

SUDAN JOURNAL OF HEALTH SCIENCES



- 1- Editorial, Social Phobia
- 2- Research Activities and University Ranking in Sudan
- 3- Social Phobia and Academic Achievement in Alfajr College
- 4- Use of Diode Laser in the Treatment of Dentine Hypersensitivity
- 5- Expenditure on health sector in Sudan



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SUDAN JOURNAL OF HEALTH SCIENCES
Published by Alfajr College for Science & Technology





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Contents

Rules and conditions for publication in the Journal	v
Editorial Board	ix
Editorial, Social Phobia	1
Research Activities and University Ranking: Academic Staff Opinion from a Sudanese University, with Roadmap for Improvement	2
Social Phobia and Academic Achievement among Alfajr College for Science and Technology Medical Students, Khartoum, 2022	2
Use of High and Low Powers Diode Laser (980nm) in the Treatment of Dentine Hypersensitivity: an in Vivo Comparative Study	2
Abstract of the Article Published in the Arabic Section of the Journal	2
Expenditure on Health Sector and its Effect on improving Health Indicators in Sudan. A study of Live Births and Neonatal Mortality Indicators, 2002 - 2020	2

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Social phobia (SP) also referred to as social anxiety disorder (SAD), is characterized by a significant and persistent fear of social or performance situations where one may experience embarrassment.⁽¹⁾ This fear often leads individuals to avoid such situations altogether or endure them with intense anxiety or distress. The Diagnostic and Statistical Manual of Mental Disorders officially recognized this condition in 1980, and subsequent research has revealed that it is a diverse disorder with a wide range of symptoms.⁽²⁾

The estimated lifetime prevalence of SAD in the general population is between 2% to 5%. However, it is important to note that this condition is often under-reported. Failing to address SP can result in the development of comorbid mental disorders, increased disability, and a higher risk of suicide.⁽³⁾ Therefore, understanding and addressing SP is crucial in the field of mental health research and practice.

One key aspect of SP that requires attention is the presence of specific interpretive biases that can perpetuate the disorder.⁽⁴⁾ Individuals with SP tend to interpret ambiguous social events in negative light and mildly negative social events in a catastrophic manner. These biases can lead to heightened anxiety, engagement in safety-seeking behaviors, and avoidance of social situations. Consequently, this may elicit fewer warm responses from others and reinforce the individual's negative self-perception. This cycle undermines self-efficacy and increases the likelihood of future social avoidance, contributing to the maintenance of SP.^(2,4) Therefore, research into these interpretive biases and their consequences can inform more effective treatment strategies for SP, highlighting the significance of cognitive approaches in understanding and treating this condition.

The etiology of SAD/SP is complex and involves a combination of genetic and environmental factors.^(3,5,6) Research conducted on twins and

families has indicated a genetic predisposition towards anxiety, with higher rates of concordance observed in monozygotic twins compared to dizygotic twins.⁽⁶⁾ This suggests that there is a certain level of heritability for SP. However, it is important to note that these studies often find stronger evidence for a general predisposition towards anxiety rather than a specific heritability for SP.

In addition to genetic factors, environmental influences also play a significant role in the development of SP. Factors such as parenting styles, exposure to social situations, and parental modeling contribute to the familial aggregation of SP.^(2,5,6) A study conducted on a community sample of parents further supports the role of familial and environmental factors in the development of SP. This study examined the 5-year risk of offspring developing SP during adolescence and found evidence for the influence of familial and environmental factors.⁽⁶⁾

Developmental models propose that vulnerability factors, including genetic factors and behavioral inhibition, contribute to the development of social fear and avoidance behavior.^(5,6) This can potentially lead to a restricted lifestyle and impact developmental pathways. Behavioral inhibition in childhood has been identified as a risk factor for SAD, including SP.

The diagnosis of SP is achieved by utilizing diagnostic criteria such as DSM-5 and ICD-11. SAD (SP), as described in the DSM-5, encompasses a range of symptoms characterized by an individual's significant fear or anxiety in social situations that involve potential scrutiny.⁽¹⁾ These situations include various social interactions, being observed while engaging in activities such as eating or drinking, and public performances. In children, the anxiety must be evident in peer settings. The individual is afraid of negative evaluation, expecting humiliation or rejection due to perceived inadequate behavior or anxiety symptoms. Social situations consistently trigger fear or anxiety, leading to avoidance or enduring experiences that are marked by intense distress. Importantly, the fear or anxiety is disproportionate to the actual threat posed by the situation and the socio cultural context. This persistent fear, lasting for a minimum of six months, causes clinically significant distress or impairment in social, occupational, or other important areas of functioning

including learning. Furthermore, the disorder is distinguished by its independence from the physiological effects of substances or medical conditions and its exclusion from being better explained by symptoms of other mental disorders or concurrent medical conditions.⁽¹⁾

The evaluation of SAD relies on a variety of standardized scales that systematically measure symptoms and quantify the severity of social anxiety in both adults and children.^(3,5) These scales play a crucial role in clinical assessments and research studies that focus on social anxiety. Noteworthy instruments include the Social Interaction Anxiety Scale (SIAS), Social Phobia Scale (SPS), SP and Anxiety Inventory (SPAI), and SP Inventory (SPIN). Another widely used tool for self-reported evaluation is the Liebowitz Social Anxiety Scale-Self-Report (LSAS-SR). In addition, adults are further evaluated using instruments such as the Social Anxiety Questionnaire for Adults-30-item version (SAQ-A30), while children's anxiety is measured using the Multidimensional Anxiety Scale for Children (MASC), Revised Screen for Child Anxiety Related Emotional Disorders (SCARED), Spence Children's Anxiety Scale (SCAS), SP and Anxiety Inventory for Children (SPAI-C), Social Anxiety Scale for Children-Revised (SASC-R), and the Liebowitz Social Anxiety Scale for Children and Adolescents-Self-Report (LSAS-CA-SR). These diverse scales provide a comprehensive framework for clinicians and researchers to accurately assess and comprehend the intricacies of social anxiety across different age groups.⁽⁷⁾

The current therapeutic approaches for SP encompass both pharmacotherapy and psychotherapy.^(3,8) Clinical trials have demonstrated the potential of selective serotonin reuptake inhibitors (SSRIs) such as paroxetine and fluvoxamine in effectively treating SAD. These medications have shown efficacy in alleviating symptoms. Additionally, cognitive-behavioral therapy (CBT) has proven to be another successful approach to addressing SAD. By employing cognitive techniques to modify negative thought patterns and behaviors associated with social anxiety, CBT has shown long-term benefits for individuals with moderate impairment. Group therapy has also exhibited effectiveness when compared to control groups or placebo pills. However, social skills training and relaxation training have not yielded convincing

evidence of a specific anxiolytic effect in social situations. It is important to consider comorbidity, or the presence of other disorders, as it may complicate treatment strategies and necessitate tailored approaches. The role of combined or sequential psychotherapeutic and pharmacologic treatment is still unclear, and further research is needed to determine the optimal treatment strategies for SAD.^(3, 5,8)

Coping with social anxiety encompasses a wide range of evidence-based strategies. Various relaxation techniques, such as deep breathing, progressive muscle relaxation, and mindfulness meditation, have been proven effective in alleviating symptoms of anxiety. Gradual exposure to increasingly challenging situations can help desensitize individuals to anxiety-provoking stimuli. Social skills training can enhance confidence by teaching effective communication strategies.^(5,9) Engaging in self-care practices, such as regular exercise, sufficient sleep, a balanced diet, and stress management, can contribute to overall well-being. It is also important to build a supportive network and challenge negative self-talk. Mindfulness and acceptance techniques can assist in observing and accepting anxious thoughts without judgment. While the effectiveness of these strategies may vary, it is advisable to seek professional help for a personalized treatment plan that offers tailored guidance and support in managing social anxiety.

