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with health studies

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The ethical policy of Al-Hadi Journal for Health Research is based on the guiding principles of the Committee on Publication Ethics (COPE) and is in line with the rules of conduct issued by the journal's editorial board. Readers, authors, reviewers, and editors are required to adhere to these ethical policies when dealing with the journal. The journal's ethical policy is responsible for determining which of the research or research articles submitted to the journal can be published in its issues. For information on this matter in publishing and ethical guidelines, please visit the website: <http://publicationethics.org>.

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10. When authors discover a significant error or inaccuracy in their published work, it is the author's duty to promptly notify the Editor-in-Chief or the publisher to either withdraw the research or correct it.
11. All authors should be aware that submitted research to Al-Hadi Journal for Health Research is subject to review or examination using an anti-plagiarism program.
12. All authors must ensure that all co-authors have read the final review checklist before submitting it to the journal

Fifth: Duties and Responsibilities of Reviewers

1. Assist the editorial board members in deciding on the publication of submitted research.
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3. Provide timely comments to help editorial board members make decisions on the submitted research to be published or not.
4. Handle received research for review as confidential, and reviewers must not use information obtained through the review for personal advantage.
5. Reviewer comments on the research should be technically, professionally, and objectively supported.
6. Reviewers should not review research in which they find a conflict of interest with any of the authors or institutions.
7. Reviewers must disclose any conflicts of interest and attempt to avoid them.
8. Sixth: Principles of Transparency

Sixth: Principles of Transparency

1. **Double-Blind Review Mechanism:** The journal's research undergoes a secret double-blind evaluation, meaning that the researcher does not know the reviewer, and the reviewers are not aware of the researcher.
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11. **Archiving:** The journal's plan for electronic backup and maintaining access to the journal's content is clearly outlined.

Seventh: Violations of Publishing Ethics

1. **Impersonation:**
 - A. Deliberately using another person's ideas or original materials as if they were one's own, even if the sentences were used by the same researcher in other journals without proper citation, is considered impersonation.
 - B. All research under review or published in the journal is examined using the plagiarism prevention program. Therefore, impersonation is a serious violation of publishing ethics.
 - C. CrossCheck, a service that helps editors verify the authenticity of papers, is operated by the iThenticate program from iParadigms, known in the academic community as the provider of Turnitin for a searchable list of all journals in the CrossCheck database.
2. **Fabrication and Falsification of Data:**

Fabrication of data and falsification mean that the researcher did not actually conduct the study but rather fabricated data or results, recording or fabricating false information. Data falsification means that the researcher conducted the experiment but processed, altered, or deleted data or results from the research findings.

3. **Simultaneous Submission:**

Simultaneous submission occurs when a research paper (or large sections of it) is submitted to the journal while it is already under consideration by another journal.

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Duplicate publication occurs when two or more papers share the same hypotheses, data, discussion points, and conclusions. This behavior is rejected within Al-Hadi Journal's publishing policy.

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Unnecessary publications include inappropriately dividing study results into several articles, often done to inflate academic credentials.

6. Inappropriate Contribution or Attribution:

All listed authors must have made a significant scientific contribution to the research and agreed to all its requirements. Any person who made a significant scientific contribution, including students, should be included.

7. Manipulation of Citations: Manipulation of citations includes excessive quoting in the submitted research that does not contribute to the scientific content of the material and is included only to increase citations from a specific author's work, or in articles published specifically for the journal. This distorts the importance of the journal's work and is a form of scientific misconduct.

8. Sanctions:

In the case of documented violations of any of the mentioned policies in any journal, regardless of whether the violations occurred in that journal or not, the following sanctions will be applied:

- i. Immediate rejection of the offending research.
- ii. Immediate rejection of any other research submitted to any journal published by any of the offending research authors.
- iii. Imposition of a ban for a period of no less than 36 months on all authors for any new submissions to any journal, either individually or in collaboration with other authors for violating research.
- iv. Prohibition of all authors from working on the editorial board of any journal.

Authors guides

First: Submission Requirements

1. Initial Submission: Researchers can choose to submit the research in a single file to be used in the evaluation process.
2. Corrected Submission Requirements: When the submitted research is in the correction stage after evaluation, researchers are required to adjust the research to the correct format specified by the journal for publication acceptance. Additionally, any additional elements required by the journal for publication should be provided.

Second: Authorship Guidelines

Authors' names should be assigned to the research based on:

1. Substantial contributions to study design, data collection, or analysis and interpretation.
2. Substantial contribution to drafting or critically revising the intellectual content of the research.
3. Definite approval of the final version submitted for publication.

All the above conditions must be met by all authors mentioned in the research. Contributors who do not meet these criteria can be added in the acknowledgment section. All authors must agree on the order of authors before submitting the research for publication. Additionally, consensus from all authors is required to designate one researcher to be responsible for correspondence.

Third: Research Evaluation Process

To maintain the research evaluation system, researchers are committed to participating in the evaluation of scientific research submitted by other researchers. When necessary, authors may be required to provide a reviewer or a group of reviewers for the editorial board. The journal adopts a double-blind review policy, where researchers and reviewers are unaware of each other. The evaluation process is conducted confidentially, and the research evaluation is done through the online research submission system.

Fourth: Pre-Publication Research Evaluation

In addition to the initial evaluation process, the journal evaluates research before publication in its final form by the editor-in-chief and members of the editorial board. This evaluation aims to ensure the quality of published research and adherence to scientific publishing standards. This stage includes comments and citations through the journal's website and on published papers. Researchers are required to respond to comments and observations from the scientific committee.

Fifth: Research Paper Preparation

Research should be submitted in Arabic or English, following appropriate writing and spelling rules. Research papers should be printed in Times New Roman font size 14, single-column format, and in MS-Word format. The research should be written on A4 paper, and the printed area should be 15 cm x 24 cm. Research papers should be submitted once to obtain an identifier number for the research in the journal. Sending

the research multiple times may result in rejection. Research papers should include a title page with the author's name, affiliation, and the title of the research.

Sixth: Submission of New Research

Submission is done through the Al-Hadi College website and the journal's online portal. Researchers will be guided step by step in creating and uploading research files as part of the submission process. Researchers may choose to submit the research in one file for use in the evaluation process. The research file should be in .docx or .doc format to be used in the evaluation process. It is recommended to include all forms and tables in the main research file.

Seventh: Citation

The Vancouver citation method should be adopted for writing sources in the research.

Eighth: Formatting Requirements

There are no strict formatting requirements, but all research should contain necessary elements, including abstract, keywords, introduction, materials and methods, results, discussion, conclusion, acknowledgments, conflicts of interest, and the list of references. Ensure that all figures and tables are included in the main research file.

Ninth: Submission After Evaluation

Regardless of the submission file format, especially after reviewers' corrections, researchers are requested to submit the research file according to the format used in Al-Hadi Journal of Health Research in MS-Word document to avoid unnecessary errors. Researchers are advised to use spell check at this stage. At this point, the name of the researcher (or researchers) and affiliation must be included.

Tenth: Research Document Submission

During the submission of the research to Al-Hadi Journal of Health Research, all contributing researchers must ensure that the research represents valid work, has not been published in full in another journal, and does not contain significantly similar content to the research of other authors. Other researchers must agree to choose one of them to be responsible for correspondence with the editorial board, handling reviewers' corrections, and proving the validity of the research.

Eleventh: Research Submission and Verification

Research should not have been previously published digitally or in print and should not be simultaneously submitted to Al-Hadi Journal of Health Research and another journal for evaluation. Copies of references that may be duplicated in the current research (including those containing significantly similar content or using the same data) and have been published or are under consideration in another journal must be submitted.

Twelfth: Open Access Statement

Al-Hadi Journal of Health Research is considered a fully open-access journal, meaning that all articles are available online to all users immediately upon publication. The author and journal should be correctly included in the research. Advantages of open access for authors include free access for all users worldwide, retention of copyright by authors without restrictions, and increased visibility for readers.

Thirteen: misconduct allegations

Al-Hadi Journal of Health Research is highly sensitive to research misconduct and utilizes all available means to prevent the publication of erroneous research. Despite the absence of a unified definition of research misconduct, the journal's editorial board broadly defines research misconduct into three categories of actions and behaviors. The journal employs this definition to address research misconduct and strictly follows a plan to monitor the ethics of scientific publishing when dealing with research misconduct. This includes:

1. mistreatment of research subjects
2. data falsification and fabrication
3. plagiarism and impersonation

The fabrication is defined as taking data from other research without collecting scientific data. Falsification is defined as manipulating research materials to achieve favorable results. Falsification and fabrication can occur at any stage of the research process (in the field) until the research is published, where citation misuse can occur (indicating a citation when it does not support the argument). The journal aims to identify any type of falsification or fabrication at all levels of research processing, from initial examination to the comprehensive evaluation of the revised research, and even after publication. Reporting any falsification or fabrication is an ethical obligation for our authors, participating authors, reviewers, editors, and readers. In any case of falsification or fabrication, the journal reserves the right to withdraw the fabricated or falsified material. The journal follows the guidelines of its publication ethics committee in dealing with falsification and fabrication.

Scientific evaluator guide

Firstly: Preliminary Guidelines

Before accepting or declining the invitation to review the current research, read these questions as they will assist you in making the decision:

1. Does the current research align with your specific expertise? Accept the review if you believe you can conduct a rigorous scientific evaluation.
2. Do you have a potential conflict of interest with the research topic or authors? Send such concerns to the editor-in-chief when responding to the review request.
3. Do you have sufficient time to review the research? Scientifically rigorous evaluation of research requires a significant amount of time, so before committing, ensure you are aware of the deadline for submitting the review.

Secondly: How to Evaluate a Research in Al-Hadi Journal of Health Research

The scientific reviewer's evaluation should be a comprehensive critique of the research submitted for publication, presented in a full report rather than just a few brief sentences. While the journal does not require a specific template for the structure of the scientific review report, the following sections can be utilized:

1. Abstract
2. Major and significant issues
3. Minor and insignificant issues

The journal encourages scientific reviewers to assist researchers in improving the scientific content of their research papers. Therefore, the scientific review report should provide a constructive analysis with clear evidence to the researcher, especially for those parts of the research that require modifications. In cases where the scientific reviewer does not wish the researcher to be aware of their comments on the research, these comments can be sent to the journal's editor-in-chief confidentially. The evaluation process may vary from one scientific reviewer to another, but the scientific reviewer should pay attention to the following aspects as much as possible:

1. Is the current research topic well defined?
2. Has a contemporary research problem been addressed?
3. Is there a need for ethical approvals for the research, or does it need such approvals?
4. Is the study model sufficient to answer the study's questions?
5. Are the statistical tests used adequate, and are their results correctly included?
6. Are figures and tables adequately explained, and do the results accurately represent them?
7. Have previous researches conducted by the researcher, included in the current study, been discussed adequately, and have the results of studies related to the current research been compared well?
8. Is there incorrect citation of sources, such as using a source in a context contrary to where it was originally cited, or has the researcher extensively used their previous studies in the current study?
9. Do the study results support the conclusions?
10. Are there any restrictions on conducting the research mentioned?
11. Is the abstract an accurate summary of the current research and its results without repetition?
12. Is the language of the current research clear and understandable?
13. To assist researchers in making corrections promptly, the reviewer should send a copy of the evaluated research through the journal's submitted research tracking system. If the scientific reviewer cannot conduct the research evaluation within the specified time, they should contact the journal to adjust the final deadline for submitting the evaluated research. The scientific reviewer is encouraged to provide constructive criticism for the under-review research and focus on objectivity in critiquing scientific aspects of the research, which includes, for example, the soundness of research methods and methodology. At the end of the research evaluation process, the reviewer will be asked the following question regarding the current research:

- Accepted
- Needs major revisions
- Needs moderate revisions
- Rejected
- Unable to evaluate the research

Thirdly: Confidentiality in the Research Evaluation Process

Research submitted for evaluation must be treated with complete confidentiality throughout the evaluation process. The scientific reviewer should not share information about the research under evaluation or discuss its content with anyone outside the research evaluation process. The scientific reviewer may, upon request, consult with a colleague who has a relevant relationship with the research topic, and

this consultation should be done confidentially while keeping the research under evaluation confidential. In such cases, the researcher should first contact the journal or its editor-in-chief and inform them of the colleague's name who wishes to communicate regarding this matter, including their information in the "Comment to the Editor" field in the evaluation report.

Fourthly: Conflict of Interest

The scientific reviewer should refuse to evaluate the research in one of the following cases:

1. They have a specific business interest in the research topic.
2. They have previously discussed or provided opinions and advice on the research topic with the researcher.
3. When they feel incapable of being impartial in evaluating the research for any reason.

Fifthly: Applications for Scientific Reviewer Membership

Al-Hadi Journal of Health Research values those applying for membership in the journal's committees. The journal's editorial board is responsible for selecting research reviewers based on the research itself. In each case, suitable reviewers are invited based on their expertise or previous publications. To ensure the possibility of selecting a scientific reviewer, please regularly update your contact information. For those not registered on the journal's website and wishing to be selected as a scientific reviewer, they should register on the website as a researcher.

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Exploring the Precision and Innovation of Laser Dentistry

As I dive into the fascinating world of modern dentistry, one technological marvel stands out prominently - laser dentistry. The marriage of science and precision, laser dentistry has revolutionized the traditional approach to dental procedures, offering a new realm of possibilities for both practitioners and patients alike.

The journey into the realm of laser dentistry begins with a profound appreciation for the power of light. Unlike traditional dental tools, lasers harness the energy of light to perform a myriad of procedures with unparalleled precision. The versatility of lasers in dentistry is truly awe-inspiring, ranging from simple teeth whitening to intricate surgical interventions.

One of the key advantages of laser dentistry is its ability to minimize discomfort and reduce the need for anesthesia. As the gentle glow of the laser interacts with dental tissues, it simultaneously cauterizes blood vessels, minimizing bleeding during procedures. This not only accelerates the healing process but also ensures a more comfortable experience for patients who may harbor anxiety about dental visits.

In the realm of periodontal treatments, lasers have emerged as powerful allies in the fight against gum disease. This targeted approach not only aids in the preservation of healthy gum tissue but also promotes faster recovery post-procedure.

The precision of laser dentistry extends beyond surgical interventions to restorative procedures as well. Lasers can be employed to remove decayed enamel with remarkable accuracy, preserving more of the healthy tooth structure. Additionally, lasers facilitate the bonding of dental materials, ensuring a secure and durable restoration.

As I reflect on the impact of laser dentistry, I am compelled to acknowledge its role in transforming the patient experience. The days of prolonged discomfort, noisy drills, and post-operative pain may be numbered, thanks to the finesse of laser technology. Patients now have the opportunity to undergo dental procedures with reduced anxiety, quicker recovery times, and enhanced overall satisfaction.

While the benefits of laser dentistry are undeniably impressive, it is essential to recognize that this field is still evolving. Ongoing research and technological advancements promise even greater precision and expanded applications for lasers in dentistry. As the journey into the future of oral healthcare unfolds, the role of laser technology is likely to become increasingly prominent, reshaping the landscape of dental practice.

In conclusion, laser dentistry represents a beacon of innovation in the field of oral healthcare. The precision, versatility, and patient-centric advantages of laser technology mark a paradigm shift, offering a glimpse into a future where dental procedures are characterized by efficiency, comfort, and optimal outcomes. As I embark on this exploration of laser dentistry, I am captivated by the endless possibilities that light can bring to the world of smiles.

