need to extend formal training to cover all Highway TPOs.

Keywords: *First Aid, Traffic police officers, Road traffic accidents, Sudan*

Introduction

Road Traffic Accidents (RTAs) are considered the ninth cause of death worldwide.(1) RTAs might cause non-fatal injuries which were estimated at 20-50 million each year, while about 1.5 million victims died per year.(2)

Commencement of care after traumatic injury and before reaching the hospital is critical for the reduction of mortality and morbidity. The early initiation of continuous care, known as “the trauma chain of survival” is important for patients suffering from severe traumas.(3)

Survival after traumatic injury is always determined by the effectiveness of the intervention received immediately after the accident, the first three minutes being a life-saving time.(4) First Aid (FA) consists of life-saving techniques which can be performed by any individual who has been through FA training.(5) According to the literature, Nigeria has the highest percentage of traffic deaths (25%) among African countries followed by Congo, Ethiopia, Kenya, South Africa, Tanzania, and Uganda respectively.(6)

The introduction of FA and Cardio-Pulmonary Resuscitation (CPR) training led to the reduction of mortality by 25% of traumas resulting from RTAs.(7) According to the Sudanese Ministry of Interior, 1711 individuals died due RTAs in 2014, and 4374 were injured or disabled.(8) In 2017, the total deaths constituted 11.4% of all RTAs in El Gazera State.(9) Most of the RTAs’ deaths happened before reaching the hospital, estimated to be around 50%.(3,10) Building the capacity of the traffic police officers (TPO) through FA skills attainment is essential, since they are usually the first responders to those who are affected by the RTAs on the highways.(11,12) This study was carried

out to explore Sudanese officers' Awareness and practice regarding FA.

Materials and Methods

This was a descriptive, cross-sectional study conducted during the year 2021 in three States in Sudan. The States (Khartoum, El Gazira and White Nile) were purposively selected being the States with the highest rates of RTAs among the 15 States of the Sudan.(8)

Sample Size and Sampling

The sample size was calculated using the formula $n = (Z^2pq/e^2) * deff$; where $Z=1.96$ (which corresponds to the level of confidence); p ; the estimated proportion of the Highway Traffic Police Officers (TPOs) awareness was taken as $=0.5$ since there was no previous estimates; $Q=1-p=0.5$; e =margin of error at 95th confidence interval (C.I) (0.05), $deff=0.35$. The total sample size (134) was divided equally between the three States.

Data collection Tools and Techniques:

The data was collected through face-to-face interviews using a structured pretested questionnaire consisting of 20 questions covering the police officers' characteristics, awareness and practice towards traffic accident victims. A convenient sample technique was used to select the study samples. The study permission was obtained from the Press office of the Police Department in the three States and permission to interview police officers was obtained from Rapid Traffic Department. All participants signed informed consent before filling out the questionnaire. Statistical Package for Social Sciences was used for the descriptive and inferential analysis. The ANOVA test was used to calculate the effect of the police officers' years of experience and their age on the practice score.

Results

The response rate obtained from the 134 targeted officers was 99.2%. All the participants were male officers with a mean age of 34 years. More than half of

them (52.7%) had more than seven years of experience.

Fifty-seven percent of the participants claimed that they had sufficient knowledge about FA; almost one-third got their information from the media, 37.6% from field practice and 26.3% took the information from FA courses. Forty-five percent had formal First Aid training, while the remaining 55% stated that they weren't able to attend the training because of their limited time and/or the non-availability of training centers. FA awareness score of the TPO indicated that almost half of them (48.1%) had good level of awareness. (Table 1)

Table 1: First Aid Awareness among Highway Traffic Police Officers in Khartoum, El Gazira and White Nile States, Sudan, 2021

Score of awareness regarding FA* among TPO*	Number (%)
Poor	17 (12.8%)
Average	52 (39.1%)
Good	64 (48.1%)
Total	133 (100%)
FA* = First Aid; TPO = Highway Traffic Police Officers	

When asking the police officers about the priority actions to be performed in the accident scene, 60.2% responded by the correct answer of: “start FA procedures immediately and then ask for help”. Regarding the management in cases of fractures, 99.2% of the TPOs knew the correct action: “fixing the bone with a hard object and calling for help”. In case of bleeding, all the respondents knew the correct actions to stop bleeding, the question was designed to assess a number of bleeding control methods.(Table 2)