The prognosis and long-term outcome of SAD can vary depending on various factors. With appropriate treatment and support, many individuals with SAD can experience significant improvement in their symptoms and overall functioning. However, without treatment, SAD can persist and have a chronic course.^(4,9)

In this issue of *The Journal* there is a study conducted at Alfajr College for Science and Technology (ACST) among medical students, evaluating the distribution pattern of social phobia and its impact on academic achievement. Authored by: Rahaf Ali, Amani Burbur and Egbal Abukaraig. This study significantly contributes to the existing literature on social anxiety disorder among the young Sudanese population.

The researchers adopted a descriptive cross-sectional design and utilized the Social Fear Scale (SFS) by Raulin and Wee, which exhibits high accuracy, internal validity, and consistency.

Despite the statistical potentials of the social fear scale , it's essential to note that it was initially tailored for a specific type of social fear associated with genetic predisposition to schizophrenia, making the use of a generalized scale for social phobia more appropriate. Furthermore, the adoption of convenience sampling for data collection diminishes the representativeness of the sample and is better suited for by a probability sampling technique.

The researchers concluded a prevalence of 27.2% which exceeds the rates reported in the literature. However, the high female percentage is consistent with the worldwide literature as reported by the American Psychiatrists Association.

This paper serves as an eye opener and provides a more accurate portrayal of the social anxiety situation among Sudanese youth. Additional research, building upon the findings and recommendations of this article, is essential to fully comprehend the reality of social anxiety disorder within the Sudanese population especially young adults.

(4,5,9)

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Research Activities and University Ranking: Academic Staff Opinion from a Sudanese University, with Roadmap for Improvement

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Abstract:

Background: University ranking is an essential and crucial benchmark of excellence. In this study, we investigated the academic staff perception of a Well-Established Sudanese University (WESU) regarding reasons behind the low university ranking and how to improve it, focusing on research as it represents a considerable weight in university ranking systems.

Methods: This was a cross-sectional quantitative study, collected data through a structured self-administered, pre-tested Google form questionnaire. SPSS was used to analyze the data.

Results: Of the 114 respondents, 95.6% (n=109) believed university ranking is important, about 60% (n=69) had published, with only 7% (n=8) having more than 20 publications. Around a third 36%(n=41) of those who published research used affiliation other than WESU .Seventy-nine percent (n=90) of the participants perceived that lack of budget for scientific research was a leading cause of low university ranking, followed by the absence of clear scientific vision and the frustration of many teachers, who tended to abandon research and authorship, among other factors. Furthermore, most of the WESU academic staff did not have accounts on Academic social media.

Conclusion: As a result of the study, seven themes emerged regarding how the university ranking could be improved. The most important of these were raising awareness about ranking among academic staff, funding, improving the university's online content, and encouraging publishing in journals with high impact. The investigators think that these parameters do not apply only to WESU, but also to most other Sudanese universities,

Keywords: University Ranking, Sudanese Universities, Research, Publication, Research Funding.

Introduction:

The role of universities in developing technology, medicine, engineering, and financial systems and innovation in the current world is widely felt in all aspects of our lives, locally and globally.^(1,2) Therefore, it is not surprising that since the development of The Shanghai University's Academic Ranking for World Universities (ARWU) in 2004, students, researchers, governments, and funders have been closely looking for universities with high ranks.^(3,4) Notably, the three main functions of the universities are education, scientific research, and social accountability. Therefore, ranking systems always try to assess the quality of these three elements. Of these, research is the most objectively and realistically measurable.⁽⁵⁾

The criteria and indicators used by ranking systems often share many similarities, but their weights can vary greatly.⁽⁶⁾ ARWU measures six indicators: a) Staff awards (winning Nobel Prizes or Fields medals), b) highly cited researchers, c) papers published in Nature and Science, d) papers indexed in Science Index-Expanded and Social Science Citation Index, e) quality of education (Alumni winning Nobel Prizes or Fields medals) and f) finally the per capita performance of an institution.⁽⁷⁾ The United Kingdom Times Higher Education (THE) World University Rankings uses thirteen performance indicators, which are grouped into five areas: a) Teaching (the learning environment); b) Research (volume, income, and reputation), c) Citations (research influence), d) International outlook (staff, students and research) and e) Industry income (knowledge transfer).⁽⁸⁾

The Web Ranking represents the leading Spanish Webometrics ranking as it reflects the global performance of the university, the quality of its departments and services, the impact of its outputs, and its international prestige.⁽⁹⁾ It included 31000 Higher Education Institutions from more than 200 countries.⁽¹⁰⁾ The Center for World University Rankings (CWUR), headquarters in the United Arab Emirates, uses seven indicators grouped into four areas to rank the world universities: a) Quality of Education, b) Alumni Employment, c) Quality of Faculty, and d) Research Performance.⁽¹¹⁾ The Quacquarelli Symonds (QS) World University, which is considered one of the most accurate and reliable ranking systems uses five parameters: Academic reputation, Faculty/student ratio, Citations per faculty, Employer reputation and the International faculty/student ratio. The QS system is approved by the International Ranking Expert Group.⁽¹²⁾ Recently, the Alper-Doger Scientific Index (AD Scientific Index) has been released, which relies on the scientific performance and the added value of the scientific productivity of individual.⁽¹³⁾

The data collected for this research was obtained from a well-established university in Sudan and will be referred to in this article as the Well Established Sudanese University (WESU) for anonymity. It is an academic institute with more than 60,000 students and reasonably good resources. Nevertheless, WESU is not part of the ARWU and THE ranking

systems. Furthermore, it came late in Webometrics,⁽¹⁴⁾ being over the 5000th internationally and in the mid-10000th globally in the AD Scientific Index 2021.

Locally, WESU ranked among the last seven of twenty-seven ranked Sudanese universities. (Information from the official website of the WESU). It is observed that Sudanese universities, in general, came late in the different ranking methodologies. However, the underlying causes behind such ranking are not well studied. Identifying the reasons for the current status and involving the WESU academic staff in highlighting the possible actions may help the stakeholders draw a roadmap for improving the Sudanese university ranking. This study aims to explore the knowledge of the academic staff at WESU about the international universities ranking and their opinion on the reasons for the current low rating of WESU and how to improve it, with especial attention to staff research activities, as it has considerable weight in most of the ranking systems.

Materials and Methods

Study Design and Area:

This was a cross-sectional descriptive study that targeted academic staff at WESU, which is a public university founded in the 20th century. Its main campus is in grater Khartoum. WESU has several branches in the different States of Sudan. Currently, WESU has 20 Colleges and several institutes and branches. The number of academic staff members was over 1500; the undergraduate students were more than 60000, the postgraduate students were more than 4000, and the international students were around 400. (Information obtained from Wikipedia's WESU page and the official website of WESU)

Data Management:

The study used a self-administered interview through a pre-tested Google form questionnaire to collect data. The Google form was sent to all academic staff who use a social media platform (WhatsApp). The university designed several WhatsApp groups for their staff and encouraged them to join.⁽¹⁵⁾ A hundred and fourteen academic staff members agreed to participate in the survey and signed an informed consent.

The questionnaire contained 29 questions, including socio-demographic characteristics, professional details, staff research activities, and participation in scientific social network sites. In addition to Lickert-scale, there were questions about the reasons behind low ranking and suggestions for upgrading. The online survey was conducted during the second wave of the COVID-19 pandemic in Sudan (July 20 to August 10, 2021). Ethical clearance was obtained from the Research Ethical Committee at WESU.

The data were analyzed using Microsoft Excel and the Statistical Package of Social Sciences (IBM SPSS ver19.0). Both descriptive and inferential statistics were used.