Mohammed A. Al-Maliky
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Managing editor
Al-Hadi Journal for Health Research

Cross-Sectional Study Investigating Parental Awareness and Attitudes Toward Pediatric Dental Procedures

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ABSTRACT:

Introduction: Many parents are uninformed about the role that a pediatric dentist plays in their child's development, and they underestimate the importance of early dental checkups because they believe that baby teeth would naturally fall out and therefore don't require much attention. **Aims of study:** the study aimed to assess parental comprehension of the importance they attribute to baby teeth, as well as their attitudes towards the treatment of a primary tooth with symptoms and the adoption of preventive interventions. **Materials and methods:** A survey was disseminated to 400 parents with children ranging from newborns to 12 years old. The study consisted of 300 fully completed questionnaires. Statistical analysis: The data was imported into an excel spreadsheet and analyzed using the IBM SPSS 22.0 software. **Results:** Over two-thirds (84.7%) of the parents who participated in the study recognized the importance of primary teeth. However, only (42.7%) were aware that root canal treatment and capping can be performed on primary teeth. Additionally, (50%) of the parents reported being aware that decay in primary teeth can be prevented. Interestingly, (76.3%) of the parents believed that infection from a decayed primary tooth can spread to the underlying permanent tooth and cause damage. **Conclusion:** The study's findings clearly indicate that the degree of education has a crucial role in shaping parents' attitudes and comprehension of dental caries. Parents have limited attitudes and understanding on the importance of regular dental checkups and the acceptability of preventive dental procedures at a young age. Gaining a comprehensive comprehension of this issue is crucial for the sustained preservation and improvement of a healthy set of teeth in young individuals residing in Baghdad.

Keywords: Primary dentition, Pediatric dentist, preventive dental procedures.

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INTRODUCTION

Pediatric dentists offer oral healthcare services and address dental conditions in infants, children, teenagers, and those with specific medical requirements. Pediatric dentists employ several methodologies to assist youngsters due to the inherent variability among individual individuals. (1)

To fully perform any required dental procedures. Dentists provide parents with guidance on behavior modification strategies for their children, taking into account the child's health history, specific medical requirements, dental needs, treatment options, potential consequences of not receiving treatment, emotional and cognitive development, as well as the dentist's personal preferences and expertise. A multitude of behavior management strategies have been devised in response to the challenge of dealing with youngsters who are incapable or unwilling to comply. (2)

The deciduous teeth, which emerge sequentially until the age of two, are pristine and beautiful pearls that initially appear on the lower dental arch at around six months of age. In order to operate correctly, these teeth must remain in the mouth until the permanent teeth emerge without any complications. Regrettably, many children have premature tooth loss, occurring before their teeth would normally shed. (3)

Dental caries is a widespread condition, particularly common among young children. (4) The preservation of decaying primary teeth is essential because of their significance in mastication, articulation, and their function as inherent space maintainers in the dental arch. The management of dental caries in children is a longstanding problem that presents several problems, such as behavior control and the requirement for a long-lasting therapy that remains effective until the natural shedding of the tooth. The main cause of premature tooth loss is dental caries, resulting from parents neglecting their children's oral hygiene, neglecting to schedule regular dental examinations to detect early signs of caries, and refusing to seek necessary and suitable dental treatment. (5)

Parental knowledge and habits are crucial in the prevention of diseases and the enhancement of oral health in children. Furthermore, the first duty for maintaining oral health is with the parents, and eventually requires the joint effort of both parents and children. (6)

The notion that 'infant dental care is unnecessary as primary teeth would eventually be shed' has significantly diminished in the Western hemisphere. (7) Pediatric dentistry is a very nascent field in Iraq, with a lesser level of recognition as a specialized profession compared to well-established practices in Western countries.

In Iraq, Pediatric dentistry has been recognized as a distinct specialty since 1972, in accordance with the rules set by the dental council. However, it was officially established as a separate institution in 2003. The level of oral health awareness and practice in Iraq is significantly lower compared to that of Western populations. According to reports, children in Western societies tend to have a higher level of awareness of frequent dental appointments, as these trips are typically started by either their parents or dentists. The Iraqi situation lacks a significant effort on the side of the parents.

Many parents are unaware of the crucial role that a pediatric dentist plays in their child's life. Additionally, the significance of early dental appointments is sometimes underestimated, as some assume that since primary teeth will eventually fall out, they are not worth much care. During the initial 6-7 years of a child's life, the primary teeth have a significant impact on the development of speaking, chewing, preserving space, and directing the emergence of permanent teeth. Although it is advisable for parents to bring their kid to a pediatric dentist, many may not do so due to a lack of information regarding the significance of primary teeth. The parental knowledge, attitude, and action significantly impact their child's development of a favorable dental attitude. (8)

MATERIALS AND METHODS:

This study examined the level of parent knowledge, attitude, and behavior about pediatric dentistry in the ALDORA area of Iraq. A survey was designed to examine the knowledge, attitude, and awareness of parents regarding Pediatric dental operations and the significance of preventative procedures. The questionnaire was delivered to 300 parents of children aged 0 to 12 years who expressed their willingness to participate. Throughout the questionnaire completion process, one student consistently remained accessible, and participants were actively encouraged to seek clarification from the students if necessary. Upon finishing the questionnaire, every participant was provided with training and information regarding the importance of keeping healthy primary teeth.

This research encompasses parents from diverse socioeconomic origins, spanning various age groups, educational attainment levels, and genders. The survey required around 10 minutes to finish. The questionnaire was segmented into three sections: the initial piece encompassed inquiries regarding the participants' personal attributes, such as the kid's name, age, gender, the companion's connection with the child, their job status, scholastic achievements, and family income. The second and third portions include of inquiries regarding parents' awareness and perspectives on dental caries indicators and prevention of early childhood caries (ECC).(9)

Statistical analysis:

We used the IBMSPSS 22.0 program to analyze the data, which were all put into an Excel sheet. For each portion of the questionnaire that was delivered to parents of children, we obtained the percentage, frequency, and Pearson's chi-squared with likelihood ratio.

Results

A survey was conducted among 400 parents residing in Al-Dora city, with a total of 300 fully completed survey sheets included in the study. A total of 300 parents were selected, with

149 coming from a lower socioeconomic background and 151 from a higher socioeconomic one. The selection process was done randomly. The survey consisted of a total of 20 questions. Section 1 comprises demographic data of participants, whereas Questions 1 to 15 offer response alternatives of yes, no, and maybe. Questions 15 to 20 included several alternatives (9)

Table 1 showed the demographic data for parent of patient which illustrated sex, educational level, occupation and family income.

TABLE 1: Basic characteristics of participants

1	Sex	
	Girl	48%
	Boy	52%
2	Educational level	
	Primary	26%
	Secondary	32.3%
	Bachelor's	35.7%
	Postgraduate	6%
3	Occupation	
	Work	49%
	Not work	51%
4	Family income	
	Good	50.3%
	Average	39.7%
	Bad	10%

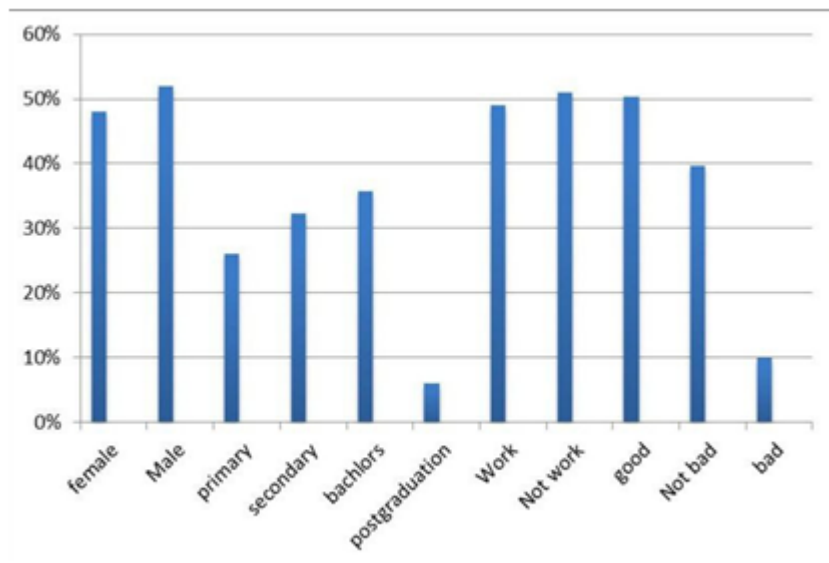


Figure 1 Basic characteristics of participants

Table 2 presents the findings on parental awareness of primary teeth and early childhood caries (ECC). 94.7% of parents are aware that humans have two sets of teeth. 85.7% of individuals believe that primary teeth hold significance. 71.7% of children receive dental care before seeing the dentist. 60% of parents are aware of the specialized field of pediatrics. 42.7% of parents are aware that root canal therapy can be performed on primary teeth. 68.7% of individuals agree to visit a pediatric dentist. According to their belief, there is a 76.3% chance of transmitting the illness from the primary teeth to the permanent teeth. 36% of individuals consider the presence of gaps between primary teeth to be within the range of normalcy. 58.7% of parents believe that degradation can be prevented. 63% are aware of the presence of fluoride. 50% of parents approve of preventative therapy. Did you know that pharmaceutical syrups significantly contribute to tooth decay? accounting for 38.5% of cases.

TABLE 2: parents' knowledge and attitudes about dental caries indicators and ECC prevention

No.	Question	yes	no	May be
1	Do you know that we have 2 sets of teeth- primary teeth and permanent teeth?	94.7%	5.3%	
2	Do you think primary teeth are important?	85.7%	13.3%	1%
3	Has your child ever been to the dentist before?	71.7%	27.3%	1%
4	Do you know there is a specialty called Pediatric dentistry?	60.7%	38.0%	1.3%
5	Are you aware that root canal treatment and capping can be done for primary teeth as well?	42.7%	56.3%	2.3%
6	Do you know that only a Pediatric dentist is trained in Child Psychology and Behavior Management?	39.0%	61.0%	
7	If you were referred by your family dentist to go to a Pediatric dentist, would you go?	68.7%	30.3%	1%
8	Do you feel that infection from a decayed primary tooth can spread to the permanent tooth lying under it and damage it?	76.3%	20.0%	3.7%
9	Do you think that spaces between primary teeth are normal?	36.3%	30.0%	33.7%
10	Are you aware that the right Pediatric dentistry treatment can help to prevent crooked teeth at a later stage?	61.0%	22.7%	16.3%
11	Do you think tooth decay can be prevented?	58.7%	39.3%	2.0%
12	Do you know that application of fluoride from a dentist every 6 months is going to make your child's tooth more resistant to decay?	63.0%	17.3%	19.7%
13	If a dentist advises you for Preventive treatment like sealants and fluoride application to prevent decay in your child's teeth, will you do it?	50.0%	18.7%	31.3%
14	Do you know that medicine syrups play a big role in tooth decay?	38.5%	34.6%	26.6%
15	Would you like to receive more information about your child's teeth protection and oral hygiene maintenance?	76.1%	13.6%	10.0%

Table 3 shows the results based on socioeconomic class (low or high) for questions 1–15, with response options of yes, no, and maybe. Q1, 2, 3, 4, 7, 8, 11, 12, and 15 had a high percentage for low and high SCS for answer yes and a low percentage for low and high SCS for answer no, whereas Q5 and 615 had a low percentage for low and high SCS for answer yes and a high percentage for low and high SCS for answer no. In contrast, Q9, 10, 13, and 14 had an approximately equal percentage of answer questions.

TABLE 3: Comparison between the knowledge and attitudes of parents in a high and SES

No.	Yes		No		May be no	
	Low SES	High SES	Low SES	High SES	Low SES	High SES
1	93.7%	96%	6.3%	4%	—	
2	81.7%	91.2%	16.6%	4%	1.7%	
3	69.1%	75.2%	29.1%	24.8%		
4	62.3%	58.4%	35.3%	41.6%	2.3%	
5	40%	46.4%	58.3%	53.6%	1.7%	
6	36%	43.2%	69.7%	56.8%		
7	69.7%	67.2%	28.6%	32.8%	1.7%	
8	75.4%	61.6%	18.9%	31.2%	5.7%	7.2%
9	42.9%	27.2%	26.3%	35.2%	30.9%	37.6%
10	49.7%	76.8%	29.7%	12.8%	20.6%	10.4%
11	53.1%	66.4%	44.0%	32.8%	2.9%	0.8%
12	68.6%	55.2%	16.0%	19.2%	15.4%	25.6%
13	49.7%	50.4%	16.0%	22.4%	34.3%	27.2%
14	37.7%	40.0%	29.1%	42.4%	33.1%	17.6%
15	79.4%	72.0%	12.6%	15.2%	8.0%	12.8%

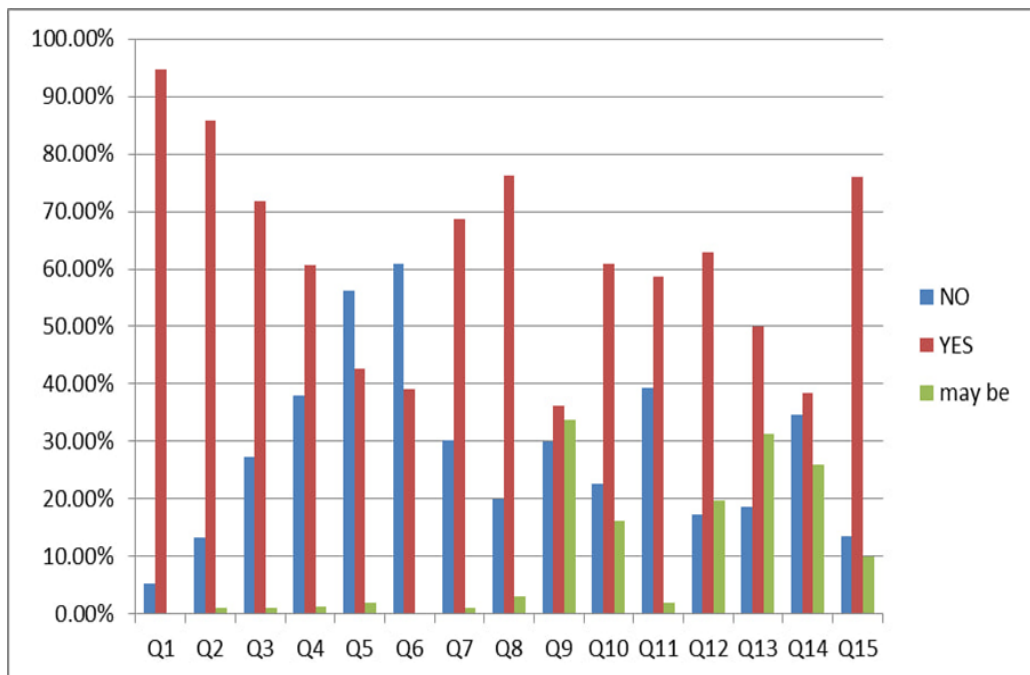


Figure 2: parents' knowledge and attitudes about dental caries indicators and ECC prevention

Table 4 revealed how parents reacted to dental care based on their socioeconomic background. 72% of high SCS for Q16 pediatric dentist, 80% of low SCS for Q17 just where there is pain, and 61.6% of high SCS for Q18 receive It was treated by going to the dentist; 61.6 of high SES for Q19 still took him to the dentist to find out what was wrong and how to fix it. Finally, 60.8% of high SES are affected by the Q20 cost factor.