Forty-two point one percent of participants had knowledge for more than two methods of bleeding control; the remaining knew at least one

Table 2: Actions to be taken for a Bleeding Patient among Highway Traffic Police Officers in Khartoum, El Gazira and White Nile States, Sudan, 2021

Actions to be taken for a Bleeding Patient	Number (%)
Put a clean cloth direct on the bleeding site	46 (34.6%)
Elevate the bleeding site	4 (3.0%)
Apply pressure on the bleeding site	27 (20.3%)
All answers are possible	56 (42.1%)

The least correct action was in case of dealing with a comatose patient where only 2.3% got the right answer; this probably indicates that the FA training was deficient in this respect, in spite of the obvious life-saving implications of procedures such as cardio-pulmonary resuscitation (CPR). In Fact, only 65.4% of the participants heard about CPR, yet none had ever preformed it to the day of the study. There was no association between the traffic police officers practice in regard to correct positioning of a comatose patient and their First Aid training (p-value 0.67).

A question about how do you rate your participation in helping victims of RTAs, 47.4% of the TPOs rated their participation as being excellent, while only 3.8% said their response was weak.

The effect of TPOs age and their years of experience on the FA awareness and practice score was explored using ANOVA test which showed significant relation (P-value 0.033). However, age had no significant effect when measured alone, (Tables3&4).

Table 3: Correlation between Age and Years of Experience with the First Aid Awareness among Traffic Police Officers in Khartoum, El Gazira and White Nile States, Sudan, 2021

Model		Unstandardized Coefficients		Standardized Coefficients	P value.
		B	Std. Error	Beta	
1	(Constant)	4.824	.239		0.000
	Age	.217	.149	.164	0.148
	Years of Experience	-.368	.140	-.296	0.010

Table 4: Correlation between the joint Effect of Age and Years of Experience on the First Aid Awareness among Highway Traffic Police Officers in Khartoum, El Gazira and White Nile States, Sudan, 2021

Model	Sig.
Regression	.033 ^b
Residual	
a. Dependent Variable: SCORE	
b. Predictors: (Constant), exp, age1	

Discussion

The World Health Organization (WHO) recommends basic FA training for potential lay respondents including police officers, to provide appropriate initial assistance before professional care providers take over.(7) Of the 133 TPOs covered by this study, 45% had had FA training. This finding is almost similar to the result of an Ethiopian study that revealed a prevalence of 42.7% trained officers.(13) Both countries were far from the WHO target that recommends training of all TPOs.

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Fractures' management using hard object to fix the bone was considered by 42% of the TPO while 57% said they would ask for help, both answers were considered correct in this study because dealing with fracture in the wrong way might cause serious complication. Results of two studies conducted in Ethiopia and India indicated good responses to this aspect of management where 84.5% and 73.4% of their study participants, respectively knew how to deal with fractures.(13,14) The possible reason why people have good knowledge on dealing with fractures, regardless of their first aid training background, might be due to that fractures are common, and people experience them more often, especially with their kids and teenagers in the playgrounds.(15) The TPOs scored a 100% correct answer when asked about action to be taken for a bleeding patient. An Ethiopian study conducted with the military officers showed that 53.6% had good knowledge about all the appropriate ways of controlling bleeding, while the rest knew only one method of bleeding control. a similar study conducted in India showed that 57.9% knew the correct actions.(13,14) Although a Nigerian study that was conducted to analyze the safe patient positioning after a traumatic event was better than our study (18.3% versus 2.3% (respectively)),(16) both results show an agreement on the face-up position which tells us that this wrong conception is widely common.

Attending a CPR course has become an essential criteria to join Police Forces in many countries and retraining is required every two years such as in United States of America.(17) Although this study did not explore the experience of facing the need of CPR, a study conducted in Greece reflected that of the participants who had never provided CPR, 61.7% realized the need, however they failed to intervene.(18)

When analyzing the effect of experience in regards of FA and dealing with RTAs we found that experience has a significant positive relation, since it affects the frequency of RTAs exposure unlike age which was found not significant. The analysis also showed a significant relation when age and experience were tested together.