Results

The 114 participants represented WESU faculties, with percentages ranging from 16.7% from the Faculty of Medicine and Health Sciences to 0.9% from the Faculty of Architecture and Planning. Of the 114 participants, 108 (95%) were on full-time contracts, and 95 (83%) served the university for six to 20 years. Table 1 shows other socio-demographic and general characteristics of WESU study participants.

Table 1: Socio-demographic and general characteristics of WESU study participants (n=114)

Characteristic	Category	Frequency (%)
Gender	Female	35 (30.7)
	Male	79 (69.3)
Age group (years)	20-30	17 (14.9)
	31-40	40 (35.1)
	41-50	38 (33.3)
	51-60	12 (10.5)
	61-65	4 (3.5)
	above 65	3 (2.6)
Academic Status	Teaching Assistant	6 (5.3%)
	Lecturer	38 (33.3%)
	Assistant professor	51 (44.7%)
	Associate professor	12 (10.5%)
	Professor	7 (6.1%)

When asked about the importance of university ranking, 109 participants (95.6%) believed that university ranking is essential. Seventy-eight

study participants (68.4%) had conducted research other than graduation, masters, or doctoral thesis. Additionally, 13 participants (11.4%) stated that they were currently researching. Sixty-nine participants (60.5%) had published research in scientific journals, with variable numbers of published papers.

The frequency of published manuscripts was one to ten in 46% of the academic staff. Only a minority had published more than ten papers. See Figure 1.

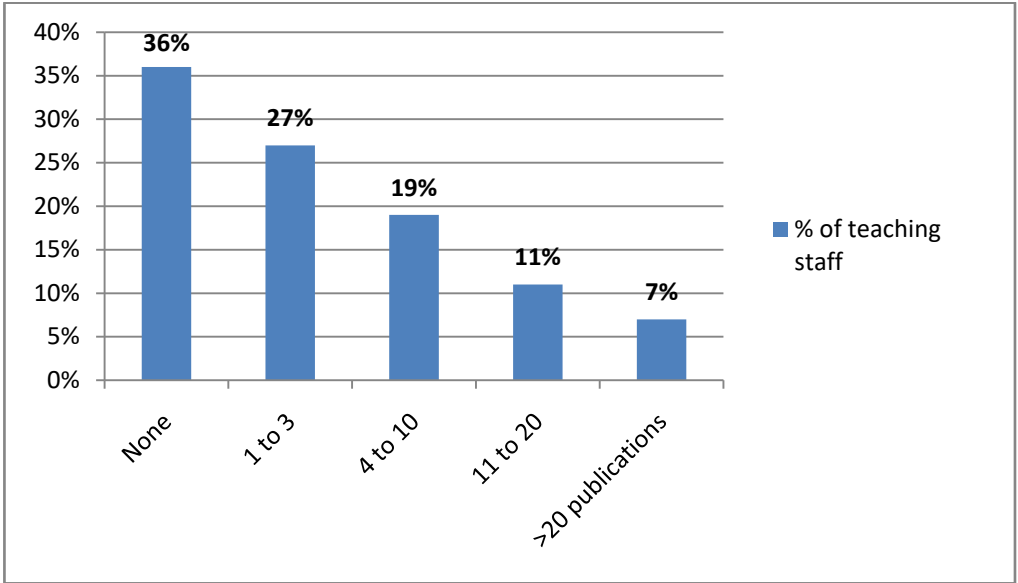


Figure 1: The Frequency of Research Publications by WESU Academic Staff

Regarding support for scientific research, most participants (77.2%) had never received financial aid. Table 2 depicts the source of financial support for research conducted by WESU teachers.

Table 2: Support for scientific research for WESU academic staff (n =114)

Question	Options	Frequency (%)
Have you ever received support for scientific research?	Yes	26 (22.8)
	No	88 (77.2)
If you received research support, the sponsor was:	MHESR*	14 (12.3)
	WESU	3 (2.6)
	Other institutions	9 (9.7)
*MHESR: Ministry of Higher Education and Scientific Research in Sudan		

The scarcity of funding to help drive scientific research and publication costs was the common belief of most participants (63%) when asked about the reasons that hinder a university teacher from publishing scientific research, followed by a lack of sufficient encouragement from higher authorities of the university (15%). See Figure 2

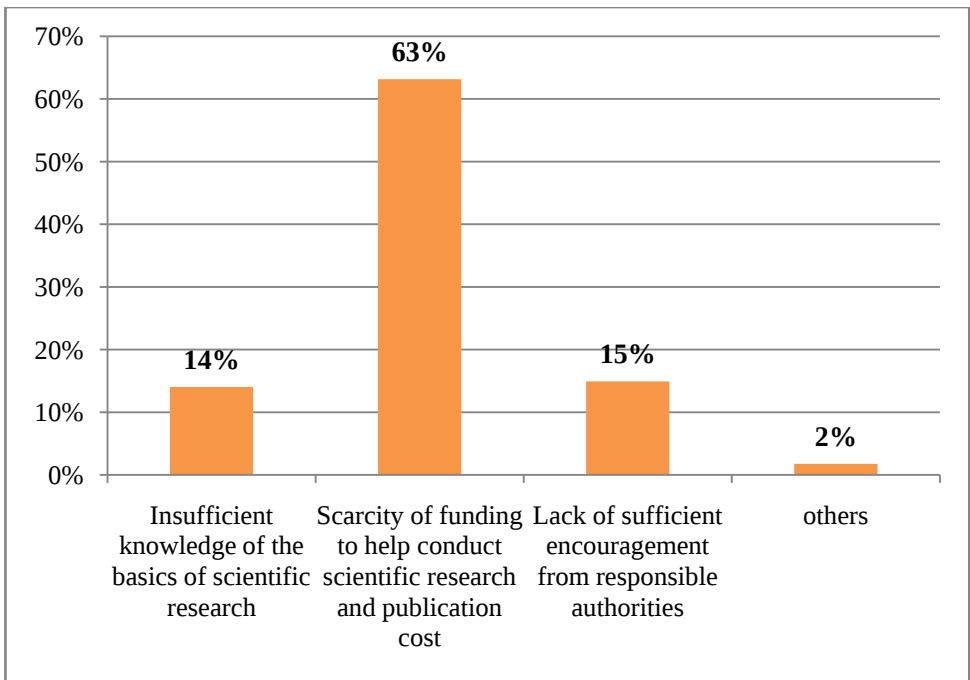


Figure 2: The opinion of WESU academic staff about the reasons that hinder them from publishing scientific research.

Half of the participants work in WESU and also in other facilities. These facilities include teaching in other universities (28.1%), practice-related to their profession (19.3%), and dedicated research centers (4.4%).

Among the 73 (64%) participants who published research, 53 (72.8%) used their WESU e-mail address, while 26 (36%) had published research with an affiliation or title other than WESU.

Most WESU academic staff did not have accounts in Google Scholar, Scopus, ResearchGate, and Academia (Figure 3).