TABLE 4 Response of parent to dental treatment

No.	Options	Low SES	High SES
16	If your child has a toothache, who would you go to?		
	• Pediatric dentist	52%	72%
	• Family dentist	37.7%	20%
	• Family doctor	10.3%	7.2%
17	When do you think should be the first dental visit?		
	• 6 months	13.1%	8.8%
	• One year	6.3%	20.8%
	• Only when there is pain	80%	70.4%
18	If your child's milk tooth is decayed, what would you do?		
	• Give medicines and try to manage it	13.1%	12.8%
	• Get it treated by visiting the dentist	35.4%	61.6%
	• Will not treat it as it is anyways going to fall off	51.4%	25.6%
19	If your child has a toothache & swelling in the mouth and after taking medicines, the toothache and swelling subsides, what would you do next?		
	• Still take him to the dentist to know the cause and treat cause	42.9%	61.6%
	• Wait for pain to recur and then take him	57.1%	38.4%
20	If a dentist advises you for Preventive treatment like sealants and fluoride application to prevent decay in your child's teeth, will you do it? If no or maybe, why?		
	• You think it is not going to help	15.4%	12%
	• Visits to dentist will increase	25.1%	27.2%
	• Cost factor	59.4%	60.8%

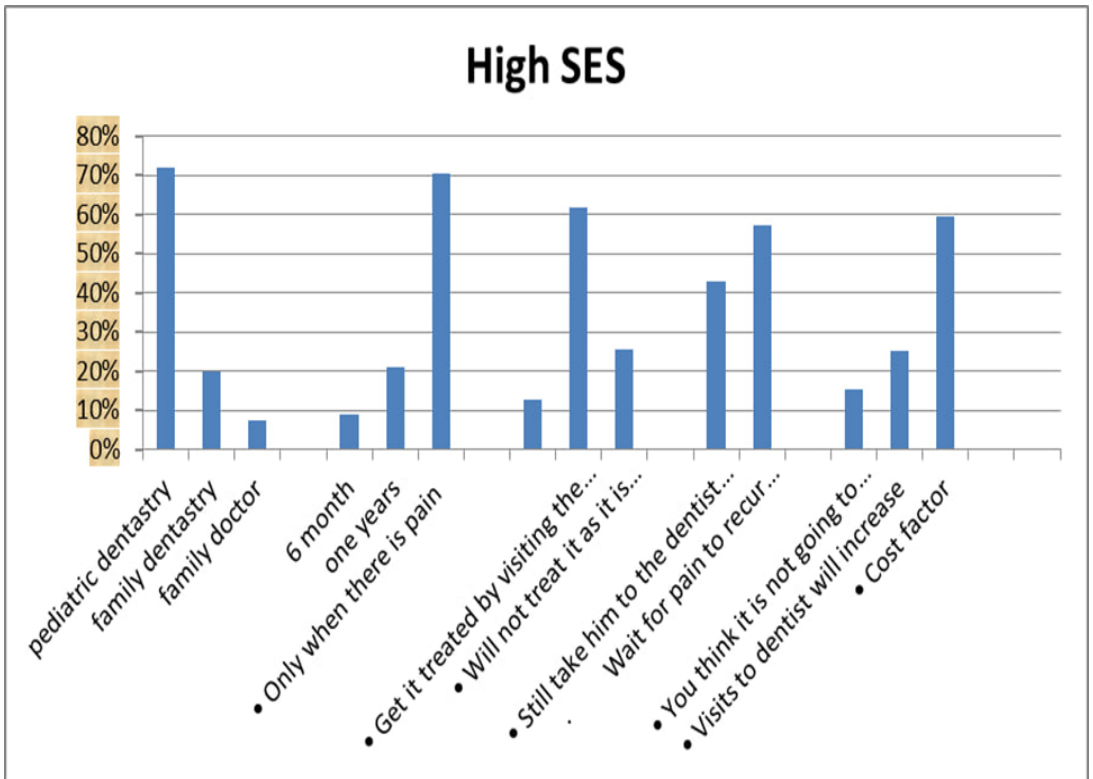


Figure 3: Response of parent to dental treatment in high SES

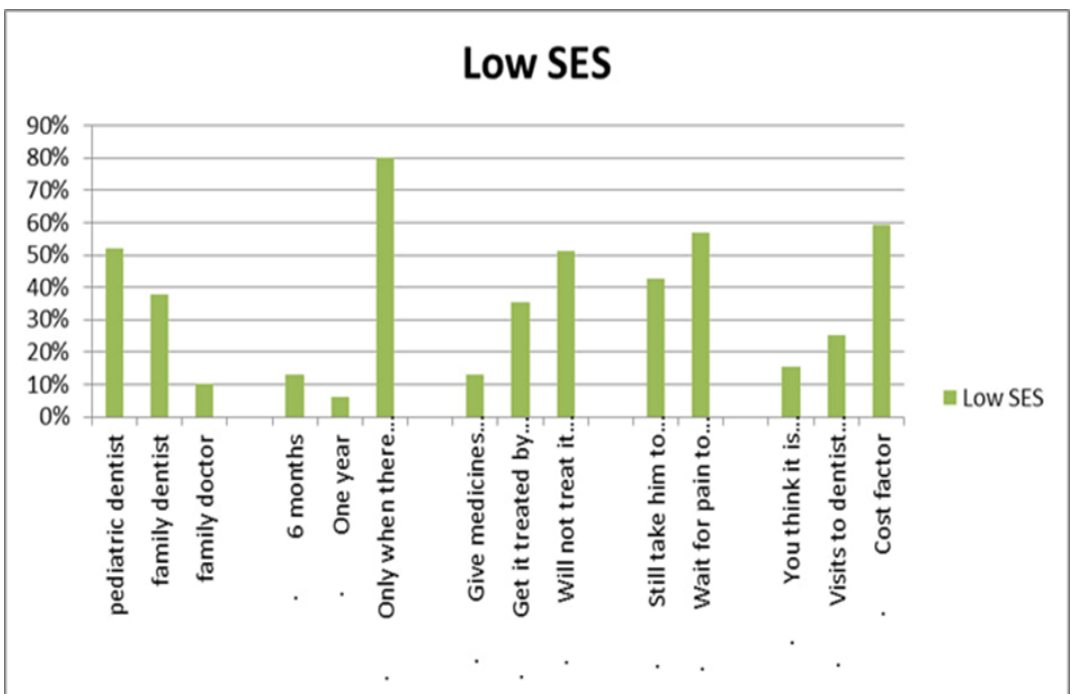


Figure 4 Response of parent to dental treatment in LOW SES

Table 5 shows Pearson's chi Sq for all sections, which were highly significant for Q2, 9, and 10, and significant for Q4 and 8. While the like-hood ratio is extremely important for Qs 2, 8, 9, and 10, it is not significant for Qs 3, 4, and 7.

Table 5: Chi-square ratio:

Q. No.		Value	Asymp. Sig. (2-sided)
1	Pearsons's chi Sq	1.145	.285
	Likelihood ratio	1.125	.289
2	Pearsons's chi Sq	10.528	.005
	Likelihood ratio	11.466	.003
3	Pearsons's chi Sq	5.535	.063
	Likelihood ratio	6.570	.037
4	Pearsons's chi Sq	6.977	.031
	Likelihood ratio	8.371	.015
5	Pearsons's chi Sq	5.656	.059
	Likelihood ratio	6.702	.035
6	Pearsons's chi Sq	2.219	.136
	Likelihood ratio	2.229	.135
7	Pearsons's chi Sq	4.974	.083
	Likelihood ratio	6.017	.049

8	Pearsons's chi Sq	9.275	.010
	Likelihood ratio	9.486	.009
9	Pearsons's chi Sq	11.439	.003
	Likelihood ratio	11.373	.003
10	Pearsons's chi Sq	33.705	.000
	Likelihood ratio	33.629	.000
11	Pearsons's chi Sq	9.065	.011
	Likelihood ratio	9.0637	.011
12	Pearsons's chi Sq	8.595	.014
	Likelihood ratio	8.766	.012
13	Pearsons's chi Sq	3.859	.145
	likelihood ratio	3.891	.143
14	Pearsons's chi Sq	15.397	.000
	likelihood ratio	15.319	.000
15	Pearsons's chi Sq	3.452	.178
	likelihood ratio	3.533	.171
16	Pearsons's chi Sq	18.222	.000
	likelihood ratio	18,138	.000
17	Pearsons's chi Sq	17.891	.000
	likelihood ratio	19.574	.000

18	Pearsons's chi Sq	32.835	.000
	likelihood ratio	33.051	.000
19	Pearsons's chi Sq	14.553	.000
	likelihood ratio	14.598	.000
20	Pearsons's chi Sq	1.100	.577
	likelihood ratio	1.090	.580

Discussion:

To enhance children's access to oral health care, it is imperative to assess the oral health literacy of their parents, who serve as the primary caregivers and decision-makers for their children. Studies have found a positive correlation between a parent's favorable attitude towards dentistry and their children's improved dental health. (10), (11)

The present study aimed to understand parents' perspectives on the significance of their child's deciduous teeth, as well as their awareness of various preventive and therapeutic choices in pediatric dentistry. In order to assess the impact of socioeconomic status on parents' understanding of pediatric dentistry, questionnaires were distributed evenly among parents belonging to both higher and lower socioeconomic strata. (12), (13)

In the present investigation, parents belonging to lower socioeconomic strata did not perceive primary teeth as a necessity. This outcome is similar to a study conducted in 2016 by Jyothsna VS, which revealed a noticeable deficiency in understanding the importance of deciduous teeth. Parents may not comprehend the benefits of retaining milk teeth unless they are cognizant of their importance.

Global data indicate that 40% of individuals have dental treatment anxiety, a condition that can be attributed to distressing childhood experiences. (14) Children must have positive early experiences, as dental fears that begin in infancy often continue

throughout adulthood. Therefore, it is imperative that the child's initial dental visit is a positive and calming encounter with a dentist who possesses expertise in working with youngsters.

Our survey revealed that a mere 39% of parents possessed knowledge regarding the fact that a pediatric dentist is a specialist who has received training in child psychology and behavior management. Among these parents, 43.2% belonged to higher socioeconomic groups, while 36% belonged to lower socioeconomic classes. According to the present investigation, 58.4% of parents belonging to higher socioeconomic groups demonstrated awareness of the existence of a specialized branch of dentistry dedicated to children. Conversely, 62.3% of parents from lower socioeconomic classes lacked this awareness. Lower socioeconomic individuals are commonly reported to have sought dental treatment in government hospitals. (15)

The observed lack of awareness in our study may be attributed to the absence of pediatric dentists at government hospitals frequented by individuals from lower socioeconomic backgrounds. Within the scope of this study, 8.9% of the surveyed parents opted to consult their family dentist regarding their child's problematic tooth, while 18.1% expressed their willingness to seek the services of a pediatric dentist if advised to do so. This might be attributed to the fact that many parents may be uninformed of the existence of specialized pediatric dentists, or they may possess a higher level of faith and trust in their family dentist, leading them to prefer having their child treated by them. (16)

As to the American Academy of Pediatric Dentistry, it is recommended that every kid should have their first dental appointment by their first birthday. In this poll, a mere 3.7% of parents expressed the belief that the initial dental appointment should occur at the age of 1 year, while 3.4% said that it should take place at 6 months. According to Alshahrani et al, the majority of parents feel that the initial dental appointment should occur between the ages of 3 and 6, maybe because they hold the belief that not all teeth have emerged by the age of 1 year. (17)

Our survey revealed that 22.9% of participants considered that the initial dental appointment should only occur in the presence of discomfort. This conclusion is substantiated by other research undertaken on this topic. (18), (19), (16), (20) Given that doctors have more frequent encounters with children for vaccine purposes, it would be advisable for them to provide guidance to patients regarding the significance of early dental appointments.

Based on the aforementioned findings, a significant proportion of parents hold the belief that they should only schedule a dental visit for their children when they experience discomfort, and they lack knowledge of the optimal age for their child's initial dental consultation.

Conducting dental check-ups at an early stage reduces anxiety and expenses, enhances the overall quality of life connected to oral health, and assists families in effectively managing their time. (20) Dental caries in primary teeth can impede a child's development and cause significant pain, perhaps resulting in life-threatening infections and diminishing general well-being. (3)

Extensive evidence has demonstrated a clear association between tooth decay in primary teeth and an increased likelihood of developing tooth decay in permanent teeth. (21)

According to our poll, 13.9% of parents expressed their intention to seek dental treatment for a decaying primary tooth instead of waiting for it to naturally come out or attempting self-medication. Only 3.9% of the parents indicated their willingness to provide medicine independently, reasoning that the tooth will inevitably shed. The data revealed a concerning trend: 57.1% of parents belonging to lower socioeconomic categories expressed a preference for delaying their dental visits till the pain resurfaced.

According to Bansal et al., extraction is the most effective treatment choice for primary teeth. Parents should possess comprehensive knowledge of the consequences of premature loss of primary teeth and its potential impact on their child's overall well-being. (22)

According to the study conducted by Winnier et al. in 2015, over 61% of the parents were not aware that primary teeth might require both crowns and root canal therapy to get the desired result.

According to our poll, most individuals were aware of the possibility of preventing decay, and around 63% were knowledgeable of the potential benefits of fluoride. (9) In contrast to the research, which suggested that mothers had inadequate knowledge of fluoride. (23)

When asked about the appropriateness of preventive therapy as recommended by the dentist, 58.7% of respondents expressed certainty or willingness to undergo preventive measures for their children. Of the individuals belonging to the top socioeconomic class, 59.4% expressed uncertainty mostly due to financial considerations, while a secondary factor was the desire for more frequent dental visits.

Only 76.3% of the parents were aware that an infection in a primary tooth might potentially migrate to the underlying permanent tooth and cause harm. This conclusion aligns with the research conducted by Ramakrishnan et al. (13)

In the present study, 61.2 % of the parents were unaware that medicinal syrups may contribute to tooth deterioration. This discovery aligns with previous research undertaken by Acharya et al and Nirmala et al. (24), (25)

Studies indicate that a significant proportion of pediatricians, almost 80%, lack awareness regarding the correlation between liquid drugs and dental side effects. Furthermore, a majority of these medical professionals do not provide guidance on the need for oral hygiene practices, such as teeth cleaning, after consuming medication. These findings indicate that doctors lack knowledge on the etiology of dental caries and its related risks. (26)

According to the latest study, 76.1% of the participants expressed parental interest in gaining further knowledge about the significance of maintaining and overseeing their children's oral health. This suggests a genuine lack of awareness rather than a lack

of concern for the value of primary teeth. This indicates that our population must improve their foundational comprehension and acquire necessary oral health education.

CONCLUSION:

The goal of education is not only to transmit knowledge, but also to develop suitable actions toward dental therapy. The current study discovered that the level of education has a significant influence in molding parents' attitudes and understanding regarding dental caries.

Parents' attitudes and knowledge about frequent dental visits, as well as the significance and acceptance of preventative dental operations at a young age, are restricted. Improving understanding in this subject is critical for long-term maintenance and enhancement of healthy dentition in young age.

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Oral health status of Iraqi autistic children and the correlation with disease severity

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Abstract:

Background: Autism is characterized clinically by deficits in communication, interactions and stereotyped behavior. Children with Autism spectrum disorder suffer difficulties with dental care both at home and at the dental clinics. The study was designed to assess caries incidence and oral health condition in sample of Iraqi autistic children. **Methodology:** forty autistic children were participated in this study with 40 healthy children age ranged (2-11) years, patient group were subdivided in to (Mild , moderate and severe) according to the severity of disease. Simplified oral Hygiene index (S-OHI) was used to assess the oral health and decay-missing-filling tooth (dmft,DMFT) indices used to assess the caries incidence in both groups. **Results:** patients with autism have a lower hygiene level regarding both caries and oral health status and this result get worsen with increasing disease severity. **Conclusion:** Caries experience shows a higher prevalence in autistic patients compared to controls, suggesting that cognitive dysfunction, aggression, Impairment in applying oral hygiene rules and the difficulties of these patients and other associated psychiatric symptoms may impede the provision of dental care.