Conclusion

We conclude that the practice of The Highway Traffic Police Officers regarding the procedures in case of fractures and bleeding was adequate. Dealing with comatose patients was the weakest point in the first aid procedures, even among trained officers. More than half of the officers (55%) never had the chance to attend training courses in First Aid. This situation confirms the need for emphasis in training and workshops on all components of First Aid; and, the need to extend training to cover all Highway Traffic Police Officers.

Funding

Authors own resources

Conflict of interest

None

References

1. International Federation of Red Cross and Red Crescent. First Response to Road Cashes “First Aid Saves Lives” 2015.
2. WHO Regional Office for Africa..Global Status Report on Road Safety 2015, 2016.
3. Nishimura T, Nojima T, Naito H, Ishihara S, Nakayama S, Nakao A. Prehospital emergency life saving technicians promote the survival of trauma patients: A retrospective cohort study. *Am J Emerg Med.* 2022;56:218–22. Available from: <https://doi.org/10.1016/j.ajem.2022.04.004>
4. The Marshall Project Many Cops Never Use First Aid to Save Lives. <https://www.themarshallproject.org/2020/12/15/cops-could-use-first-aid-to-save-lives-many-never-try> access Feb 2023
5. Ali S. Mobarak, Raouf M. Afifi, Amani Qulali. First Aid Knowledge and Attitu **First Aid Awareness and Practice of Highway Traffic** alth.2015;

- 7 (10).
6. World Health Organization. Road Safety in the African Region 2015, 2016.
 7. Kureckova V, Gabrhel V, Zamecnik P, Rezac P, Zaoral A, Hobl J. First aid as an important traffic safety factor – evaluation of the experience – based training. 2017.
 8. Ministry of Interior Affairs. Ministry of Interior Affairs. 2014. p. 1–10. Available from: <http://www.mvr.gov.mk/>
 9. Sudan News Agency. Decrease in traffic accident rates in 2018 in Gazera State. Available from <https://www.suna-news.net/read?id=267766>
 10. Lukumay GG, Ndile ML, Outwater AH, Mkoka DA, Padyab M, Saveman B, et al. Provision of post-crash first aid by traffic police in Dar es Salaam , Tanzania : a cross-sectional survey. 2018;9:1–9 <https://www.themarshallproject.org/2020/12/15/cops-could-use-first-aid-to-save-lives-many-never-try>
 11. Menti L. Ndile1, Britt-Inger Saveman, Gift G. Lukumay, Dickson A. Mkoka1, Anne H. Outwater and Susann Backteman-Erlanson. Traffic police officers’ use of first aid skills at work: a qualitative content analysis of focus group discussions in Dar Es Salaam, Tanzania. BMC Emergency Medicine 2020;20:72.
 12. Stewart M. Wilderness & Environmental Medicine. Annals Of Emergency Medicine.. 2013,24.165.
 13. Legese Mebrahtu. Assessment of Knowledge Attitude and Practices of Military Personnel Regarding First Aid Measures in Northern Command 21st Division. Addis Ababa University School of Graduate Studies Faculty of Medicine. 2014 July. Available from <http://213.55.95.56/bitstream/handle/123456789/1893/Legese%20Mebr>
- Musab I. I. Muhammed, Basheir E. Shumo, Deena A. A. Mohamed**
14. Sadhana Awasthi, Gaihemlung Pamei, Hariom K. Solanki, Amandeep Kau1,

- Maneesh Bhatt,. Knowledge, attitude, and practice of first aid among the commercial drivers in the Kumaon region of India. *Journal of Family Medicine and Primary Care*. 2019; 295-19
15. Hedström EM, Svensson O, Bergström U, Michno P. Epidemiology of fractures in children and adolescents: Increased incidence over the past decade: A population-based study from northern Sweden. *Acta Orthop*. 2010;81(1):148–53.
 16. Olugbenga-Bello AI, Sunday OK, Nicks BA, Olawale OA, Adefisoye AO. First aid knowledge and application among commercial inter-city drivers in Nigeria. *African J Emerg Med*. 2012;2(3):108–13. Available from: <http://dx.doi.org/10.1016/j.afjem.2012.06.003>
 17. AIDS Bulletin for Law Enforcement | Office of Justice Programs. Available from: <https://www.ojp.gov/ncjrs/virtual-library/abstracts/aids-bulletin-law-enforcement>
 18. Tzenetidis N, Kourlaba G, Triantafyllou C, Tzenetidis V, Koulouvaris P, Myrianthefs P. Practices and educational needs of Hellenic Police Officers in providing first aid/cardiopulmonary resuscitation: A cross-sectional survey. *Work*. 2023. p. 1–8