Research Activities and University Ranking in Sudan

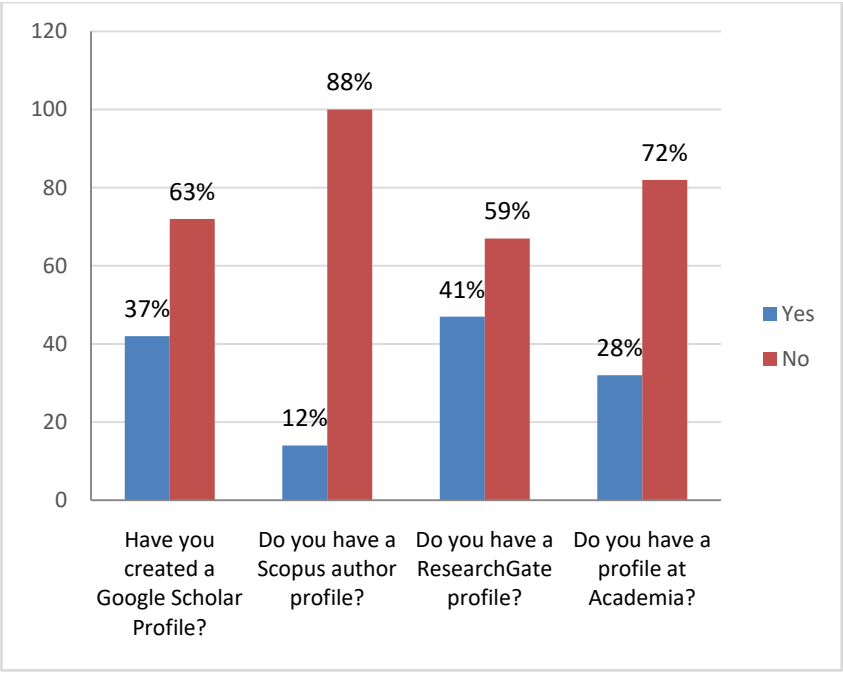


Figure 3: WESU academic staff and their membership in scientific research platforms

Table 3 shows WESU teachers' opinion about the different reasons for the low ranking of WESU. Almost all participants stated that research is essential for ranking and publications should target high-impact scientific journals. The majority of the staff (90%) believed that research is difficult to practice, which means that they need more training in research methodology. See Table 3.

Table 3: Academic staff opinion about different factors for low ranking of WESU by research parameters

Factors affecting the ranking of WESU by research parameters:	Agree n(%)
Not enough research/publications conducted by WESU academic staff.	97 (85.1%)
Research not published in journals with high impact factor.	102 (89.5%)
WESU researchers tend not to write their university e-mail addresses in scientific publications.	89 (78.1%)
Many staff members abandon publications because of research difficulties.	102 (89.4%)
Not enough emphasis by authorities on research projects of public interest.	106 (92.9%)
No budget for scientific research.	111 (97.3%)
Academic staff members are not convinced of the importance of university ranking.	53 (46.5%)
No department in the university administration is concerned with the ranking issue and seeking to improve it.	90 (78.9%)

Table 4 shows the WESU academic staff's ideas about improving WESU ranking. The data in the table show that the academic staff put a lot of weight on the support of higher authorities for research in terms of budgeting and encouraging publications in reputed journals as well as raising awareness of the importance of publishing and caring about university ranking.

Table 4: WESU teachers' responses to different ideas for upgrading WESU ranking

Suggestion to boost the WESU ranking:	Agree n(%)
Support scientific research and increase its budget	112 (98.2%)
Encourage publication in journals with a high-impact factor	112 (98.2%)
Enhance affiliation with the WESU and write it as the researcher's publication address	111 (97.4%)
Develop a clear scientific vision of innovative scientific and fruitful research projects	110 (96.5%)
Encourage teachers to create accounts on various websites	109 (95.6%)
Include the university's scientific journals in the Elsevier Publishing House	108 (94.7%)
Raise awareness of the importance of university ranking	109 (95.7%)
University ranking issue of no or little importance.	16 (14%)

Discussion

University ranking is essential as it will reassure high-caliber students to join such an academic institute.⁽¹⁶⁾ The four elements of global competitiveness are Education, Research, Knowledge Transfer, and Global outlook.⁽⁶⁾ These elements were wholly or partially considered by most famous ranking bodies, namely ARWU, THE, QS, CWUR and the AD Scientific Index. Despite the increased investment in undergraduate and postgraduate studies in Sudan within the last three decades, the universities still need more investment to be included in these prestigious ranking systems. ^(7,12, 17, 18)

The study targeted all academic staff from all WESU colleges to come out with realistic and reproducible results. Most participants were males and 78% were lecturers and assistant professors.

This is in agreement with previous studies in Sudan and Western countries that the number of males exceeded that of females in academic medicine.⁽¹⁹⁾ The high representation of males in educational institutes may lead to other problems, such as the need to increase financial income, which justifies their work in several institutions simultaneously. This assumption has been reflected in WESU academic staff. Thus, although all of the study participants (95%) were appointed with a full-time contract with relatively long years of service, the study showed that half of those who work at WESU were engaged in part-time agreements with other universities in Sudan. This is a common problem across Sudan, as reported by Zakaria Sulimanin in his study "Quality Assurance in Sudanese Higher Education". He pointed out that university lecturers were forced to start looking for additional working hours outside their universities.⁽¹⁷⁾ Interestingly, Hammam Sarhan in a journalist report about universities in Arab countries, used the term "teachers of the bag" to denote the teachers who contract with more than one university in a desire to increase their financial income.⁽²⁰⁾

It is well documented in the literature that one of the barriers to research in academic institutions in different countries, including those in the Western world, is lack of funding and decreased payment of academic staff.⁽¹⁹⁾ Like other African countries, Sudan struggled with financing and providing dedicated time for research. Therefore, it is not surprising that some teaching staff showed less interest in research and publication. Ahmed et al. stated that despite the dedication and love of Sudanese doctors working in university hospitals to conduct medical research, most had been forced to work in private clinics and hospitals to earn decent income for their families.⁽²¹⁾ Furthermore, the economic situation also results in the migration of teachers to work in other countries, the same result noted by Zakaria, who stated that one "of the most critical problems facing Sudanese universities is the brain drain problem of highly qualified faculty staff.

In recent years, statistics showed an increasing trend of teaching staff leaving the country to join universities and the business industry in the Arab countries, especially in the Gulf Cooperation Council (GCC) region”.

Considering the opinion of WESU teachers, three points can be deduced; a) Raise the awareness and funding of scientific research and publication. This matches the tremendous weight of research in most of the universities ranking systems.^(5,6,8) Furthermore, Hisham Ali concluded that raising the funds will help Sudanese universities transform from solely educational institutions into giving significant weight to research by launching Research Excellence Programs.⁽²²⁾ b) Research facilities and infrastructure should be strengthened with accessibility for digital and online materials, the same conclusion mentioned by Hammam Sarhan.⁽²⁰⁾ c) Participation in international conferences will also enhance the university's ranking. Abdallah Alabbad mentioned the same idea of globalization in his study about rising King Saud University ranking. Renowned universities with high competitiveness have fundamental principles that include international partnerships, focus on team based scientific research, technological intelligence, and abundant resources.⁽²³⁾ This explains the fact that the top universities in the USA continue to dominate the top list in most of the ranking systems. The universities in Africa included in the QS World University Ranking 2023 and the Times Higher Education 2022 World University Rankings were mostly from Egypt and South Africa. Other African countries featured were Nigeria, Ghana, Ethiopia, and Tunisia.⁽²⁴⁻²⁶⁾ The 2022 QS Arab region university ranking placed the King Abdul-Aziz University, Saudi Arabia, in the top position. This was due to excellent academic reputation citations per faculty and the number of staff holding PhD or equivalent. Qatar University held the second position in ranking with an outstanding score for publications per faculty.⁽²⁷⁾

Thus, the top ten institutions in the Arab Region were King Abdul-Aziz University, Qatar University, King Fahd University of Petroleum and Minerals, American University of Beirut, United Arab Emirates University, King Saud University, Sultan Qaboos University, American University of Sharjah, Khalifa University of Science and Technology and the University of Jordan.⁽²⁸⁾ In the international list of the QS World University Ranking for 2022, we found that the top university in the Arab Region (King Abdul-Aziz University) ranked 109 internationally, and the 10th University in the list lies in the 601- 650 position internationally.⁽²⁹⁾ It is worth noting that research funding in Arab countries does not exceed 0.2% compared to the minimum recommended of 2,28% globally.⁽³⁰⁾