Keywords: autism; oral health; dental health; autism severity

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Introduction

Autism spectrum disorder (ASD) is a neuro-developmental condition known by restricted interests, poor social communication, and stereotyped or repetitive behaviors ⁽¹⁾. Autism can be diagnosed as early as 18-24 months if certain symptoms can be notable from normal development and other developmental delays or abnormalities ⁽²⁾. The World Health Organization (WHO) estimated that one in every hundred children had autism, with a male-to-female ratio that was higher ⁽³⁾. Autistic persons display problematic behaviors such as anger, resistance to directions, and an inability to speak in a regular manner, and they are commonly related with social anxiety, attention deficit/hyperactivity disorder, and obsessive-compulsive disorder. As a result, it is difficult for them to reach the same educational levels as their neuro-typical peers or to live a normal life ⁽¹⁻⁴⁾.

Autism has long been thought to be a debilitating disorder. Autism has three severity categories, according to current DSM5 criteria ⁽⁵⁾, ranging from "requiring support" to "requiring very substantial support." Severity assessments are based on the features of the two fundamental domains that comprise the diagnostic criteria. The first domain includes social and communicative deficiencies (social affect). The second domain is the presence of limited or repetitive patterns of behavior and interests.

Individuals with special needs (especially those with developmental and mental disabilities) are virtually always affected in terms of oral health, with dental caries and poor oral hygiene being the most common problems ⁽⁶⁾. Autistic people are among those who struggle to acquire standard dental treatment ⁽⁷⁾. Children with ASD provide difficulties for parents and dentists since the dental environment is considered challenging with children's abilities, features, and abnormal behaviours ⁽⁸⁾.

Methodology:

A case-control study was conducted on 80 subjects from 6 institutes in Baghdad from both (Al-Karkh and Al-Resafa), with the patient

group consisting of 40 children diagnosed with autism spectrum disorder (31 males and 9 females), and the control group consisting of 40 apparently healthy children (25 males and 15 females) chosen from the same geographical area where autistic institutions were found. The age range was (2-11) years, and the patients were divided into three categories based on disease and symptom severity: mild, moderate, and severe. The index of decayed, missing, and filled teeth was used to assess primary and permanent dentition, while the simplified oral hygiene index was used to assess oral health in both groups.

Results:

Demographic Features

The results of the current study were based on the analysis of 40 autistic patients compared with 40 healthy children, whose ages ranged from 2 to 11 years. The mean age of the patient’s group was (6.70±2.34) years, meanwhile the mean age of the controls was (7.10± 2.40) years. As presented in table 1.

Table 1: demographic features regarding the age

Age group (years)	Study groups				T-test (P-value)
	Patients group No.=40		Control group No.=40		
	N	%	N	%	
3-7	27	67.50	23	57.50	0.83 ^{NS}
8-12	13	32.50	17	42.50	
Range	(2 - 11)		(2 - 11)		
Mean ± SD	6.70±2.34		7.10±2.40		0.32 ^{NS}

According to the severity of the disease, this study found that 6 (15%) of patients have mild autism, 13 (32.5%) have moderate autism, and the remaining 21 (52.5%) have severe autism, as shown in figure (1).

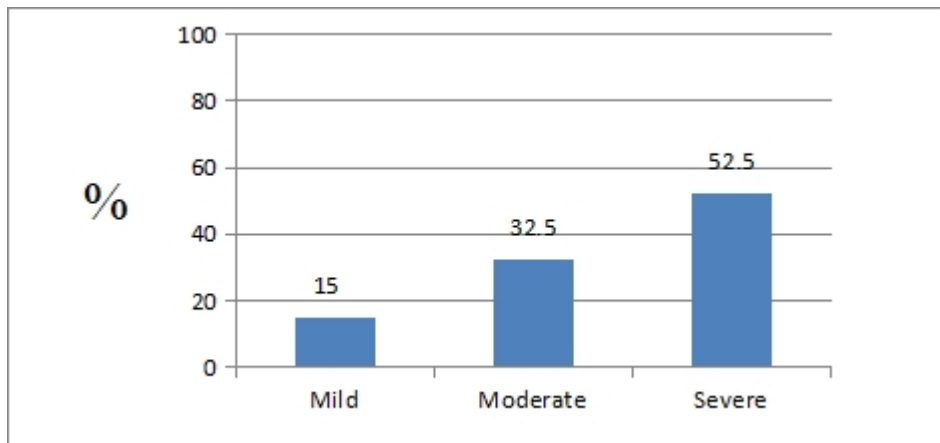


Figure 1: Frequency distribution of patients according to disease severity.

Table (2) shows the caries experience in both groups of children, dmft index showed a significant difference between the two groups. According to permanent dentition, this study found a significant increase in DMFT in patient group (1.07 ± 0.26 ; 1.90 ± 0.37) than that in control group (0.37 ± 0.11 ; 1.02 ± 0.16) respectively.

Table 2: Caries experience distribution of primary and permanent teeth in two groups.

Variables	Groups			
	Patient N=40	Control N=40		
	Mean \pm SD	Mean \pm SD	T-test	P value
dmft	4.87 ± 0.71	2.82 ± 0.51	2.328	0.023*
DMFT	1.90 ± 0.37	1.02 ± 0.16	2.133	0.038*

*=significant; SD: Standard Deviation

The differences in oral hygiene between patients and control group are presented in table (3). The result showed that there is a significant difference between the two groups regarding the S-OHI where patients group showed a higher mean value than control group.

Table 3: S-OHI distribution between groups

	Groups		
	Patients	Control	

Vars.	Mean±SD	Mean ± SD	T-test	P-value
DI	0.96±0.63	0.68 ±0.30	1.895	0.062
CI	0.12 ± 0.27	0.07±0.19	0.840	0.404
S-OHI	0.84±0.63	0.58 ±0.40	2.246	0.028*

NS: non-significant; SD: Standard Deviation

Figure (2) illustrates the oral hygiene index discrepancies between patients and controls. According to the data, 25 of the patients had poor oral hygiene and 15 had good oral hygiene, whereas 11 of the control group had poor oral hygiene and 29 had good oral hygiene.

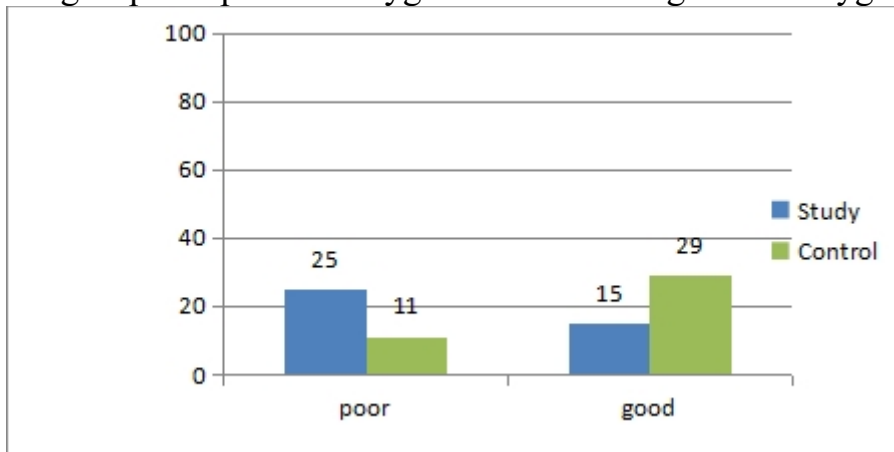


Figure 2: Oral hygiene distribution

Dentition Status with Severity of Disease

Table (4) reveals a significant increase in dmft, DMFT indices as the severity of autism increases.

Table 4: Dentition status with severity of disease

		Mean ± SD	F	P value
dmft	Mild	1.625±0.420	3.788	0.033*
	Moderate	5.600±1.116		
	Severe	5.765±1.244		
DMFT	Mild	0.250±0.250	8.187	0.002*
	Moderate	2.133±0.668		
	Severe	2.471±0.589		

*=significant at p<0.05.

Oral Hygiene Status According to Severity of Disease

The distribution of oral hygiene according to the severity of disease is clearly presented in table (5). The results revealed highly significant differences in oral health status among three groups of patients, where oral hygiene get worse when increasing disease severity.

Table 5: Oral hygiene status with severity of disease

		Mild No.=8	Moderate No.=15	Severe No.=17	ANOVA P- value)
DI	Mean ± SD	0.45±0.32	0.827±0.694	.053±0.623	0.013*
CI	Mean ± SD	0.038±0.106	0.020±0.077	0.247±0.379	0.087
S-DHI	Mean ± SD	0.488±0.348	0.847±0.704	.300±0.852	0.014 *

SD: Standard Deviation

Discussion and conclusion

Caries Experience and Oral Health Status

- **Caries Experience**

As per the results of this study, there was a significant difference between the patient group and the control group in terms of dental caries incidence and get even worse with increasing the disease severity in both deciduous and permanent teeth. This finding is consistent with prior research^(10,11,12). This may be related to the fact that individuals with ASD have trouble controlling their tongues, which raises the risk of dental caries, as well as their preference for eating more delicate and sweet foods and their propensity to hold them in their mouths rather than swallow them. Furthermore, according to Udhya and colleagues, dental caries risk may be considered to be higher in the autistic individuals due to difficulty in brushing teeth; yet, oral hygiene is known to be poor in these individuals⁽¹³⁾.

On the other hand, earlier research ^(14,15) has indicated that children with autism had a decreased prevalence of caries. According to the authors, autistic families and special institutions in charge of providing care may serve less cariogenic meals. Likewise, autistic children due to their ritualistic behavior, which is portrayed by unchanging design of everyday activities, for example, unvarying list of options of meals; thus they are more regular in their meal habits than are ordinary health children; along these lines, a reduction in the frequency of snacking between-meals and in the consumption of carbohydrates may have a role in the less caries experience ⁽¹⁶⁾ . Alrawi et al. also attributed the lower occurrence of caries to the lack of any retentive region owing to the flat occlusal surfaces due to bruxism and opened proximal contacts ⁽¹⁷⁾ .

Furthermore, this study discovered that dental caries experience was significantly correlated with the severity of autism symptoms in terms of DMFT/dmft indices, and that the incidence of caries was higher in children with severe autism than in other autistic groups. This is because severe autism is characterized by bad behaviour and a reduced ability to comply with instructions. It is also more difficult to provide basic oral hygiene treatment. Additionally, this outcome may be related to the use of antipsychotics, antidepressants, and anticonvulsants, which some people with severe autism disorders take. These drugs have also been linked to xerostomia, changes in the physical properties of saliva that affect flow rate and buffering capacity, and dental caries ⁽⁷⁾ .

- **Oral Health Status**

Oral care in autism syndrome is mostly dependent on the parental and caregiving support roles. Our finding of relative association of oral health conditions with disease severity revealed that milder forms of autism were associated with lower scores of S-OHI. The main reason of current results is that children with autism have a physical disability that often precludes them from engaging in self-oral hygiene behaviors such as brushing their teeth, and this condition getting worse with increasing disease severity. Moreover, the efforts to help children with ASD adopt proper oral hygiene practices can be

stressful regarding the time and energy required⁽²²⁾. If an autistic person's impairment is slight to moderate, they can usually be educated, which indicates that habit development and repeated instruction can help them maintain better dental hygiene.

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Knowledge and attitude toward fake braces in Iraqi population. A cross sectional study

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Abstract

Orthodontic braces are now seen as status symbols and fashion statements in certain regions globally. Despite their popularity in the realm of wealth and style, there is a lack of information regarding how these fashionable braces impact different facets of individuals' quality of life. Hence, our objective was to examine the influence of fashion braces on the quality of life related to. Knowledge and attitude of people. This study exploring the knowledge and attitudes of Iraqi people towards fake orthodontic appliance, the sample size 332 participants, A cross-sectional investigation was conducted by gathering data through a Google Form questionnaire distributed in Iraq through different social media channels over a span of 5 months. The assessment of Oral Health-Related Quality of Life was done using the validated Arabic version of the Oral Health Impact Profile questionnaire. Results show a notable portion of participants inclined to reject fake orthodontic braces, suggesting a substantial understanding and awareness of dental science and positive oral hygiene practices among the included individuals.

Keywords: Orthodontic appliance, Fake braces, Cross sectional study

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Introduction

Orthodontic treatment offers the benefit of correcting malocclusion and addressing disharmonious jaw positioning, resulting in improved oral function and enhanced tooth protection. During the course of orthodontic therapy, patients are fitted with a fixed orthodontic device. A fixed orthodontic appliance refers to a non-removable device or equipment that is affixed to the teeth, enabling various types of tooth movement. Due to its effectiveness, fixed orthodontic appliances are commonly favored by both patients and orthodontists. Nevertheless, the consequences of malfunctions in fixed appliances are considerably more significant compared to those of detachable appliances (1, 2). There are several issues commonly associated with fixed appliances, including debonded brackets, misplaced or loose bands, slipping or shattered archwires, and instances of trauma. Currently, counterfeit orthodontic braces are regarded as a prominent symbol of fashion. The phrase "fake" is commonly understood to refer to something that lacks truthfulness, authenticity, or genuineness, and is instead artificial in nature (3). In the domain of dentistry, counterfeit braces refer to orthodontic appliances that are frequently marketed on the internet or offered at significantly reduced prices by unaccredited vendors. Frequently, these devices are self-repaired or installed by an individual lacking the necessary qualifications. Prior to the application of counterfeit braces, a comprehensive dental examination, including the absence of appropriate investigations such as radiography or study models, was not conducted (4). In the absence of diligent oversight from dental professionals, engaging in this behavior has the potential to result in dental cavities and gum bleeding, hence exacerbating the individual's facial profile. There have been documented instances of severe consequences associated with the use of counterfeit braces, as evidenced by the unfortunate fatalities of two adolescents residing in Thailand. These individuals succumbed to infections that arose as a direct result of their utilization of these fraudulent orthodontic devices (5). There are two frequently accessible varieties of counterfeit braces, namely active and passive. The installation of counterfeit braces involves the application of etching and bonding processes by unqualified

personnel, who affix functional imitation braces onto the teeth. While the passive variant of counterfeit orthodontic braces is not affixed to the teeth, it is worth noting that fake braces can be worn autonomously with relative ease. This implies that it is only suitable for a restricted duration (6). Our aim was to investigate how fashion braces impact people's quality of life in terms of their knowledge and attitudes.

Materials and methods.

The study employed a cross-sectional research design and was carried out subsequent to obtaining ethical approval from the ethical committee of the Department of Dentistry at Al-Hadi University College.

The process of data collecting was carried out by employing a self-administered questionnaire. The study concluded with a final sample size of 322 individuals, The ethical approval obtained from the ethical committee in the dentistry department Al hadi university college in 14-12-2023 numbering HD231202. The research employed survey items that were adapted from a prior study (7) and subsequently translated from English to Arabic in order to improve understanding among the participants of the study. The research team utilized a Google form to administer the questions to participants, which were afterwards circulated around college students in order to achieve a broader dissemination of the questionnaire. The dataset comprised information pertaining to each patient, including their date of birth and educational backgrounds. Responses falling outside the predetermined age range of the study were omitted from the analysis. The investigation was carried out over the period spanning from May 2023 to September 2023. The preservation of data privacy and confidentiality was effectively maintained by the utilization of coding techniques for the questionnaire and the establishment of secure storage measures.