Support for Distal Extension Denture Base Using Corrected Cast Technique; Case Report

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Abstract

Replacing missing teeth distal to remaining natural teeth with removable partial dentures (R.P.D) poses a significant challenge to dentists. Patients with missing teeth often desire to use removable partial dentures to improve their dental aesthetics and restore their oral function. The altered cast impression technique is a simple technique that increases the support for the distal extension base. This case report aims to describe a method of recording minimal tissue displacing altered cast impression using condensation silicone material.

Introduction

Prosthodontists often face challenges when constructing mandibular Kennedy class, I denture(s). Throughout the replacement of missing teeth for a distal extension removable partial denture, we should keep in mind De Van's statement: "the perpetual preservation of that which remains and not the meticulous replacement of that which has been lost." (1).

The residual alveolar ridge provides the distal extension removable partial denture (RPD) with most of its support, stability, and retention. These dentures only have little amount of dental support because their bases may be the extensions covering the ridge distal to the final abutment tooth.(2) The quality of the residual alveolar ridge and its contour, the amount of ridge covered by the RPD, the accuracy of the impression, the accuracy of the denture's fit, the design of the RPD, and the total occlusal load applied during function are all factors that affect the support provided by the residual alveolar ridge.(3)

Occlusal stresses must be equally spread across the tissues of the residual ridge and the abutments when they are applied to distal extension partial dentures. For a master cast created from a single impression, this cannot be achieved. The *altered cast technique*, also known as the "corrected cast," is applied in a dual impression approach to properly outline the periphery of the denture base and record and relate the tissues under consistent loading.(4)

The *altered cast impression technique* necessitates an additional step for both the dentist and the dental technician. It improves the support of the distal extension partial denture, maximizes stability and offers little stress on abutment teeth. Additional benefits include improved occlusion, fewer post-operative visits, maintenance of the remaining ridges, and decrease in food impaction.(5) Tissues of the edentulous ridge in the distal extension removable partial denture are prone to be displaced under occlusal pressure. The difference between the resiliency of the residual ridge tissues and the teeth causes a discrepancy of support that causes denture instability.(6)

Clinical significance:

The *altered cast technique* allows the residual alveolar ridge to be captured in a functional form so that when the prosthesis is seated, it gets support from both the teeth and the soft tissues.

Although supporting distal extension, partial denture through using corrected cast technique is well known globally, yet its use is limited in Sudan, especially in private clinics and only applied for educational purposes. This may be attributed to lack of knowledge among dentists about its importance in stability of denture. Another factor, may be the attitude of many dentists to try to reduce the number of visits in conducting denture to provide a low-cost product which can be affordable to many patients at the expense of quality. In other words, the economic hardships in Sudan have direct effect on quality of clinical services provided for patients.

Case report:

A 55 years old woman attended to Prosthetic Department and requested new upper and lower prostheses. She felt her face looked too old after tooth loss. She had a history of three previous acrylic partial dentures but she didn't use them because they were uncomfortable. Intraoral examination showed an average size ovoid-shaped maxillary arch with irregular ridge and bilateral bulbous overhanged tuberosities. No inter arch space was available. There was average sized, ovoid shape mandibular arch with normal tongue size (Figure 1).



Figure 1: Intra oral view

Assessment of teeth:

Clinical assessment of the teeth showed the following findings (see also Figures 2 and 3).

- 13 (cariou, over erupted).
- 21(over erupted).
- 36 (mesially tilted, over hanged old amalgam filling, secondary cariou, tender to percussion,cariou root).
- 34,32 (cariou).
- 41,44 (cariou).

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- 46 (mesially tilted, over hanged old amalgam filling, tender to percussion, exposed carious root).
- Poor oral hygiene, inflamed gingivae.



Figure 2



Figure 3

Figures 2 and 3: show clinical assessment of teeth

Investigations done:

1. Diagnostic Impression using metal special trays with heavy consistency condensation silicon. The impression was poured with type III dental stone producing diagnostic cast
2. Articulated Study Casts:

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Figure 4: Illustrates the bulbous over hanged tuberosities.