When considering Sudanese Universities in the QS World Ranking system for 2022, only the University of Khartoum (U of K) and Sudan University of Science and Technology (SUST) ranked in the 1200+ order. The top 10 Sudanese Universities, according to Webometrics, 2022 were the U of K, SUST, Gezira University, University of Science & Technology Omdurman, Omdurman Islamic University (OIU), Alneelain University, University of Bahri, Mashreq University, Future University of Sudan, and International University of Africa (IUA).⁽¹⁴⁾ Noteworthy, not a single Sudanese university was included in the Shanghai or the Times World Ranking systems.^(7,12,17,18)

Web of Science is another institution that ranked the Sudanese universities based on the Hindex, which was developed by J.E. Hirsch. It reflects the productivity of authors based on their publication and citation records. Researchers use the H-index to assess the quality of the published articles, which is a valuable indicator of their scientific output.^(29,31,32) In the recently released University Ranking, the U of K was on top of the Sudanese list, with an H-index of 68, followed by the University of Gezira (H-index 31), Neelain University (H-index 28), OIU (H-index 25), and SUST (H-index 24).⁽³³⁾

The Well Established Sudanese University occupied near the 6000s order out of 31000s in webometrics.⁽¹⁴⁾ Importantly, it is not included in the three famous systems of QS, THE, and Shanghai. Among Sudanese universities, WESU ranking differs from one classification system to another.^(12,34)

Our study showed that about one-third of the study participants had no publications, and only 7% of WESU academic staff had more than 20 publications. Similar levels of research productivity by academic staff were reported in other African countries.⁽³⁵⁾ In several publications addressing the problem of university ranking, it has been advised that ranking may improve by recruiting experienced researchers to help improving scientific writing by graduate students working for Masters and PhD, publishing in journals with high impact factors, writing books in international publishing houses with open source for more citations, in addition to hiring researchers as adjuncts and visiting professors to write papers in reputed journals such as Nature and Science, so as to enlighten faculty members about writing highly citable articles.^(28,36-39) Adopting a culture of scientific publishing and directing academic staff members to join and register in scientific communication sites is vital for strengthening research productivity.⁽⁴⁰⁻⁴²⁾ Most WESU teachers did not have Google Scholar, Scopus, Research Gate, or Academia profiles. Similar perspectives were stated by Sohail and Daud “using social networks to communicate scientific knowledge enhances research productivity and the number of publications and citations”.⁽⁴³⁾ Perhaps other activities for improving visibility in the scientific social media include creating pages in different languages, especially English; translating books and research and adding them to the digital repository; cooperating with bodies concerned with scientific research and publication; providing appreciation and scientific recognition for those who publish scientifically, and create a personal pages for all researchers on Google Scholar.⁽⁴⁴⁾

Conclusions

It can be concluded from this study that the following seven recommendations may be implemented to improve the ranking status of WESU. The investigators think that these parameters do not apply only to WESU but also would be appropriate to most other Sudanese universities:

1. The university leadership should monitor university ranking on various platforms and raise students' and staff's awareness of the importance of ranking.
2. Improve the university's digital content and ease access to online data to improve global outlook.
3. Encourage university staff and graduate students to publish their research, preferably in journals of high impact factor.
4. Encourage teachers to create profiles on scientific social networks.
5. Increase the staff-to-student ratio and work to provide the staff with satisfying salaries to face reasonable living standards.
6. Encourage international collaboration with other universities and teachers and take the advantage of the Sudanese academic staff available abroad.
7. University authorities should push to make the university ranking in the National Vision, Mission, and Strategic Planning.

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Social Phobia and Academic Achievement among Alfajr College for Science and Technology Medical Students, Khartoum, 2022

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Abstract

Background: Social phobia, also called social anxiety disorder, is one of the anxiety disorders and is considered as one of the most common psychiatric disorders. It is defined as persistent fear of one or more performance situations in which the person is exposed to unfamiliar people.

Aim: The study aimed at assessing the distribution pattern of social phobia and its effect on academic achievements among batches five and six medical students in Alfajr College 2022.

Methods: The study was a descriptive cross sectional institutional based study, carried out in Khartoum State at Alfajr College. The Data was collected through structured questionnaire using social phobia scale (SPS) by Raulin and Wee. Electronic Self-administered interview was the method of data collection. Convenience sampling technique was used to involve the first respondents of batch 5 and 6 medical students of Alfajr College. Data was entered, categorized, and analyzed using Excel and Statistical Package for Social Science.

Results:

A total of 151 students were included in this study. The study showed that prevalence of social phobia among Alfajr medical students in batches 5 and 6 was 27.2%, while 41.7% of students had impending social phobia. In this study, social phobia did not affect academic achievements of the studied sample, as indicated by their Grade Point Average scores.

Conclusion:

About a quarter (27%) of Alfajr medical students in batches 5 and 6 had social phobia. However, it didn't affect the academic achievement in this studied sample.

Keywords: Social phobia, Academic achievement/performance, Medical students, Sudan.

Introduction:

Social phobia – also called social anxiety disorder – is a common anxiety disorder and is considered one of the most common three psychiatric disorders, with major depression disorders and anxiety disorders.^(1,2)

Social phobia is the persistent fear of one or more performance situations in which the person exposed to unfamiliar people. The individual fears that the person will act in a way or show anxiety symptoms that will be embarrassing and humiliating.⁽³⁾

Social phobia has been associated with impairment in most areas of functioning like education, employment, family relationships, marriage/romantic relationships, friendships/social networks, and other interests.^(4, 5)

Phobia of something is when being excessively fearful of a situation or object on an ongoing basis, for six months or more, feeling an intense need to avoid or escape from the feared situation or object, experiencing panic or distress when exposed to the situation or object.⁽⁵⁾

It is apprehension or fear of social interaction or social situations in general and is considered as one of the mental or behavioral dysfunctions.⁽⁴⁾

Symptoms of social phobia include facial blushing, nausea, sweating, shivering, increased heart rate, fear of criticism and difficulties in communication or speaking.

Social phobia's prevalence varies between countries and cultures.⁽⁶⁾ Social phobia prevalence in Western countries accounts for 7-13%.⁽⁷⁾ In India, it was reported at a rate of 10%; and in Saudi Arabia 11.7 %.^(8,9) Various studies have shown that males are diagnosed with social phobia more often than females.⁽¹⁰⁾

Persons with social phobia have lower self-esteem than those without, and they have significantly lower quality of life, impairments in work performance, and negative impact on social relationships.^(11,12) Social phobia increases the risk of developing a major depressive disorder and has a high comorbidity with other mental disorders.⁽¹³⁾

This study aims to determine the prevalence of social phobia among medical students at Alfajr College for Science and Technology (ACST) and to disclose whether the presence of social phobia affects students' academic performance.

Materials and Methods

Study design and area

The study was a descriptive cross-sectional institutional based study. It was conducted among ACST medical students, batches 5 and 6. ACST is located in Khartoum State, was founded in 2015, and had ten programs and seven batches. On the average, each batch in each program composed of around 100 students.

Sample size and technique:

The sample size was calculated using the formula

$$n = N / \{1 + (N E^2)\}$$

Where: n = the sample size, N = number of the study population (243), E = margin of error at 95% confidence interval (0.05). The computed sample size (n) = 151.

The sample was collected as a convenience sample. Questionnaires were sent through Google form link to the targeted study population, and the first respondents were taken until the calculated sample size was achieved.