Statistic:

The statistical analyses of the study were performed using the SPSS 25.0 software, developed by IBM Inc. in Chicago, IL, USA. The descriptive metrics were presented in a tabular format, encompassing frequency, percentage, and mean values. The assessment of the conformity of the questionnaire scores to a normal distribution was conducted using the one-sample Kolmogorov-Smirnov test. The frequency test was utilized to investigate the relationships between categorical variables. Throughout the investigation, a predetermined significance level of 5% was established to accommodate the potential occurrence of a type-I mistake. The assessment of statistical significance involved comparing the calculated p-value with a predetermined threshold of 0.05.

Results:

The current study had a cohort of 332 people who willingly completed the questionnaire and were later included in the final analysis. The results collected indicate a statistically significant difference across all sections of the questionnaire ($p < 0.05$) as shown in Table 1.

Table 1. Distribution of the participant answers

Are you aware of Do-It-Yourself (DIY) braces?	N	Mean	Std. Deviation	Std. Error Mean
Do you know the difference between actual braces and fake braces?	332	1.21	0.811	0.045
Do you think fake braces can harm you?	332	0.89	0.920	0.050
Is it essential to stop people from using fake braces?	332	1.28	0.818	0.045
Do you want to get braces?	332	1.17	0.883	0.048

Have you consulted anybody before wearing braces?	332	0.14	0.489	0.027
Are you wearing/ Have you worn any braces before?	332	0.57	0.811	0.044
Do you need orthodontic treatment	332	1.14	0.871	0.048

In relation to the treatment, a majority of the participants (56.6%, n = 188) acknowledged the necessity for it, while only 25% of the participants responded negatively. A minor percentage of the participants (18.4%) remained indecisive, as indicated in Table 2.

Table 2: Treatment Need

		<i>Do you need orthodontic treatment</i>			
		Frequency	Percent	Valid Percent	Cumulative Percent
<i>Valid</i>	No	83	25.0	25.0	25.0
	Maybe	61	18.4	18.4	43.4
	Yes	188	56.6	56.6	100.0
	Total	332	100.0	100.0	

The findings indicate that a mere 46.1% of the participants had prior experience with orthodontic treatment, but the majority, comprising 53.9% of the participants, had no previous history of such treatment, as illustrated in Table 3.

Table 3: Treatment History

		<i>Are you wearing/ Have you worn any braces before?</i>			
		Frequency	Percent	Valid Percent	Cumulative Percent
<i>Valid</i>	No	179	53.9	53.9	53.9
	Yes	153	46.1	46.1	100.0
	Total	332	100.0	100.0	

In relation to the comprehension of the significance of the orthodontist's role in the initiation of treatment (attachment fixation) or during treatment, a majority of the participants,

accounting for 63.9% (n = 212), responded negatively to the question. Only 20.5% of the participants answered affirmatively, with the remaining 15.7% remaining undecided, as indicated in Table 4.

Table 4: Understanding of orthodontist role

Fixing braces don't require an orthodontist, do you agree?

		Frequency	Percent	Valid Percent	Cumulative Percent
<i>Valid</i>	No	212	63.9	63.9	63.9
	Maybe	52	15.7	15.7	79.5
	Yes	68	20.5	20.5	100.0
	Total	332	100.0	100.0	

When surveying the test group on their understanding of the notion of fake braces and comparing them to actual braces, it was found that 48.2% of the participants indicated that they were unaware of the distinction, while only 37.3% claimed to possess knowledge differentiating between fake and actual braces, as illustrated in Table 5.

Table 5: Knowledge about fake braces

Do you know the difference between actual braces and fake braces?

		Frequency	Percent	Valid Percent	Cumulative Percent
<i>Valid</i>	No	160	48.2	48.2	48.2
	Maybe	48	14.5	14.5	62.7
	Yes	124	37.3	37.3	100.0
	Total	332	100.0	100.0	

In the section pertaining to the inquiry regarding the inclination towards wearing fake braces, the overwhelming majority of participants, accounting for 91.3% of the total sample, explicitly expressed their disapproval of such practice. A small proportion, comprising 5.7% of respondents, indicated agreement with the

aforementioned statement, while a mere 3% of participants remained undecided, as illustrated in Table 6.

Table 6: Desire for fake braces.

		<i>Do you want to get fake braces?</i>			
		Frequency	Percent	Valid Percent	Cumulative Percent
<i>Valid</i>	No	303	91.3	91.3	91.3
	Maybe	10	3.0	3.0	94.3
	Yes	19	5.7	5.7	100.0
	Total	332	100.0	100.0	

With respect to awareness and understanding of the adverse effects associated with fake braces, just over 50% of the participants indicated that they possess knowledge of the negative effects of fake braces. According to the data presented in Table 6, 51.5% of respondents expressed a lack of unfavorable attitudes towards this particular application, while 23.2% also indicated a similar sentiment. Additionally, 25.3% of participants remained undecided about their stance as shown in table 7.

Table 7: Knowledge of fake braces effect.

		<i>Do you think fake braces can harm you?</i>			
		Frequency	Percent	Valid Percent	Cumulative Percent
<i>Valid</i>	No	77	23.2	23.2	23.2
	Maybe	84	25.3	25.3	48.5
	Yes	171	51.5	51.5	100.0
	Total	332	100.0	100.0	

In relation to the participants' perspective on fake braces, it was found that 48.5% expressed the opinion that this form of application should be discontinued. Conversely, 31.9% of the participants said that fake braces should not be discontinued, while 19.6% remained undecided, as indicated in Table 8.

Table 8: Attitude towards fake braces

Is it essential to stop people from using fake braces?

		Frequency	Percent	Valid Percent	Cumulative Percent
<i>Valid</i>	No	106	31.9	31.9	31.9
	Maybe	65	19.6	19.6	51.5
	Yes	161	48.5	48.5	100.0
	Total	332	100.0	100.0	

Discussion

The phenomenon of fake braces, also known as fake orthodontic appliances, has gained popularity among young individuals, particularly teenagers, as a form of accessory. These fake braces involve the bonding of orthodontic brackets to the teeth, but they lack any functional purpose as genuine orthodontic appliances. It is worth noting that such individuals often engage in this practice without seeking proper consultation from a qualified orthodontist or dentist. The utilization of counterfeit braces can result in various adverse effects, primarily attributed to the usage of non-approved adhesive materials or the incorporation of non-standardized materials in the construction of the brackets. These factors contribute to the release of toxic substances within the mouth cavity, thereby impacting the overall health of people.(8).

The objective of this study was to assess the level of awareness and attitude among the Iraqi population regarding the use of this particular application. The study also aimed to determine the extent to which this application has been adopted within the Iraqi community. Previous research has indicated that individuals in their youth, typically between the ages of 15 and 30, are more likely to be recipients of fake braces (9). Therefore, our study focused on participants within the age range of 18 to 30 years.

The analysis of the initial section of the questionnaire in our study focused on the assessment of treatment realization and treatment necessity. It was found that a majority of the participants, specifically 56.65%, expressed a requirement for orthodontic treatment. This finding indicates a commendable level of dental education and awareness regarding malocclusion within the

examined community. These results are consistent with previous research, which has also observed a growing demand for orthodontic treatment among adult patients in dental practices. (10, 11).

In the section pertaining to treatment desire in our study, the findings indicate that a majority of the participants expressed reluctance towards undergoing orthodontic treatment. This contrasts with the findings reported by Zhang et al., who observed that adult patients' motivation for seeking orthodontic treatment primarily stems from their desire to improve esthetics and occlusal function, indicating a favorable inclination towards receiving treatment. (12).

The study revealed that a significant proportion of the participants acknowledged and valued the role of orthodontists in dental treatment. This finding suggests that the community under investigation possesses a commendable level of dental education and demonstrates a satisfactory level of awareness regarding dental issues and their corresponding treatments. This observation is consistent with the findings of Sri et al., who reported that a substantial majority of patients (specifically 79.6%) exhibited knowledge regarding the orthodontists' competence in effectively aligning teeth. Moreover, a significant percentage, specifically 73.5%, maintain the perspective that the proper arrangement of teeth plays a role in augmenting facial aesthetics. Additionally, according to Dalessandri et al., a substantial majority (97.5%) of individuals undergoing orthodontic treatment expressed a positive attitude towards telemonitoring. This indicates that they hold a favorable opinion regarding the involvement of orthodontists in their treatment. Similarly, Kouguchi et al. found that approximately 90–95% of patients and parents reported satisfaction with orthodontic treatment, indicating a positive perception of the role played by orthodontists (13-15).

In relation to the understanding of fake braces or do-it-yourself braces (DIY), the findings of the study indicate that a significant proportion of participants, specifically 48.2%, lack knowledge

about this concept and are unaware of its existence. Conversely, only 37% of participants demonstrate awareness of fake braces, while 14.5% possess some level of familiarity with the concept. These results suggest that the prevalence of fake braces within the Iraqi community is not as widespread as in other countries worldwide. Previous research has also examined knowledge and treatment preferences based on gender, revealing a higher inclination towards seeking treatment among females. This can be attributed to the fact that females tend to place greater emphasis on their dental appearance and aesthetic concerns (16, 17).

Previous studies have indicated that adolescents exhibit a tendency to adorn themselves with counterfeit orthodontic appliances, as these products are seen as symbolic of wealth and the capacity to indulge in conspicuous consumption (4). According to a study conducted by Hassan et al, a considerable proportion of adolescents living in the Klang Valley area exhibit a tendency to embrace counterfeit orthodontic braces. This inclination is mostly motivated by their desire for improved aesthetic attractiveness. (18), In contrast, our research findings reveal that a significant majority of the research population, approximately 91.3%, expresses a strong aversion to the utilization of fake braces. This high percentage suggests a commendable degree of dental consciousness within Iraqi society, particularly against the use of orthodontic appliances that are not administered by licensed dental professionals.

The utilization of counterfeit orthodontic braces might lead to various outcomes, including but not limited to hemorrhaging, significant dental overcrowding, incongruity in skeletal patterns, and impairment of nerve function.(19). In previous studies, participants had diverse findings on the impact of wearing counterfeit braces. Some individuals reported positive changes in their dental alignment, while others experienced no significant alterations or even detrimental consequences. (18), The findings of our survey indicate that 51.5% of the participants demonstrate awareness of the detrimental impact of counterfeit braces on dental health, suggesting a commendable level of oral health consciousness.

In relation to the perception of counterfeit braces, the findings derived from our study reveal that 48.5% of the participants hold the belief that this practice should be discontinued. Conversely, 31.9% of the participants expressed the view that it is not necessary to halt this application. Furthermore, 19.6% of the participants remained undecided on the matter. It is worth noting that another study yielded diverse outcomes concerning the impact of wearing fake braces. Some respondents reported positive improvements in their dental alignment, while others observed no significant changes or even experienced negative consequences. (20). In a separate research investigation examining the extent of counterfeit braces awareness among university students in Malaysia, the results indicated that a meager 35% of the participants exhibited understanding of the potential adverse ramifications linked to the utilization of counterfeit braces (5).

Conclusion

The current study is utilizing the Health Belief Model for the first time to examine the factors that influence the utilization of fashion braces among the Iraqi population. The findings of our study indicate that a significant proportion of the participants exhibited a propensity to decline the utilization of fake orthodontic braces. This outcome suggests a noteworthy level of comprehension and awareness pertaining to dental science and favourable oral hygiene practices among the individuals included.

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Management of Medically compromised patients During orthodontic Treatment. A review of literatures

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Abstract

In contemporary times, there has been a noticeable surge in the need for orthodontic treatment among individuals. Concurrently, the need for orthodontic treatment among patients with medical disorders also increased. The observed phenomenon can be ascribed to the progressions in medical treatment, which have resulted in an expanded populace of persons with enduring diseases and impairments experiencing extended lifespans. In most instances, orthodontic intervention is generally not considered contraindicated for individuals with these diseases, unless the problem is not well managed.

The objective of this article is to provide a comprehensive analysis of various medical disorders and their corresponding orthodontic issues.

Key Words: Orthodontics, Review, Medically Compromised Patients

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Introduction

In recent years, there has been an observable increase in orthodontic treatment demand. Simultaneously, the demand for orthodontic treatment among individuals with medical conditions has been steadily growing. This can be attributed to advancements in medical care, which have led to a larger population of individuals with chronic illnesses and disabilities living longer lives. The resolution of orthodontic problems is often feasible; nevertheless, it often requires the implementation of specific interventions (1).

In the majority of cases, orthodontic intervention is typically permeated for individuals with these conditions, except uncontrolled cases. It is important to note that the tissues' capacity to effectively react to orthodontic therapy may be reduced during the active or acute phase of the condition (2). One commonly seen aggravating factor in persons with medical conditions is a diminished sensitivity to infection. Therefore, it is crucial for orthodontists to avoid inducing irritation to the mucosal tissues and thoroughly evaluate the condition of periodontal health. Additionally, they should remain cautious regarding potential negative consequences linked to pharmacological interventions, such as xerostomia and compromised immunological response (3). Denying the provision of orthodontic treatment only on the basis of a serious medical condition may be deemed inappropriate, since such therapy has the potential to have favorable results. The majority of individuals have the potential to undergo successful orthodontic treatment with appropriate care (4).

Infective endocarditis

This disorder is characterized by the inflammation of the endothelium, which is the inner lining of the heart and blood vessels with the capacity to affect many surfaces that are covered by endothelial cells, such as the ventricles, atria, and pulmonary arteries with the cardiac valves have a specific susceptibility (5). The correlation between infective endocarditis and orthodontics has not been fully elucidated (6). The committee of the American Heart Association determined that there is no substantial risk of

bacteraemia associated with the manipulation of orthodontic appliances. Therefore, it is not advisable to routinely administer prophylaxis for the purpose of adjusting detachable or fixed orthodontic appliances or bonding orthodontic brackets (7). It is advisable to administer prophylaxis for orthodontic procedures that have the potential to cause perforation of the oral mucosa or manipulation of gingival tissues. The procedures encompassed in this category consist of the implantation and removal of orthodontic bands, interproximal reduction, as well as the insertion of temporary anchorage devices (8).

In order to minimize any adverse effect during orthodontic treatment in patient with infective endocarditis, it is advisable to engage in consultation with the patient's physician in order to assess the amount of risk and establish an appropriate antibiotic prescription in accordance with the planned orthodontic treatment (2). It is imperative to adhere to a rigorous oral hygiene protocol during the course of treatment. In addition, it is advisable to go for bonded brackets as opposed to bands, elastomeric ties are considered to be a more favorable option compared to ligature ties for the purpose of securing arch wires in position. It is recommended that any sharp edges, including those found on tubes and hooks, be appropriately softened and polished. It is advisable to eliminate and cleanse any surplus adhesives. It is recommended to refrain from using fixed acrylic equipment, such as Nance and acrylic fast maxillary expanders (9).

Thrombocytopenia

This disorder arises as a consequence of a decrease in the number of blood platelets, which is caused by the disruption of bone marrow function. The occurrence of this condition can be attributed to the presence of cancer in the bone marrow, such as leukaemia, or the manifestation of an autoimmune disorder, such as aplastic anaemia (10).

The occurrence of spontaneous gingival bleeding, even in individuals who maintain appropriate dental hygiene practices, is seen as an early indication of leukemia (10). The orthodontist may potentially be the initial professional to identify the condition and

is advised to recommend the patient to a specialist for consultation (11). The administration of chemotherapy or radiotherapy for the treatment of leukemia has been observed to result in a decrease in their growth rate. However, it has been observed that this growth retardation is temporary and normal development patterns are typically restored following the completion of treatment. Consequently, several orthodontic issues may arise, such as mandibular retrognathism, a decrease in the vertical facial dimension, diminished height of alveolar processes, anomalies in development of, the presence of V-shaped roots, and the occurrence of microdontia (1, 12).