Management:

The following were considered possible options available for the treatment of the Maxilla:

- (a) Implant fixed prosthesis;
- (b) Implant supported complete over denture and
- (c) Removable maxillary complete prosthesis.

The following were considered possible options available for the treatment of the Mandible:

- (a) Implant fixed prosthesis; and (b) Cobalt – Chromium RPD.

Risks, benefits and alternatives were discussed with the patient. The patient chose

‘Upper complete denture opposing lower chrome cobalt partial denture’.

The following Management steps were undertaken:

- Patient education and motivation
- Scaling and oral hygiene instructions.
- Surgical reduction for tuberosities.
- Alveoplasty for irregular area of ridges.
- Extraction of (13,21,36,46).
- Endodontic and conservative phase (filling for carious teeth).

Prosthodontics treatment:

- Primary impression using cake compound for maxilla, heavy consistency condensation silicon for lower jaw then pouring with type III dental stone.
- Construction of special trays using chemical cure acrylic resin, border molding with green stick compound.
- Final impression using medium consistency condensation silicon, pouring to produce the master cast.
- Frame work wax up for the mandibular arch: linguplate major connector, Mesioocclusal Rest, Proximal plate Ibar (RPI) clasping system both sides.
- Metal frame work.



Figure 5: (A) shows metal frame work on cast; and (B) shows metal frame work try in

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- **Corrected Cast Technique:**

The altered cast impression technique can minimize displacement of the denture under occlusal loads, by taking an impression of the free-end saddle areas under controlled pressure. In this technique, close-fitting baseplates are constructed on the metal framework to take an impression of the distal extension areas while the metal framework is seated and the pressure is applied only on the rest seat areas. The saddle areas of the master cast are then sectioned and removed in the laboratory and the new saddle areas are poured with the framework in place.(6)

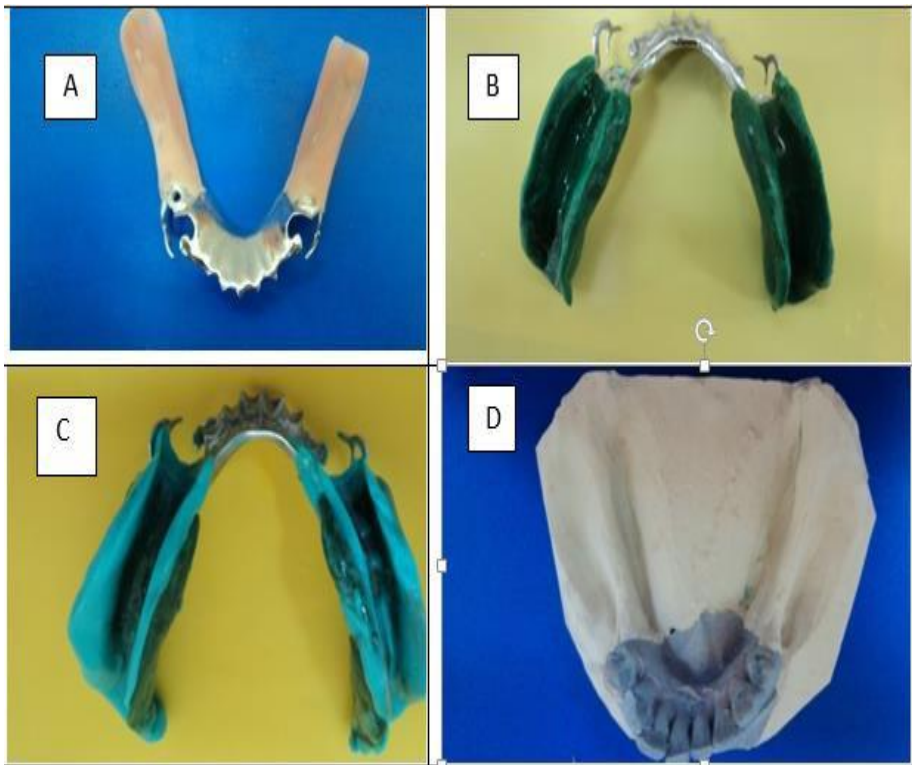


Figure 6: Corrected Cast Technique:

- A. Special tray added to metal frame work
- B. Border molding and compound impression for free saddle area
- C. Condensation light silicon impression for free saddle area
- D. Altered cast at free end saddle area