Data collection tools and technique:

Electronic self-administered interview was used with a closed ended questionnaire. The questionnaire consisted of participants' background characteristics, their rating to their academic achievement and the Social Phobia Scale (SPS) by Raulin and Wee.⁽¹⁴⁾

The SPS scale is a 36-item Yes-No self-report measure, to assess specific social-interpersonal behaviors associated with schizotypal personality disorder. Respondents were asked to endorse each item with "Yes" or "No" depending on whether they judge the item applied to themselves or not. Each "Yes" was given 1 point, while "No" answers were given 0 for 28 items; while for the remaining sentences 3,7,14,16,17,27,28,33 the score was reversed, by scoring "No" answers by 1 and "Yes" answers by 0. A total score is obtained by summing ratings made across all 36 items. The scores were categorized as low risk social phobia from 0-11, impending social phobia from 12-23 and high social phobia from 24-36.

Academic achievements were classified according to the Grade Point Average (GPA) as excellent for GPA 3.5 to 4, Very good for 3 to 3.4, Good for 2.5 to 2.9, Pass for 2 to 2.4 and Fail for less than 2. The judgment was based on the students' response as per his or her GPA last score.

Data analysis

Data entry and analysis was done using Microsoft Excel and SPSS statistical software ver25. The level of significance was set at 0.05 with 95% confidence interval and a p -value < 0.05 . The Fisher's Exact Test was used to test the association between the presence of social phobia and its effect on academic achievements.

Ethical consideration

Ethical clearance was obtained from the ethical review committee of the community medicine department at ACST. Voluntary informed consent for participation in the study was taken from each student as part of the structured questionnaire.

Results

The study covered 151 medical students with 100% response rate. Around two thirds (65.6%) of the participants were females and the majority (94%) were single. The most frequent age group (74.2%) was 20-25 years.

Table 1 shows the demographic characteristics and achievements of the study sample. It is notable that over half of the respondents (53.6%) achieved a GPA of Very good or higher. A score of Good or higher was achieved by 90% of the respondents.

Table 1: Demographic Characteristics and Achievement Categories of ACST Medical Students, 2022 (n=151)

Variables		n (%)
Sex	Male	52(34.4%)
	Female	99(65.6%)
Age group	Less than 20	32(21.2%)
	20-25	112(74.2%)
	More than 25	7(4.6%)
Marital status	Single	142(94%)
	Married	9(6%)
Academic achievements	Excellent	23(15.2%)
	Very good	58(38.4%)
	Good	55(36.4%)
	Pass	11(7.3%)
	Fail	4(2.6%)

Social Phobia and Academic Achievement in Alfajr College

The distribution of the Social Phobia Scale among ACST medical students showed that 41.7% of students got scores indicating impending social phobia, while 27.2% got scores indicating social phobia. The majority were female students in both cases. (See Table 2)

Table 2: Distribution of Social Phobia Scale (SPS) among ACST Medical Students, 2022(n=151)

	Students without social phobia n(%)	Students with impending social phobia n(%)	Students with social phobia n(%)
Male	20(13.2%)	26(17.2%)	6(4%)
Female	27(17.9%)	37(24.5%)	35(23.2%)
Total	47(31.1%)	63(41.7%)	41(27.2%)

Table (3) shows that social phobia was significantly associated with the female gender (p value= 0.005). However females were the majority of the study sample constituting 65.6%.

Table 3 Association between social phobia and gender of the studied ACST medical students 2022 (n=151)

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	10.469 ^a	2	0.005
Likelihood Ratio	11.566	2	0.003
Linear-by-Linear Association	7.466	1	0.006
N of Valid Cases	151		
a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 14.46.			

When considering the relation between social phobia and academic performance in the studied sample, no significant association was found (p value=0.296), as shown in Table 4.

Table 4 Association between Social Phobia and Academic Achievement of ACST Studied Medical Students 2022 (n=151)

Chi-Square Tests					
	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	8.963 ^a	8	0.345	0.351	
Likelihood Ratio	9.044	8	0.339	0.420	
Fisher's Exact Test	9.216			0.296	
Linear-by-Linear Association	1.328 ^b	1	0.249	0.258	0.137
N of Valid Cases	151				

Discussion

In the present study, 27.2% of the medical students were considered to have social phobia. This is less than the results from two studies on medical students from Saudi Arabia and Malaysia, where the prevalence of social phobia was found to be 60% and 56% respectively.^(15,16) Similarly, in an Iranian study, the prevalence of social phobia including three grades (moderate, severe and very severe) among medical students was found to be 58.5%.⁽⁶⁾

Also a high prevalence (85%) was reported among medical students in Prague, Czech Republic.⁽¹⁷⁾ On the other hand, a relatively low prevalence of social phobia symptoms (22%) was reported among medical students in Norway.⁽¹⁸⁾ The lowest percentage of prevalence (8%) was reported among English medical students.⁽¹⁹⁾

This difference in prevalence of social phobia between medical students may be attributed to the use of different tools for evaluating

prevalence of social phobia as well as the differences in culture and socio-demographics between different communities.

In this study, more female medical students were affected by social phobia than male students. This may be attributed to cultural and social factors. In addition there were more females than males in the studied sample size. In the study from Saudi Arabia, male medical students reported higher scores for social phobia than females.⁽¹⁵⁾

In the current study, academic achievement was not affected by different social phobia grades, contrarily to the Saudi study, which demonstrated that medical students with high scores for social phobia tended to show lower academic achievements.⁽¹⁵⁾

Conclusion:

About a quarter (27%) of ACST medical students in batches 5 and 6 had social phobia. This seems to be a considerable proportion of students although academic performance was not affected. However, the College may consider educating students about social phobia and how to counteract it, including psychological support.

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Use of High and Low Powers Diode Laser (980nm) in the Treatment of Dentine Hypersensitivity: an in Vivo Comparative Study

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Abstract

Background: Dentine Hypersensitivity (DH) is defined as a short, sharp pain arising from exposed dentine in response to stimuli typically thermal, evaporative, tactile, or osmotic.

Objectives: The study aimed to evaluate and compare the clinical efficacy of low and high output power of a 980 nm diode laser in the treatment of DH.

Materials and Methods: Twelve teeth with DH were randomly divided into two groups: group A, treated with a high -power diode laser of 1W, and group B, treated with a low-power laser of 500 mW. Sensitive teeth from both groups were subjected to one laser irradiation session using a 980 nm diode laser for duration of 60 seconds. Dentine hypersensitivity was assessed by tactile and thermal stimuli and measured by a visual analog scale (VAS): before treatment, 15 minutes post operatively and one week later. Comparison between different variables by t-Test with the level of significant set at p value of <0.05 .

Results: The obtained results for both groups, (before versus after 15 minute of laser sessions) showed a significant reduction in VAS scores (p -value < 0.05). The intergroup comparison showed that the reduction in VAS scores was significantly higher in group A. However, when comparing the VAS scores after 15 minutes versus after one week, the mean reduction decreased in the two groups.

Conclusion: A 980 nm diode laser with a high output power of 1W can be used effectively to provide immediate relief in severe cases of DH and is still better after one week.

Key words: Diode laser, Dentine hypersensitivity, Visual analog scale

Introduction

Dentine hypersensitivity (DH) is defined as a short, sharp pain arising from exposed dentine in response to stimuli typically thermal, evaporative, tactile, osmotic, or chemical and which cannot be ascribed to any other form of dental defect or pathology.⁽¹⁾ DH usually affects one out of seven adult patients attending a dental clinic.⁽²⁾ The prevalence of DH was found to be higher in patients aged 30–40 years and mainly in females.⁽³⁾ Furthermore, the commonest teeth affected were the upper premolar and molar teeth.⁽⁴⁾

Many theories have been proposed to explain DH. For instance, the hydrodynamic theory, produced by Brännström⁽⁵⁾, was adopted more than the odontoblast transducer and direct innervations theories.⁽¹⁾ It considers a pressure change across the dentine that can be generated by certain stimuli, which increase the outward flow of fluid in dentinal tubules, creating a pressure change within the dentine and thus activate intra-dental nerves at the pulp-dentine border or within the dentinal tubules.⁽⁶⁾

The management of DH depends on an adequate diagnosis. That is why it must be distinguished from other causes of sharp dentinal pain. There are two treatment approaches for DH. Either by occluding dentinal tubules that

subsequently blocks the flow of tubular liquid; or by preventing the neural response to a pain stimulus.^(3, 6, 7)

Many methods have been used to treat DH, including iontophoresis, root coverage, and desensitizing agents; mainly sodium fluoride.⁽⁸⁾ However, these methods have not been proven to achieve satisfactory results in reducing the level of pain.