If the diagnosis of leukemia is confirmed before to commencing orthodontic treatment, it is recommended to postpone the orthodontic treatment until after the completion of chemotherapy and a minimum of 2 years following transplantation of the bone marrow in order to minimize the risk of malignancy relapse and discontinue the use of immune-suppressive medications (1, 10). If the diagnosis is confirmed during the course of orthodontic treatment, all current orthodontic appliances should be removed to prevent complications such as bleeding, irritation, or infection with removable retainer be employed which is well tolerated by the patient (11).

The recommencement of orthodontic treatment can occur once all necessary therapy has been completed, and the patient has achieved a minimum of two years without any adverse events [8]. During this phase, orthodontic mechanics should prioritize simplicity and employ gentle force to mitigate the potential for root resorption. The orthodontist must acknowledge the need for compromised outcomes and focus only on treating the maxilla, as the mandible is susceptible to osteo-radio-necrosis (ORN) due to its restricted blood supply (12, 13).

Clear aligners have been identified as a potentially optimal treatment option for these patients. It is advisable to utilize orthodontic appliances that do not cause irritation to minimize the potential for mucosal irritation, this can be enhanced by employing silicon and wax to provide further protection to the mucosal lining.

Maintaining a rigorous oral hygiene regimen is imperative (12, 13). Additionally, it is important to use caution when trimming transparent aligners in order to prevent any potential gingival irritation.

Haemophilia

Haemophilia is a hereditary bleeding disorder characterized by the deficiency or dysfunction of clotting. This disorder arises due to a deficit in one of the components involved in the process of blood coagulation. Haemophilia A and B are characterized by deficiencies in factor VIII and IX, respectively, Von Willebrand's illness is attributed to a genetic abnormality affecting Von Willebrand's factor (11).

It is important to adhere to rigorous oral hygiene practices in order to maintain optimal oral health. Additionally, it is crucial to prevent any potential mucosal injury that may arise from the actions of the orthodontist or the use of orthodontic equipment. It is necessary to ensure that sharp edges are appropriately softened, and any surplus wires are trimmed. According to a previous study self-ligating brackets are considered to be more favourable compared to traditional brackets. It is recommended that arch wires be ligated using elastomeric ligatures instead of wire ligatures (14).

The duration of treatment should be minimized. Removable appliances have been found to be associated with a higher incidence of gingival irritation. Therefore, it is recommended to use fixed appliances (14). It is recommended to consider a non-extraction treatment approach and bonding over banding, if feasible (15). The use of non-steroidal anti-inflammatory medicines (NSAIDs) for pain management is not advised due to their potential to exacerbate bleeding tendencies, acetaminophen has been identified as a comparatively safer option (16). In order to reduce the risk of soft tissue injury, it is recommended that during the process of bonding, it is advisable to place a saliva ejector on a gauze that is positioned on the floor of the oral cavity (16).

Sickle cell anaemia

Sickle cell anaemia is a genetic disorder characterized by abnormal hemoglobin molecules, resulting in the deformation of red blood cells into a sickle shape (17). Also the reduction in flexibility and impaired capacity to traverse microcirculation is seen which results in an elevation in blood viscosity, causing the obstruction of capillaries, constriction of blood flow to vital organs, and ultimately resulting in the manifestation of discomfort, ischemia, and tissue damage (18).

Several orthodontic abnormalities can be identified, such as delayed tooth eruption, class II malocclusion, increased overjet and overbite, prognathic midface, prognathic maxilla, retrognathic mandible, increased vertical dimension, and convex profile (17, 19).

Orthodontic therapy is not considered to be contraindicated. It is recommended that visits be arranged during the early morning hours, and it is preferable for the patient to be in a chronic phase of the condition. It is advisable to limit emotional stress (17). If feasible, it is recommended to choose for a non-extraction treatment strategy (20).

In order to facilitate the restoration of local microcirculation, it is recommended that rest intervals be incorporated into the treatment plan following activations (20). Additionally, it is important to prevent bleeding during orthodontic operations. If additional anchoring is required, it is preferable to use extra-oral anchorage rather than temporary anchorage devices (TADs) or mini-plates. Furthermore, it is crucial to use caution while managing the applied forces (21).

Thalassemia

Thalassemia is characterized by a decrease in the production of α or β -polypeptide chains, which are essential for the formation of the typical hemoglobin complex known as HbA. The aforementioned phenomenon leads to a decrease in the concentration of hemoglobin inside erythrocytes, resulting in the development of anaemia (22). β -Thalassemia major, often known as Cooley's anaemia, is widely recognized as the most severe form of the condition. Orthodontic

issues encompass several conditions such as skeletal class II malocclusion, diminished dental arch dimensions, decreased tooth size, everted lips, spacing and flaring of anterior teeth, open bite, protrusion, maxillary enlargement, and increased overjet (3, 23, 24). The maxillary bone marrow experiences a greater degree of hyperplasia compared to the mandible, resulting in the characteristic appearance known as "chipmunk face" (25).

Orthodontic diagnosis and interceptive therapy are recommended to start at an early age in order to address any orthodontic issues that may arise (26). Functional appliances and extra-oral appliances have been employed in the management of dentofacial issues (24). When utilizing high pull headgear, it is advisable to administer a moderate level of power in brief durations (24, 27).

Diabetes mellitus (DM)

Diabetes mellitus (DM) is a medical condition characterized by a chronic elevation in blood glucose levels (hyperglycemia) caused by a deficiency in insulin. There are two main types of DM: Type 1, which is characterized by a lack of insulin secretion, and Type 2, which is characterized by insulin resistance and insufficient insulin production (28).

Orthodontic treatment is contraindicated in uncontrolled Diabetes mellitus does but not present a contraindication for those with well-managed diabetes mellitus. Therefore, it is necessary to engage in contact with the patient's physician in order to ascertain the patient's diabetic mellitus (DM) state both before to and during treatment (14). It is recommended that appointments be scheduled for early morning, and the patient is advised to consume a regular breakfast and take their customary medication before the visit (1).

Oral hygiene must be diligently upheld and consistently reinforced throughout each patient visit at the dental clinic. Furthermore, it is important to closely evaluate any decline in dental health during each visit (28). It is advisable to include a periodontist, particularly when dealing with adult patients, in order to assess the periodontal status before to and throughout orthodontic treatment (28).

Thyroid disorders

Hyperthyroidism arises due to dysregulated production of thyroid hormones. On the other hand, hypothyroidism arises due to a decrease in the functioning of the thyroid gland and subsequent reduction in the synthesis of its hormones. Orthodontic complications associated with hyperthyroidism encompass heightened bone remodelling and expedited dental emergence. Orthodontic issues associated with hypothyroidism encompass anterior open bite, macroglossia, delayed tooth eruption, impaction of the mandibular second molars, and reduced bone turnover (3, 29).

It is recommended that a stress reduction program be adopted in cases with hyperthyroidism (30). Additionally, it is advised that analgesic drugs be chosen with caution while treating individuals with hyperthyroidism. Nonsteroidal anti-inflammatory drugs (NSAIDs) and aspirin are not advised and it is preferable to provide other analgesic (31). Individuals with hyperthyroidism exhibit a higher degree of tooth movement (3). Conversely, individuals with hypothyroidism are more prone to an elevated risk of root resorption (3).

Epilepsy

Epilepsy is the prevailing and prevalent chronic neurological illness of a serious kind which is distinguished by the occurrence of recurrent seizures (32). The lifetime incidence rate of epilepsy ranges from 2% to 5%. The prevalence of this condition is estimated to affect around 0.5-2% of the population (1). During seizures, it is possible for injuries to manifest in many areas such as the tongue, buccal mucosa, facial fractures, avulsion, luxation or fractures of teeth, and subluxation of the temporomandibular joint (33). Both the etiology and the therapeutic approach of a medical issue might have an impact on oral health.

It is imperative for the orthodontist to guarantee that the patient is consistently receiving comprehensive and stringent preventive dental treatment in order to mitigate or reduce the occurrence of dental diseases. The most prevalent consequence of anti-epileptic

medicine is gingival overgrowth, which is commonly connected with the use of phenytoin. The procedure of gingivectomy is advised for the purpose of eliminating any hyperplastic tissue that may impede both aesthetic and functional aspects. It is advisable to exercise caution while utilizing removable equipment due to the potential risk of dislodgement during a seizure (34).

Renal Disorders

Chronic renal failure is the prevailing renal ailment frequently encountered by orthodontists. Chronic renal failure refers to a gradual and permanent deterioration in the functioning of the kidneys. As the quantity of operational units inside the kidney, namely the nephrons, decreases, there is a corresponding decline in the glomerular filtration rate. This reduction in filtration rate is accompanied by an increase in blood levels of urea (35, 36). Approximately 90%, of individuals diagnosed with renal insufficiency have oral manifestations in both soft and hard tissues. These manifestations might arise as a direct consequence of the disease or as a result of the medication administered to manage the condition.

It is recommended to refrain from employing extraction protocols and temporary anchoring devices due to the utilization of bisphosphonates has the potential to impact orthodontic therapy through many mechanisms, including the potential delay in tooth eruption, hindered tooth movement, poor bone healing, and the development of bisphosphonate-induced osteonecrosis of the jaws (37, 38).

Osteoporosis

Osteoporosis is a chronic, systemic, degenerative condition that is defined by a reduction in bone mass, a degradation of the microarchitecture of the bone, and a resulting increase in bone fragility (39). Hence, it is imperative for orthodontic therapy to encompass the assessment of issues such as bone resorption, instability in retaining the corrected position, and temporomandibular dysfunction (40). The examination of problems connected with medicine is also crucial. Nevertheless, the omission

of these medicines in orthodontic therapy for individuals with osteoporosis may lead to the resorption of alveolar bone and perhaps tooth roots (41). The utilization of bisphosphonates has the potential to impact orthodontic therapy through many mechanisms, including the postponement of tooth eruption, hindered tooth movement, compromised bone healing, and the development of bisphosphonate-induced osteonecrosis of the jaws (37). It is recommended to refrain from utilizing extraction protocols and temporary anchoring devices (38).

Liver Diseases

Liver diseases are prevalent in the population and can be categorized into two main types: acute and chronic. Acute liver diseases are characterized by a swift resolution and complete restoration of the liver's structure and function once the underlying cause is removed. On the other hand, chronic liver diseases are characterized by ongoing damage to the liver cells, leading to progressively impaired organ function (42).

Liver disease can lead to decreased levels of coagulation factors in the plasma. In cases when extraction is necessary, it is imperative to exercise caution due to the heightened risk of bleeding. In such instances, the administration of fresh frozen plasma infusion may be deemed appropriate. In the event that a patient presents with many or severe coagulopathies, it may be necessary to conduct advanced oral surgical operations or any dental treatments that have the potential to induce bleeding inside a hospital environment (43, 44).

Down Syndrome

Down syndrome is a prevalent genetic abnormality that affects around 1 in every 800-1000 live births (45). The main skeletal anomaly that impacts the orofacial structures in Down syndrome is a deficiency in the growth of the midfacial area. The nasal bridge, midface bones, and maxilla are comparatively diminutive in size. Often, this leads to a prognathic class III occlusal connection, which contributes to the development of an open bite (46).

People with Down syndrome experience a delayed eruption pattern. Typically, there is a dental condition including an abnormality in the enamel of the teeth. Congenital absence of teeth, known as hypodontia, is a common occurrence. Additionally, individuals may exhibit atypical tooth morphology. Approximately 40-60% of newborns with Down syndrome have congenital cardiac abnormalities. It is recommended to administer antibiotic prophylaxis to children with heart abnormalities who are undergoing dental treatments in order to prevent subacute bacterial endocarditis (47). Seizures manifest in around 5-10% of children diagnosed with Down syndrome. Generalized tonic-clonic seizures are the most prevalent. The diagnosis and treatment of seizures are identical in children with and without Down syndrome (48).

It is recommended to utilize quick-set materials with enjoyable tastes while taking impressions, since they can help decrease the likelihood of triggering the more sensitive gag reflex sometimes observed in persons with Down syndrome. High-memory wires provide a greater duration of activation gap between sessions. Self-ligating brackets facilitate a more patient-friendly activation appointment.

Autism

Autistic disorder is a pervasive developmental disorder characterized by abnormal development of social skills (such as withdrawal and lack of interest in peers), limitations in the use of interactive language (both speech and nonverbal communication), and sensorimotor deficits (inconsistent responses to environmental stimuli)(49).

The primary obstacle faced by the orthodontic team may lie in the diminished capacity of autistic patients to effectively communicate and establish connections with others. Initial appointments focus on boosting the patient's self-assurance and assessing the highest level of adherence that may be attained. Simultaneously, an assessment may be done to choose the most appropriate approach (behaviour control, sedation, or general anaesthesia) for performing complex operations, such as taking impressions or bonding brackets (50).

The range of techniques employed to manage pain and anxiety during orthodontic treatment of autistic children can be categorized into conscious methods (such as oral, intramuscular, inhalation with nitrous oxide and oxygen, and intravenous sedation) and unconscious methods, which encompass intravenous or inhalation deep sedation and general anaesthesia with endotracheal intubation (51). Jackson was the initial proponent of utilizing genetic algorithms for the placement of orthodontic bands (52).

The patient should receive treatment in a secluded and soundproofed individual operatory, rather than an open-bay setup, with little ornamentation and subdued lighting. Techniques such as tell-show-do, voice modulation, and positive reinforcement have positive results when used with youngsters (53, 54).

The efficacy of reinforcers may differ among children diagnosed with autism spectrum disorder (ASD)(55). Some children may get reinforcement from common and suitable reinforcers such as praise, stickers, or video clips, whereas others may be encouraged by engaging in self-stimulatory behaviours (e.g., hand flapping or self-talk) or fixation on uncommon things. The individual's name is Hung DW. Utilizing self-stimulation as a kind of positive reinforcement for children with autism (56).

Conclusion

Patients with medical disorders that may affect their health can get care and treatment at the orthodontic clinic, provided that their symptoms are effectively managed. Prior to initiating orthodontic treatment, it is crucial for individuals to engage in effective communication with their healthcare providers, including their physicians. It is important for orthodontists and their personnel to possess fundamental understanding of these disorders and be adequately equipped to manage any unforeseen situations that may arise during orthodontic sessions.

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Climate Change Mitigation and Adaptation: A Literature Review

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Abstract

Climate change is a global challenge that poses significant risks to ecosystems, societies, and economies. To address this challenge, two key strategies have emerged: climate change mitigation and adaptation. Mitigation encompasses the endeavors and steps undertaken to diminish or avert the severity of adverse impacts caused by human activities on the environment and climate change such as mitigation involves reducing the release of greenhouse gas emissions to constrain the magnitude of climate change, while adaptation aims to minimize vulnerability and build resilience to the impacts of climate change. This manuscript offers a comprehensive examination of strategies pertaining to the mitigation and adaptation of climate change and explores the interconnectedness between them. It emphasizes the significance of global cooperation and collaborative efforts in addressing this worldwide issue.

Keywords: Climate Change; Mitigation; Adaptation; Renewable Energy; Iraq

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Introduction

Climate change is a multifaceted and pressing global concern with profound implications for the Earth and its inhabitants. The scientific consensus is unequivocal: human activities, specifically the combustion of fossil fuels and alterations in land use, are the primary drivers behind the surge in greenhouse gas emissions, resulting in an unparalleled escalation in global temperatures. (Masson-Delmotte, 2022). This, in turn, is causing a wide range of impacts, such as heatwaves, droughts, escalating sea levels and the escalation in both the frequency and intensity of extreme weather events.