- **Maxillomandibular Relationships**



Figure 7: Jaw relationship

- **Face bow transfer:**



Figure 8: Face bow transfer

- **Mounting on semi adjustable articulator:**

Figure 9 shows Teeth arrangement and intraoral try in:



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Figure 9: (A) shows Try in stage on semi adjustable articulator; and (B) shows Intraoral try in

Figure 10: shows the finished processed denture:



Figure 10: Finished denture

- **Occlusion:**

Bilateral balanced occlusion was achieved as shown in Figure 11:

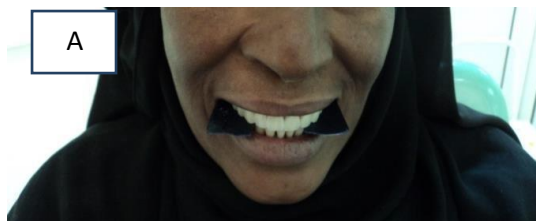


Figure 11 shows: (A) Centric occlusion: intra-orally.



Figure 11 shows: (B) Centric occlusion: Extra-orally.



Figure 11 shows: (C) Lateral movement: Intra-orally (right side);



Figure 11 shows: (D) Lateral movement: Extra-orally (right side);

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Figure 11 shows: (E) Lateral movement: Intra-orally (left side);



Figure 11 shows: (F) Lateral movement: Extra-orally (left side);



Figure 11 shows: (G) Protrusion movement: extra orally;



Figure 11 shows: (H) Protrusion movement: intraorally

Figure 12: shows the procedure before and after completion:

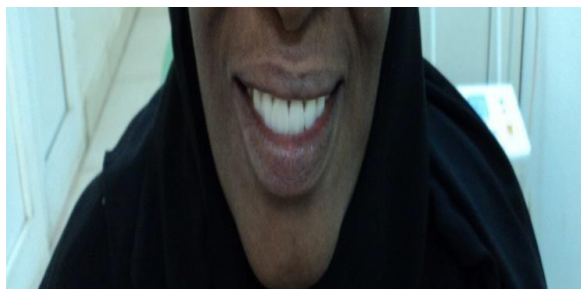


Figure 12: view before and after the procedure.

Comment:

Optimum residual ridge coverage with a well-fitting dentures base is required for recording Kennedy's class I and II edentulous areas. To decrease

Support for Distal Extension Denture Base

stresses, protecting the remaining supporting tissues can be achieved with the use of an altered cast technique.(6)

In this case, the altered cast impression technique was used by taking an impression of the free-end saddle areas under controlled pressure which can minimize displacement of the denture under occlusal loads. In this technique, close-fitting baseplates are constructed on the metal framework to take an impression of the distal extension areas while the metal framework is seated and the pressure is applied only on the rest seat areas. The saddle areas of the master cast are then sectioned and removed in the laboratory and the new saddle areas are poured with the framework in place.(7)

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Conflict of interest

None

References

- 1-Viral H Gada et al. A Maxillary Conventional Complete Denture Opposing a Bar Retained Mandibular Overdenture: A Case Report. *Pravara Med Rev* 2016;8:22-26
2. Carr AB, Brown DT. McCracken's Removable Partial Prosthodontics. 12th Edition. Mosby: 2011. Chapter 16. P 232.
- 3- Frank RP, Brudvik JS, Noonan CJ. Clinical outcome of the altered cast impression procedure compared with use of a onepiece cast. *J Prosthet Dent.* 2004;91:468-476.
3. Garcia EE, Evans JG. Removable partial dentures: the altered cast technique. *J Dent Technol.* 1998;15:25-29.

4-Rashid H, Vohra FA, Shahzad A. Altered Cast Technique: Improving Tissue Support for the Distal Extension Bases. *J Pak Dent Assoc* 2013; 22: 234-236.

5- Marciano et al. Altered cast technique impression technique for removable partial denture. 2017; *JIDENT*; 2 :1-5

6-All Answers Ltd. Improving Tissue Support- Altered Cast Technique [Internet]. November 2018. [Accessed 19 August 2020]; Available from: <https://nursinganswers.net/essays/improving-tissue-support-altered-cast-9436.php?vref=1>.