Because DH is considered an unpleasant disease, patients constantly search for more effective and long-lasting therapies. The development of light amplification by stimulated emission of radiation (laser) applications in dentistry has opened a new gate of treatments.

In 1985, Matsumoto and coworkers used the Nd:YAG laser in the treatment of DH for the first time. After that, studies continued and developed on this issue in the last 10 years.⁽⁹⁾

Research has shown that laser is one of the easiest and most effective ways in desensitization. It has been shown that laser increases the formation of secondary dentine by the odontoblasts. Diode lasers have been used frequently, but there are still no conclusive results on how they occlude dentinal tubules or what suitable time of exposure, power, or wavelengths. ¹⁾ There is need for more studies to confirm the beneficial effects of treatment when comparing different laser parameters.

The aim of this study was to evaluate the effect of diode laser, with different powers (high power 1.0 W and low power 500 mW) on the treatment of DH.

Material and Methods

The study protocol consisted of clinical examination and laser treatment, and was approved by the Ethics Commission of the Institute of Laser, Sudan University of Science and Technology. Patients who were referred to periodontal department at Haj Almarady teaching hospital were considered for the study.

All patients attending the clinic during the study period, aged 24-30 years suffering from DH due to tooth wear or gingival recession, were

considered for the study. Exclusion criteria were for patients suffering from teeth with carious lesions or defective restoration, active periodontal disease, periodontal surgery within the previous six months, using analgesics or anti-inflammatory drugs, pregnancy, and lactation. Further, the patients should not have received any desensitizer agents for the previous two months.

Participation in the study was voluntary and those who agreed, after being informed about the study objectives, signed a written consent.

Clinical Evaluation

At the first visit, full mouth scaling and root planning were performed. The patients were instructed to brush their teeth with non-desensitizing dentifrices throughout the study.

Clinical testing included teeth exposed to both tactile stimuli by scratching the suspected tooth with the tip of a dental probe and thermal stimulation by the application of a jet of air using a dental air unit syringe perpendicular to the tooth surface for Three seconds. The adjacent teeth were isolated with cotton rolls to prevent false-positive results. Then the patient was asked to determine the level of pain based on VAS scale from 0 to 10.⁽¹²⁾ The range of the pain on VAS was evaluated according to the ^(10,11) standard assessment as 0 (no pain), 1-3 (mild), 4-6 (moderate), 7-9 (severe), and 10 (worst pain).

Then using a split-mouth design, the side of the mouth was selected randomly by tossing coin, to one of the following treatment group; group A or group B. Twelve teeth were included in the study, so each group of treatment method contained six teeth.

Laser Treatment

Laser session was conducted at AlModather Dental Clinic, Khartoum. Laser treatment was performed by diode laser-Quick Lase (810+980 nm) - United Kingdom. After the first VAS measurement, the involved teeth were randomly divided into two experimental groups, namely group A and group B.

Group (A) was treated by the diode laser with a high power of 1.0 W in continuous emission mode, glass fiber 400µm in diameter, the selected wavelength was 980 nm, and the exposure time was 60 seconds in non-contact

mode on the exposed dentine. Group (B) was treated with the same parameters as Group (A), except the power was changed to 500 mW.

Both groups were subjected to one session of laser for the treatment of DH. The VAS measurements were performed again after 15 minutes of laser treatment, and after one week.

Data was analyzed using SPSS ver26. Descriptive analysis was performed using the mean $\pm$ standard deviation (SD) for numerical variables. A comparison between the study groups was analyzed by a paired sample T-test. For all statistical tests, P value < 0.05 was considered statistically significant.

Results

We started with 22 teethes diagnosed with DH. They received laser treatment, and the pain level was measured after 15 minutes, which showed a clear decrease in pain level. However, a few of them defaulted and we left with only 12 teeth, on them, we completed the study and followed up after a week.

The mean and standard deviation (SD) results of the VAS scores for group A are shown in Table1. It shows a significant reduction in VAS after one week of laser treatment (p value = 0.001), and after 15 minutes (p = 0.007).

Table1. Comparison between Means and Standard deviations of VAS scale for Group A before laser treatment, after 15 minutes and after one week.

Comparison	Mean	SD	P value
Before laser versus after 15 min	1.5	0.837	0.007
Before laser versus after one week	1.667	0.516	0.001
After 15 min versus after one week	0.167	0.753	0.611

Use of Diode Laser in the Treatment of Dentine Hypersensitivity

Table 2 shows the VAS reading for group B for each time point of the therapeutic protocol. There was no significance when comparing the VAS scale before applying the laser versus after 15 minutes (p value = 0.141) and the VAS after 15 minutes versus after one week of treatment (p value = 0.328). However, there is a significant reduction in p value in the VAS scale before laser versus after one week (p value = 0.007).

Table 2: Comparison between Means and Standard deviations of VAS scale for Group B before laser treatment, after 15 minutes and after one week

Comparison	Mean	SD	P value
Before laser versus after 15 min	0.833	1.169	0.141
Before laser versus after one week	1.5	0.753	0.007
After 15 min versus after one week	0.667	1.095	0.328

The comparison between p values for both groups from tables (1) and (2) shows a significant result in the p values before laser versus after one week, with group A having a significant reduction.

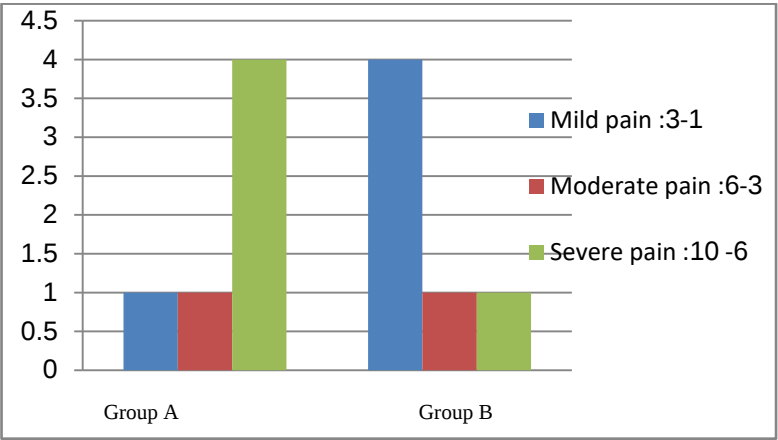


Figure.1. Numbers of teeth have readings of VAS scale before laser in both groups

Figure (1) shows the number of teeth that had a VAS scale, ranging from mild to severe in groups A and B.