To address the global challenge of climate change, two primary approaches have emerged: mitigation and adaptation. Mitigation refers to efforts aimed at reducing greenhouse gas emissions and stabilizing or decreasing their concentration in the atmosphere. This includes shifting towards renewable energy sources, enhancing energy efficiency, advocating for sustainable transportation, and embracing sustainable land-use practices (Nolon, 2011). Mitigation measures are vital to limit the extent of climate change and achieve the long-term goal of ensuring that the global temperature increase remains significantly below 2 degrees Celsius above pre-industrial levels, as stipulated in the Paris Agreement (Falkner, 2016).

Adaptation, on the other hand, recognizes that some extent of climate change is already inevitable due to past and ongoing emissions. Adaptation entails adapting to the effects of climate change to mitigate vulnerability and enhance resilience. This includes developing strategies to protect vulnerable communities, infrastructure, and ecosystems from the impacts of climate change. Adaptation measures may include building climate-resilient infrastructure, implementing early warning systems, improving water management, and enhancing agricultural practices (Sikka et al., 2022 and Srivastav et al., 2021).

While mitigation and adaptation are distinct strategies, they are interconnected and mutually reinforcing. Mitigation efforts can help reduce the severity and frequency of climate change impacts, thereby reducing the need for adaptation measures. Conversely,

adaptation is essential to address the immediate and unavoidable impacts of climate change, ensuring the well-being and sustainability of communities and ecosystems (Adger, 2010).

Mitigation and adaptation responses share the common purpose to mitigate the adverse effects of climate change on both human societies and ecosystems. However, they differ in various aspects, including their specific objectives, scope, required level of collaboration, and temporal considerations in addressing the complex relationship between human activities and global climate change. Duguma et al. 2014, established a clear differentiation between endeavors aimed at climate change adaptation and those focused on mitigation, Fig.1.

Tackling the global challenge of climate change necessitates global collaboration and collaborative efforts. No single country can tackle this issue alone. International agreements, such as the Paris Agreement, play a crucial role in fostering cooperation and setting common goals for both mitigation and adaptation efforts (Obergassel et al., 2015).

Furthermore, knowledge sharing, technology transfer, and financial support from developed to developing countries are essential for effective climate action (Pandey et al., 2022).

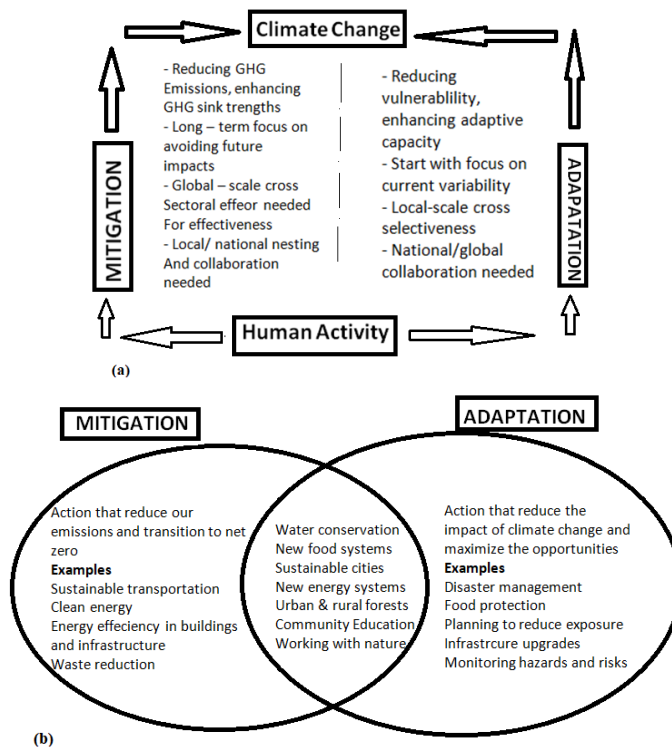


Fig. 1. (a) Climate change mitigation and adaptation (b) Climate Resilience.

Climate change and land

Climate change is altering land ecosystems around the world, posing significant challenges to food security, water availability, and biodiversity conservation. Human activities, such as deforestation, agricultural expansion, and unsustainable land management practices, have contributed to increased greenhouse gas emissions and land degradation, exacerbating the impacts of climate change on land (Smith et al., 2016).

Rising temperatures, changing precipitation patterns, and more frequent extreme weather events are affecting land productivity, soil health, and ecosystem functioning.

The effects of climate change on terrestrial environments are multifaceted and vary across regions. In some areas, higher temperatures and prolonged droughts are leading to reduced crop yields, increased pests and diseases, and increased water scarcity (Nikolaou et al., 2020).

Coastal areas are experiencing the consequences of sea-level rise, including saltwater intrusion into freshwater resources and increased vulnerability to storm surges (Williams, 2013 and Cazenave et al., 2014).

Mountainous regions are facing challenges such as reduced snowpack, changes in hydrological regimes, and increased risks of landslides (Beniston, 2003). Biodiversity loss and habitat degradation are also accelerated due to climate change, further compromising ecosystem services and resilience (Beniston, 2003). Adaptation strategies play a critical role in addressing the consequences of climate change on land. These strategies involve a range of actions to diminish susceptibility and bolster resilience. Sustainable land management practices, such as agroforestry, conservation agriculture, and integrated watershed management, can have a substantial impact on adapting to climate change while simultaneously contributing to mitigation efforts (Chandra et al., 2016). These practices promote soil conservation, enhance carbon sequestration, and enhance water utilization efficiency, thus reducing the pressure on terrain resources and enhancing ecosystem resilience.

However, adaptation efforts alone are insufficient to address the issue of climate change and its impact on land. Mitigation measures, aimed at reducing greenhouse gas emissions, are equally important. Reducing deforestation, promoting reforestation and afforestation, and transitioning to sustainable land-use practices can significantly contribute to alleviating the effects of climate change on land (Reyer et al., 2009 and Zomer et al., 2008). Integrated approaches that combine adaptation and mitigation strategies, instances like agriculture practices that are climate-smart and adaptation methods based on ecosystems, provide the potential for synergistic benefits and more sustainable outcomes (Chandra et al., 2016).

Addressing the complex challenges of climate change and land requires integrated approaches, strong governance, and international cooperation. Policies and incentives that promote sustainable land management, protect ecosystems, and support small-scale farmers are crucial in fostering resilience and reducing vulnerability (Cocklin et al., 2007). Strengthening the scientific

knowledge base, enhancing monitoring and early warning systems, and facilitating technology transfer are also essential for effective decision-making (Masson-Delmotte, 2022). Collaboration among stakeholders, including governments, civil society, indigenous peoples, and the private sector, is vital in implementing and scaling up climate change and land initiatives.

Impacts climate change on the earth's atmospheric composition

Climate change and the air are intricately linked, as changes in atmospheric composition and circulation patterns significantly influence global and regional climate dynamics. Human activities, particularly activities such as the combustion of fossil fuels and industrial operations have resulted in a rise in greenhouse gas emissions, leading to the buildup of carbon dioxide (CO₂), methane (CH₄), and other greenhouse gases in the atmosphere (Raupach, 2011). These gases trap heat radiating from the Earth's surface, causing the planet to warm-a phenomenon known as the greenhouse effect.

The warming of the planet due to increased greenhouse gas concentrations has wide-ranging impacts on the air and its composition. Rising temperatures can accelerate certain atmospheric chemical reactions, leading to the formation of ground-level ozone-a major component of air pollution that poses risks to human health and ecosystems (Yoro and Daramola, 2020). Changes in temperature and precipitation patterns can also affect the distribution of air pollutants, altering air quality and exacerbating respiratory and cardiovascular diseases (WHO, 2006). Furthermore, climate change impacts the occurrence and severity of extreme weather events, such as heatwaves, droughts, and storms, which have significant implications for air quality. Heatwaves and droughts can enhance the formation and persistence of air pollutants, as higher temperatures and reduced precipitation hinder the dispersion and removal of pollutants from the atmosphere (Lorenzini et al., 2014). Intense storms, on the other hand, can contribute to the transport of air pollutants over long distances, affecting air quality in regions far from the emission sources (WHO, 2018).

Mitigation of climate change plays a pivotal role in improving air quality and reducing the impacts of air pollution. By decreasing

the emissions of greenhouse gases, we can curtail the magnitude of climate change and alleviate its impacts on the atmosphere. Transitioning to clean and renewable energy sources, improving energy efficiency, and adopting sustainable transportation systems are essential steps in reducing emissions and improving air quality (Masson-Delmotte et al., 2022). Additionally, sustainable land-use practices, such as afforestation and reforestation, can enhance carbon sequestration, which helps mitigate climate change and improve air quality (Shukla et al., 2019).

Adaptation measures are also crucial for addressing the consequences of climate change on the atmosphere. Strengthening air pollution monitoring and early warning systems can help identify and respond to changing air quality conditions. Developing resilient infrastructure, such as green spaces and cooling centers, can mitigate the health risks associated with extreme heat events (WHO, 2018). Moreover, international collaboration and knowledge-sharing platforms are essential in addressing transboundary air pollution and promoting effective air quality management (Christensen, 2019).

Climate change and social equity and inclusivity

Climate change is not only reshaping the physical environment but also exacerbating social inequalities and injustices. The effects of climate change are disproportionately felt by marginalized communities, including low-income populations, indigenous peoples, women, children, and people of color (Venn, 2019 and Timmermann, 2021). These communities often have limited resources, social vulnerabilities, and limited access to decision-making processes, making them more susceptible to the adverse effects of climate change.

One of the key aspects of climate change and social equity is the unequal distribution of climate risks and vulnerabilities. Marginalized communities, particularly those living within coastal regions at low elevations, as well as in arid areas, and densely populated urban areas, are prone to heightened vulnerability regarding elevated exposure to extreme weather events, escalating sea levels, and increased risks of food and water insecurity (Neumann, 2015). Limited access to financial resources,

healthcare, infrastructure, and social support systems further exacerbates their vulnerability to climate impacts.

Moreover, climate change can perpetuate existing social inequalities and injustices. For instance, the displacement of communities due to sea-level rise or extreme weather events often leads to further marginalization and loss of livelihoods (Magadza, 2000). Similarly, the transition to low-carbon technologies and renewable energy sources may inadvertently exclude certain groups, unless deliberate efforts are made to ensure equitable access and benefits (Streimikiene, 2022 and Xin-Gang et al., 2023). Inadequate representation and engagement of communities in decision-making processes related to climate action can also reinforce existing power imbalances and limit the effectiveness of climate policies (Daniell et al., 2011).

Addressing climate change in a socially equitable and inclusive manner is essential for building a just and sustainable future. This requires recognizing and addressing the diverse needs, perspectives, and experiences of marginalized communities in climate action. It involves empowering marginalized groups by providing them with access to resources, information, and decision-making processes. It also entails integrating social justice principles into climate policies and programs, ensuring that vulnerable communities are not left behind (Paavola, 2008).

Inclusive climate action involves engaging marginalized communities as active participants in decision-making processes, from the local to the global level. It requires strengthening social networks, promoting community-based adaptation and strengthening resilience initiatives, and supporting the leadership of marginalized groups in climate governance (Butler, 2015 and Restrepo-Mieth et al., 2015). Additionally, investing in education, capacity building, and sustainable livelihood opportunities can improve the adaptive capability of marginalized communities and promote social equity in the face of climate change (Elasha et al., 2005).

Climate change adaptation: local solutions for a global problem

Climate change is a worldwide issue with localized impacts, necessitating adaptive measures that are tailored to the specific needs and vulnerabilities of communities. The impacts of climate change vary across regions, with some areas experiencing more frequent and severe extreme weather events, while others face challenges such as sea-level rise, drought, or changing precipitation patterns. Local solutions participate a vital role in climate change adaptation by harnessing the knowledge, resources, and capacities of communities to foster resilience and effectively respond to these challenges.

One key advantage of local solutions is the utilization of local knowledge and traditional practices that have been developed over generations. Indigenous communities, for example, have often demonstrated a deep understanding of their ecosystems and have developed sustainable land and resource management practices that can contribute to climate change adaptation (Ford et al., 2018). Incorporating local knowledge into adaptation strategies enhances their effectiveness and ensures that solutions are context-specific and culturally appropriate.

Furthermore, community-driven approaches foster a sense of ownership and empowerment, enabling communities to take an active engage in designing and implementing adaptation measures. Local participation enhances the relevance and acceptability of adaptation strategies, as community members have a firsthand understanding of their specific vulnerabilities, priorities, and capacities. This participatory approach ensures that adaptation efforts are more inclusive, equitable, and sustainable in the long term (Ford et al., 2018).

Supportive governance structures and policies are essential in enabling and scaling up local adaptation solutions. Local governments, non-governmental organizations, and other stakeholders play a pivotal role in creating an enabling environment that facilitates community-based adaptation. This includes providing access to resources, technical support, and funding, as well as incorporating local priorities and perspectives into policy frameworks and planning processes (Neuhoff et al., 2009). Collaborative partnerships between different levels of governance

and sectors are crucial for fostering synergy and coordination in adaptation efforts.

Case studies from around the world demonstrate the effectiveness of local solutions in climate change adaptation. For example, in vulnerable coastal communities, nature-based solutions such as mangrove restoration and coastal protection measures have proven to be cost-effective and sustainable in reducing the consequences of rising sea levels and storm surges (Christensen and Olhoff, 2019). Similarly, community-led reforestation and agroforestry initiatives have shown promising results in enhancing resilience to drought and improving local livelihoods (Ford et al., 2018).

Climate change and sustainable agriculture and food systems

Climate change has emerged as a major threat to sustainable agriculture and food systems, with far-reaching implications for global food security, rural livelihoods, and environmental sustainability. Rising temperatures, changing precipitation patterns, increased frequency of extreme weather events, and sea-level rise are directly impacting agricultural production, water availability, and the functioning of ecosystems. These challenges are further aggravated by the growing global population and changing dietary patterns, placing immense pressure on agricultural systems to meet the increasing demand for food.

One of the primary consequences of climate change for agriculture is the modification of growing conditions and cropping patterns. Shifts in temperature and rainfall patterns disrupt traditional agricultural calendars and may result in diminished crop yields and heightened pressures from pests and diseases, and changes in the suitability of certain crops in specific regions (Masson-Delmotte, 2022). This poses a significant threat to food production and raises concerns about food availability and affordability, particularly in vulnerable regions that heavily rely on agriculture for sustenance and food stability.

Climate change also has profound implications for water resources, which are crucial for agricultural production. Alterations in precipitation patterns and elevated rates of evaporation can result in water scarcity and impact irrigation systems, jeopardizing the availability of water for agricultural produce (Nikolaou et al., 2020). Additionally, severe weather occurrences like droughts and

floods can disrupt water management systems and cause water-related disasters, further undermining agricultural productivity and exacerbating water resource challenges.

Moreover, climate change impacts on agriculture contribute to environmental degradation and biodiversity loss. Intensive agricultural practices, such as excessive synthetic fertilizer use and deforestation, contribute to greenhouse gas emissions and soil degradation, further exacerbating climate change (Masson-Delmotte, 2022). This vicious cycle of climate change and environmental degradation calls for transformative changes in agricultural practices and policies to ensure the sustainability and resilience of food systems.

Addressing climate change in the context of sustainable agriculture requires adopting climate-smart agricultural approaches that integrate climate change mitigation, adaptation, and agricultural productivity goals. Climate-smart agriculture encompasses a range of practices, including agroecology, conservation agriculture, and sustainable intensification, which promote resilient farming systems, biodiversity conservation, and the efficient use of natural resources (Campbell et al., 2014). By adopting these practices, farmers can improve their adaptive capacity, enhance soil health, sequester carbon, and reduce greenhouse gas emissions, contributing to both climate change mitigation and adaptation.