7-Sayed M, Jain S. Comparison Between Altered Cast Impression and Conventional Single-Impression Techniques for Distal Extension Removable Dental Prostheses: A Systematic Review. *Int J Prosthodont*. 2019;32(3):265-271. doi:10.11607/ijp.6198

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Original Article

The Creation of Man in the Holy Qur'an "The Phenotype and the Genotype", 2023

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Abstract (Translation from Arabic)¹:

Many scholars wrote and spoke about the beginning of creation, and many of them believed in the theory of evolution and natural selection, which was known by the name of Charles Darwin in 1859. This theory was scientifically refuted beyond any doubt, so that many scientists no longer believe in it. We -as Muslims- believe that the first creation of man was our Father Adam, peace be upon him. Allah created him with His absolute will. The Almighty said in the Holy Qur'an:

59. The similitude of Jesus before God is as that of Adam: He created him from dust then said to him: "Be" and he was.

٥٩ - إِنَّ مَثَلَ عِيسَىٰ عِنْدَ اللَّهِ كَمَثَلِ آدَمَ ۗ خَلَقَهُ مِنْ تُرَابٍ ثُمَّ قَالَ لَهُ كُنْ فَيَكُونُ ۝

Surat Al Imarn (Family of Imran)

On the other hand, Allah created our Mother Eve from our Father Adam, with His absolute will. Since then, reproduction of mankind is known to be generated from products of both male and female through known stages mentioned in great detail in the Holy Qur'an. These stages came in unique scientific terms recognized recently by modern embryologists. The Almighty said:

¹See full article in Arabic in the Arabic section of this issue of the *Journal*.

<p>12. Man We did create from a quintessence (of clay) ;</p> <p>13. Then We placed him as a drop of mingled products (of male and female); in a place of rest, firmly fixed;</p> <p>14. Then We made the drop into a clot of congealed blood; then of that clot We made a lump (fetus); then We made out of that lump bones and clothed the bones with flesh; then We developed out of it another creature. So blessed be God, The Best to create!</p>	<p>١٢- وَلَقَدْ خَلَقْنَا الْإِنْسَانَ مِنْ سُلَالَةٍ مِنْ طِينٍ ○</p> <p>١٣- ثُمَّ جَعَلْنَاهُ نُطْفَةً فِي قَرَارٍ مَكِينٍ ○</p> <p>١٤- ثُمَّ خَلَقْنَا النُّطْفَةَ عَلَقَةً فَخَلَقْنَا الْعَلَقَةَ مُضْغَةً فَخَلَقْنَا الْمُضْغَةَ عِظَامًا فَكَسَوْنَا الْعِظَامَ لَحْمًا ثُمَّ أَنْشَأْنَاهُ خَلْقًا آخَرَ فَتَبَارَكَ اللَّهُ أَحْسَنُ الْخَالِقِينَ ○</p>
<p><i>Surat Al-Mu'minoon (The Believers); Ayat (12-14)</i></p>	

The sperm from the male fertilizes the egg from the female. The fertilized egg carries all the genetic information of the fetus, known as the “human genome”. This human genome manifests itself either as evident features of the fetus (phenotypes) or act as a reservoir of features which appear later in life when needed (genotype). The Almighty said:

<p>98. It is He who has produced you from a single person: here is a place of sojourn (temporary stay) and a place of repository (a store-place where things are kept until needed); We detail Our signs for people who understand.</p>	<p>٩٨- وَهُوَ الَّذِي أَنْشَأَكُمْ مِنْ نَفْسٍ وَاحِدَةٍ فَمُسْتَقَرٌّ وَمُسْتَوْدَعٌ قَدْ فَصَّلْنَا الْآيَاتِ لِقَوْمٍ يَفْقَهُونَ ○</p>
<p><i>Surat Al-An'am (The Cattle)</i></p>	

In this article I propose that the concept of “*Phenotype*” (currently evident features of the “being”) has been described in the Qur’an as a “*sojourn*” (current status of the “being”). While the concept of “*Genotype*” (the part of the genome that remains uncharacterized to serve as a reservoir of features which appear later in life when needed) is expressed in the Qur’an as a “*repository*” (a store-place where things are kept until needed).

It is the scientific miracle of the Qur’an that, almost 15 centuries ago, so precisely described the functions of the two sides of the genome. This has only been recently recognized. And Allah Knows Best.

Key words: Evolution Theory, Human Genome, Phenotype, Genotype, Scientific miracles in the Holy Qur’an



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