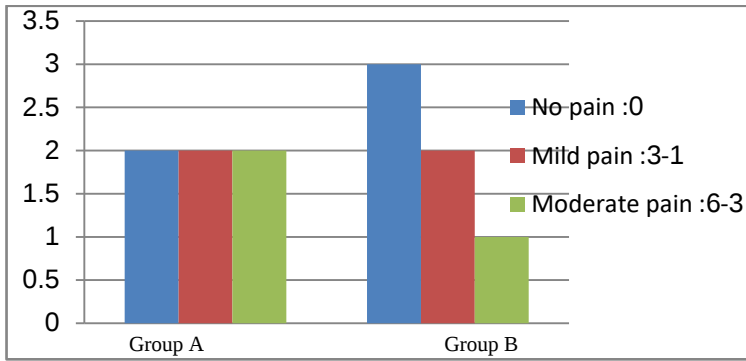


Figure.2: Numbers of teeth have readings of VAS scale after 15 minutes in both groups.

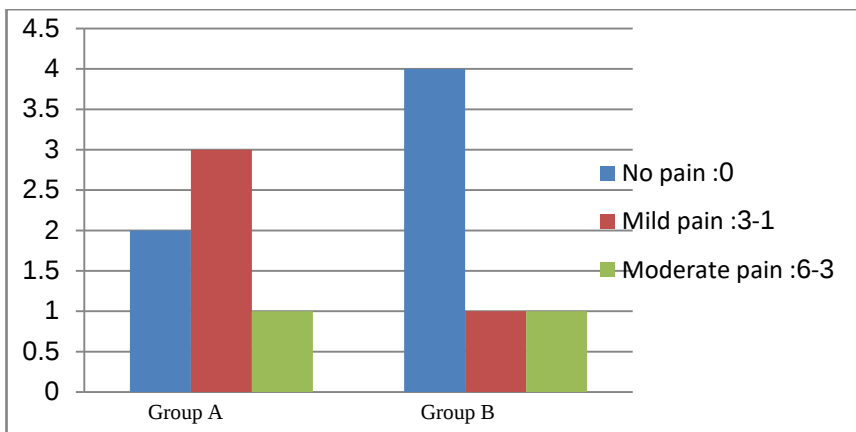


Figure 3: Numbers of teeth have readings of VAS scale after one week in both groups.

Figures (2) and (3) show the VAS with a severe mark was impaired in both groups after 15 minutes of laser treatment and after one week as well.

Discussion

DH can be attributed to either exposed dentine due to removal of the enamel covering the crown, or denudation of the root surface which is associated with gingival recession.⁽¹³⁾ Morphological studies demonstrate a larger number and wider tubules of hypersensitive teeth when compared to non-sensitive teeth.⁽¹⁴⁾ Therefore, all treatments aim at sealing or narrowing the tubules. Several studies have demonstrated that laser can be used in the treatment of DH because it has an analgesic and photo-bio modulating effect on dentinal tubules, also it promotes dentine closure by coagulation or precipitation of insoluble calcium complexes.⁽¹⁵⁾ Laser can be used with low

(He-Ne, Diode lasers) or middle (CO₂, Nd:YAG lasers) output power, with or without a desensitizing agent.⁽¹⁶⁾ The result of treatment may vary from one type of laser to another. It has been found that diode laser seals the dentinal tubule rapidly without any damage to the odontoblast or pulp tissue.^(17, 18)

In this study, the age range of the patients was 24-30 years, most of them were females, which is in contrast with the study conducted by Chitra et al, where most of patients were males.⁽¹⁹⁾

This clinical trial involved an evaluation of the effectiveness of using two different laser powers (low and high). A significant reduction in pain was observed. Furthermore, teeth that presented with sharp stimulated pain before laser treatment showed an immediate decrease in pain sensation after 15 minutes of the first session of diode laser (980 nm) in both groups. This benefit was sustained even after one week after initial irradiation. The Group treated with high power laser (1W) showed the best results.

Our results were in agreement with the results of FelicoFemio who used laser with different powers (5W and 0.2W) used separately or in combination. He found that high power diode laser recorded a better immediate improvement (57%) compared to lower laser (49%), with the preference for combination technique (60%).⁽²⁰⁾ Narges Naghsh et al. concluded that application of 810 and 980-nm diode lasers with high power (1W) for 30 seconds was effective in decreasing pain in patients with DH, with no significant difference between these two wavelengths.⁽²¹⁾

On the other hand, our results were not in agreement with the observation of Lopes et al, who did not find significant differences in the level of pain when comparing the Nd:YAG laser to a low intensity laser, using high and low doses, and desensitizing agent.⁽²²⁾

Desensitization can be referred to as a mechanism through which high power induces a photo-thermal effect that melts the hard tissue on the surface, with the smear layer occluding the tubules. Therefore, laser blocks the movement of the fluids in the dentinal tubules, which causes DH pain.⁽⁵⁾

Marwan El Mobadder et al. concluded from vivo and vitro studies that a diode laser with 1W power provided significant pain reduction immediately

and over 6 months follow up period, especially when laser was coupled with graphite paste.⁽²³⁾ Literature showed the superiority of Nd:YAG using in treatment of DH when compared with other types of laser or desensitizing agents. Nd:YAG laser seals dentinal tubules by dissolving and re-solidifying the hydroxyapatite crystals in dentine.⁽¹⁵⁾

The group treated with low laser power in the present study also showed a reduction in DH. Oliveira Lopes explained the reduction in DH by using a low-power diode laser with an infrared wavelength based on the fact that light acts on the cell membrane, allowing greater passage and a subsequent increase in Ca^{2+} , Na^{2+} , and K^{+} ions. As a result, the endorphin system and the action potential of neural cells increase. In addition, the depolarization of C fiber afferents is blocked, thereby not allowing the pain information to reach the central nervous system.⁽²⁴⁾ The long-lasting effect of low-power lasers can be attributed to the formation of a layer of tertiary dentine.

The decrease in DH by low power diode laser agrees with the results obtained by Ana Lucia Marsilio et al. who found immediate reduction in DH treated by low power (15mW), even after 60 days of follow up, without any effect of the different energies they used ($3\text{J}/\text{cm}^2$ and $5\text{J}/\text{cm}^2$).⁽²⁵⁾ Rakesh Mittal concluded that a medium-power 0.5W GaAlAs diode laser causes both nerve analgesia and partial occlusion of dentinal tubules.⁽²⁶⁾

In the current study, there was a significant difference between before and after 15 minutes irradiation. We attributed the reason to the immediate analgesia through which diode laser depress nerve transmission through blocking depolarization in afferent fibers within the pulp tissue.⁽²⁷⁾

Conclusion

The immediate and late therapeutic effects of the diode laser 980 nm with 60 seconds exposure duration and 1W power were greater than those of the 980 nm with 5mW.

It can be concluded that the laser parameters (980 nm wavelength, at 0.5W power or 1W power, and for duration of 1 minute) that have been used in

this study were safe, and no adverse effects were observed on irradiated teeth and adjacent tissue.

Further long-term studies with larger sample sizes are needed. This can confirm precisely which output power is more effective in treating dentine hypersensitivity for long treatment duration.

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Abstract of the Article Published in the Arabic Section of the Journal

Expenditure on Health Sector and its Effect on improving Health Indicators in Sudan. A study of Live Births and Neonatal Mortality Indicators, 2002 - 2020

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Abstract

Background: The economic expenditure index is considered one of the most important economic tools that are applied in the health sector to provide the appropriate health sector requirements. The later is one of the most important tools that improve health sector performance.

The study aimed to identify how much spending on the health sector correlates to Live births and neonatal mortality rates.

Methods: The researchers applied descriptive and analytical methods using time series data during the study period. The study relied on secondary data taken from the World Bank website. The analytical approach used E views.

Results: The study found that there is a direct relationship between the amount of spending on the health sector and live birth rates, and there is also an inverse relationship between the amount of spending and neonatal mortality rates.

Conclusion: One of the most important recommendations of the study is to increase and diversify sources of funding for the health sector, in addition to increasing the percentage of government spending on the health sector.

Keywords: Expenditure on the health sector, Neonatal mortality rate, Stillbirth rate.