Transforming food systems to be more climate-resilient and sustainable also requires integrating climate considerations into food system governance. This involves promoting policy coherence and coordination across sectors, supporting smallholder farmers, strengthening rural infrastructure, and enhancing access to markets and finance (Guidi et al., 2011).

Additionally, fostering research and innovation, promoting knowledge exchange and capacity-building, and incentivizing sustainable agricultural practices are crucial for enabling the transition to climate-resilient and sustainable food systems.

Addressing Climate Change in Iraq: Impacts and Solutions

Climate change poses significant challenges worldwide, and Iraq is not immune to its impacts. As a nation with a fragile ecosystem and

arid climate, Iraq faces unique challenges in mitigating and adapting to climate change.

Iraq experiences several notable impacts due to climate change, which include:

- a. **Water Scarcity:** Rising temperatures and altered precipitation patterns intensify water scarcity in Iraq, affecting agriculture, energy production, and public health (Al-Ansari, 2013).
- b. **Desertification and Land Degradation:** Climate change exacerbates desertification, leading to soil degradation and loss of vegetation, negatively impacting agricultural productivity and food security (Bindraban et al., 2012).
- c. **Extreme Temperatures and Heatwaves:** Iraq is prone to severe heatwaves, which are projected to become more frequent and intense due to climate change. High temperatures endanger human health, increase energy demands for cooling, and strain infrastructure (Hadi et al., 2023).

Solutions to Minimize the Effects of Climate Change in Iraq

Addressing climate change in Iraq requires a comprehensive approach. Some potential solutions include:

- a. **Water Management and Conservation:** Implementing efficient irrigation systems, promoting water conservation practices, and investing in wastewater treatment can optimize water use and mitigate water scarcity (Al-Ansari, 2013).
- b. **Sustainable Land Management:** Adopting sustainable land management practices such as reforestation, afforestation, and soil conservation measures can combat desertification, enhance soil fertility, and restore ecosystems (Fleskens et al., 2014).
- c. **Urban Planning for Climate Resilience:** Integrating climate resilience into urban planning by incorporating green spaces, cool roofs, and shading structures can help mitigate the urban heat island effect and reduce the vulnerability of cities to extreme temperatures (Park, 2021).
- d. **Renewable Energy Transition:** Promoting the transition to renewable energy sources like solar and wind power can reduce greenhouse gas emissions, enhance energy security, and contribute to sustainable development (Kabeyi, 2022).
- e. **International Collaboration:** Iraq can actively engage in international climate agreements, collaborate with other nations to

exchange knowledge and resources, and seek financial and technical support for climate change adaptation and mitigation efforts.

Conclusion

Climate change is profoundly affecting natural environment and the services they provide. So, climate change mitigation and adaptation are interrelated strategies that complement each other in tackling the worldwide issue of climate change. These strategies are interconnected and require international cooperation and collaboration. By implementing solutions such as water management, sustainable land practices, climate-resilient urban planning, flood management, renewable energy transition, and worldwide collaboration, we can take steps towards minimizing the effects of climate change and building a more sustainable and resilient future for generations to come.

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Exploring the Impact of Dental X-ray Radiation on Thyroid Function Tests among Al-Hadi Dental Students

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Abstract

Background: The connection between dental radiation exposure and thyroid function in dentistry students is worth investigating. The majority of thyroid injuries caused by dental x-ray radiation are subclinical, meaning they are asymptomatic and can only be identified by high levels of thyroid stimulating hormone.

Aim: The objective of this research is to assess the impact of dental X-ray radiation on thyroid function in dentistry students.

Patients and methods: A comparative study was conducted at Al-Hadi University College Teaching Hospital in the Department of Dentistry in Baghdad, Iraq, from November 1, 2022, to the end of April 2023. The study included forty participants who were divided into two groups. Group A consisted of 20 participants who were second-stage dental students and had no exposure to dental X-ray radiation. Group B consisted of 20 participants who were exposed to dental X-ray radiation. All participants undergo thyroid function tests during the same time period. An analysis was conducted to compare the outcomes between the two groups and within the same group.

Results: The thyroid function test results for the second and fifth stage groups are within the normal range. However, there is a noticeable increase in the fifth stage group compared to the second stage group. The mean values for T3, T4, and TSH in the fifth stage group are T3=2.43, T4=102.6, and TSH=2.26, while the mean values for the second stage group are T3=2.22, T4=100.9, and TSH=1.71. The findings indicated that there were no statistically significant differences seen ($P>0.05$) in terms of the test for homogeneity of variances. Additionally, no significant differences were found ($P>0.05$) when comparing the mean values.

Conclusion: No evidence indicates that dental X-rays have a substantial impact on thyroid function tests. To decrease the occurrence of radiation-

induced hypothyroidism from dental X-rays, it is advisable to minimize radiation exposure to the thyroid gland by adhering to recommended safety protocols, such as employing lead aprons and thyroid collars.

Keywords: thyroid gland, X-ray, collar, hormones.

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1. Introduction:

Medical imaging approaches are crucial for the diagnosis of diseases, identification of injuries, and the management of patient situations. *Dental radiography* is a process that uses imaging to effectively diagnose cavity detection, bone infections, root diseases, and several other dental problems in dental and maxillofacial structures (1). Dental diagnostic X-rays are a crucial component of dental practice. Despite advancements in digital technology leading to lower radiation doses, dental diagnostic X-ray imaging remains a prevalent radiological treatment routinely used in dental clinics for mouth exams (2, 3).

The thyroid gland, the largest gland in the body, is situated below the larynx in the neck. It plays a crucial role in producing and releasing thyroxine and triiodothyronine hormones, which are essential for the body's regular functioning. The hypothalamic-pituitary-thyroid axis regulates thyroid function via a negative feedback loop. As a result of thyrotropin-releasing hormone release, the hypothalamus controls the amounts of thyroid hormones in the blood, such as triiodothyronine (T3) and thyroxine (T4). In response to TRH, the pituitary gland secretes TSH, which triggers the thyroid to secrete T3 and T4 to meet physiological demands (4).

Thyroid hormone operates in almost every cell and organ in the body, including regulating calorie burn and weight loss/growth; it may slow or hasten the pulse, boost or drop body temperature,

Control muscular contractions, and Manage dead cell replacement speed (5).

X-ray technology used in the head and neck area for diagnostic and therapeutic purposes is a significant source of ionizing radiation exposure to the thyroid gland. There is a growing concern over the emergence of thyroid cancer due to radiation exposure from regular diagnostic procedures conducted as part of standard medical care. Approximately 33% of diagnostic computed tomography scans are performed in the craniofacial region of patients (6). Over the last three decades, there has been a notable increase in the incidence of thyroid cancer, which accounts for approximately 1% of all reported cancer cases (7-9) it is particularly vulnerable to radiation carcinogenesis among the organs of the head and neck region.

The thyroid gland is located next to the oral cavity and dental structures, which raises concerns about potential radiation exposure during dental procedures and its association with the risk of developing thyroid cancer (10). Previous studies have shown a correlation between dental X-ray exposure and a heightened susceptibility to cancer (11-13), even though the radiation dosage from dental X-rays is lower than that of medical imaging. Therefore, it is crucial to consider the potential risk of minimal radiation exposure from dental X-rays. It is worth noting that the primary environmental factor known to cause thyroid cancer is exposure to high levels of ionizing radiation, which typically occurs during childhood and adolescence (ages 11-13).

In high-dose radiation exposure, thyroid problems are prevalent. Studies indicate a rise in thyroid cancer, nodules, and autoimmune, with high dosages being linked to hypothyroidism, Hashimoto disease, and Graves hyperthyroidism (14-18).

Little is known about the potential pathological effects of low or very low doses on the thyroid and related hormones (T3, T4, and TSH). Occupational exposure, characterized by low doses, has also received less attention (19, 20). It is surprising because radiation is a significant occupational risk factor for workers' health and their presence in many professional settings, including the healthcare sector (21, 22). Likewise, dental students and professionals often

encounter X-ray radiation as an essential part of their everyday clinical practices. Our study is to thoroughly investigate the impact of this radiation on thyroid health and hormone levels among dental students, taking into account the possible health consequences of such exposures.

2. PATIENTS AND METHODS

2.1. Study design, Setting and Data collection time

It is a comparative study conducted in Al-Hadi University College Teaching Hospital / Dentistry Department, Baghdad, Iraq, from (the 1st of Nov. 2022 to the end of April. 2023).

2.2. Patients and methods

The study included 40 patients; 20 participated, and their ages were > 18 years.

They were divided into two groups:

- Group A consisted of 20 patients without dental X-ray exposure (2nd stage dental students).
- Group B consisted of 20 patients who were exposed to Dental x-ray radiation (5th stage)

Before starting with research, Detailed history was taken, and blood samples were drawn from all the patients and sent for thyroid function test (TFT), including (TSH, T3, and T4) and tested using radioimmunoassay by Roche device(Cobas e411).

Inclusion criteria:

1. Females and male patients with a medical history of normal thyroid.
2. Ages >18 years.

Exclusion criteria:

1. Patients with Abnormal TFT.
2. Previous thyroid surgery.
3. Patients on oral thyroid hormone (thyroxin, carbimazole , etc).

4. Individuals in the second stage with a history of radiation exposure due to prior hospitalization (surgery) or dental treatment.
5. Those with suspicious thyroid nodules for cancer with (TIRADS 5).
6. Chemotherapy.
7. Smoking.
8. Family history.

2.3. Statistical Analysis:

The study's findings were analyzed and evaluated using the statistical package (SPSS) version 22.0, employing the subsequent statistical data analysis approaches:

Analysis of descriptive data: mean, standard deviation and error, and confidence interval at a level of 95%.

Presentation of the graphics by using: Stem-Leaf charts, bar charts and ROC curve.

2.4. Inferential data analysis:

To validate or refute statistical hypotheses, the following tests were employed:

1. K-S Test:

This test compares the observed cumulative distribution function with a theoretical distribution. The Kolmogorov-Smirnov Z calculates the largest absolute difference, determining if the data reasonably originated from the given distribution.

2. Student t-Test:

The Independent-Samples t-test compares means for two groups. Ideally, subjects are randomly assigned to ensure observed differences result from treatment, not other factors.

3. Levene Test:

Used to test homogeneity of variances between studied groups.

4. Receiver Operating Characteristic (ROC) Curve:

Utilized for estimating Area Under the Curve, 95% confidence interval, standard error, and asymptotic significance level.

Cutoff Point Estimation:

Low distance between the angle front to curve and the curve:

$$d^2 = [(1 - S_N)^2 + (1 - S_P)^2]$$

High distance between the curve's point and one diameter point (Youden Index):

$$J = \text{Max} (S_N + S_P - 1)$$

Where [S_N : Sensitivity rate; and S_P Specificity rate].

5. Screening Tests:

Involving sensitivity rate, specificity rate, and cutoff points for discerning between readings of subjective groups.

2.5. Ethical Approval

Patients were orally briefed on the study and voluntarily granted their consent to participate. Rigorous protocols were in place to safeguard the anonymity of personal details. The gathered data were exclusively employed for the study's objectives.

3. Results:

In this section, the outcomes of the data analysis are systematically presented through tables, aligning with the study's objectives as outlined below:

Part 1: Assessment of Normal Distribution (Goodness of Fit Test):

Table (1) illustrates the outcomes of a one-sample "Kolmogorov-Smirnov" test procedure. This procedure compares the cumulative distribution function observed in the readings of thyroid markers tests with a predefined theoretical distribution, assuming a normal distribution (i.e., Bell Shape).

Table (1): Evaluation of the normal distribution function across various groups in relation to the Shear Bond Strength test's readings.

One-Sample Kolmogorov-Smirnov Test				
Groups	Test Statistic	T3	T4	TSH
Fifth Stage	No.	10	10	10
	Kolmogorov-Smirnov Z	0.689	0.534	0.652
	Asymp. Sig. (2-tailed)	0.730	0.938	0.790
	C.S.	NS	NS	NS
Test distribution of data follows Normal Shape				
Second Stage	No.	10	10	10
	Kolmogorov-Smirnov Z	0.610	0.357	0.478
	Asymp. Sig. (2-tailed)	0.851	1.000	0.976
	C.S.	NS	NS	NS
Test distribution of data follows Normal Shape				

The results indicate a normal distribution in thyroid test readings across different groups. This allows for applying standard statistical methods for descriptive measures (mean, standard deviation, standard error, 95% confidence intervals) and inferential statistics, including parametric hypotheses such as the Levene test for equal variances or the t-test for equal mean values. These tests assume a normal distribution of the underlying data.

Part 2: Thyroid tests:

Table (2) concisely summarizes statistical measures for the studied population's Thyroid test readings (T3, T4, and TSH) across various classes.

Table (2): Statistics of Thyroid tests

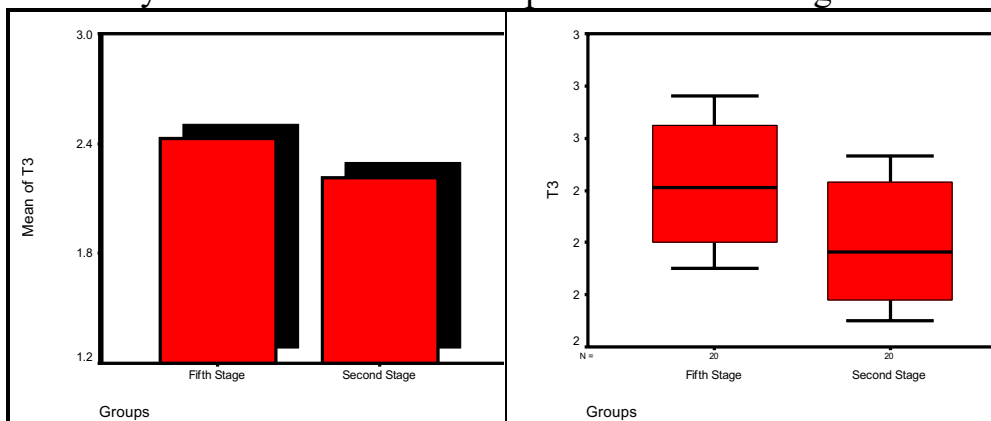
Thyroid tests	Classes	N	Mean	Std. D.	Std. E.	95% C.I. for Mean		Min.	Max.
						L.b.	U.b.		
T3	Fifth	10	2.43	0.25	0.08	2.25	2.60	2.10	2.76
	Second	10	2.22	0.24	0.08	2.05	2.39	1.90	2.53

T4	Fifth	10	102.6	10.1	3.20	95.4	109.9	91.1	121.0
	Second	10	100.9	17.3	5.50	88.6	113.3	67.5	127.5
TSH	Fifth	10	2.26	1.02	0.32	1.53	2.99	0.94	3.81
	Second	10	1.71	0.77	0.24	1.16	2.26	0.71	2.80

The normal values for Thyroid Stimulating Hormone (TSH) are 0.27 – 4.20 μ IU/mL, for Thyroxine (T4) the range is 66 – 181 nmol/L, and for Triiodothyronine (T3) it is 1.20 – 3.10 nmol/L.

While the thyroid function test indicators fall within the normal range for the second and fifth-stage groups, there is a noticeable elevation in the fifth-stage group across T3, T4, and TSH tests. This increase in the fifth-stage students can be attributed to the ageing of radiological laboratory work compared to second-stage students. This observation is not only based on mean values but also considers the minimum limits of the actual reading values and population mean estimates with a confidence level of at least 95%.

In Figure (1), a bar chart illustrates the mean values of Thyroid test readings across different groups, accompanied by a Stem-Leaf plot. The graphical representation highlights the apparent rise in the fifth-stage group, reinforcing the impact of ageing on radiological laboratory work in this cohort compared to second-stage students.



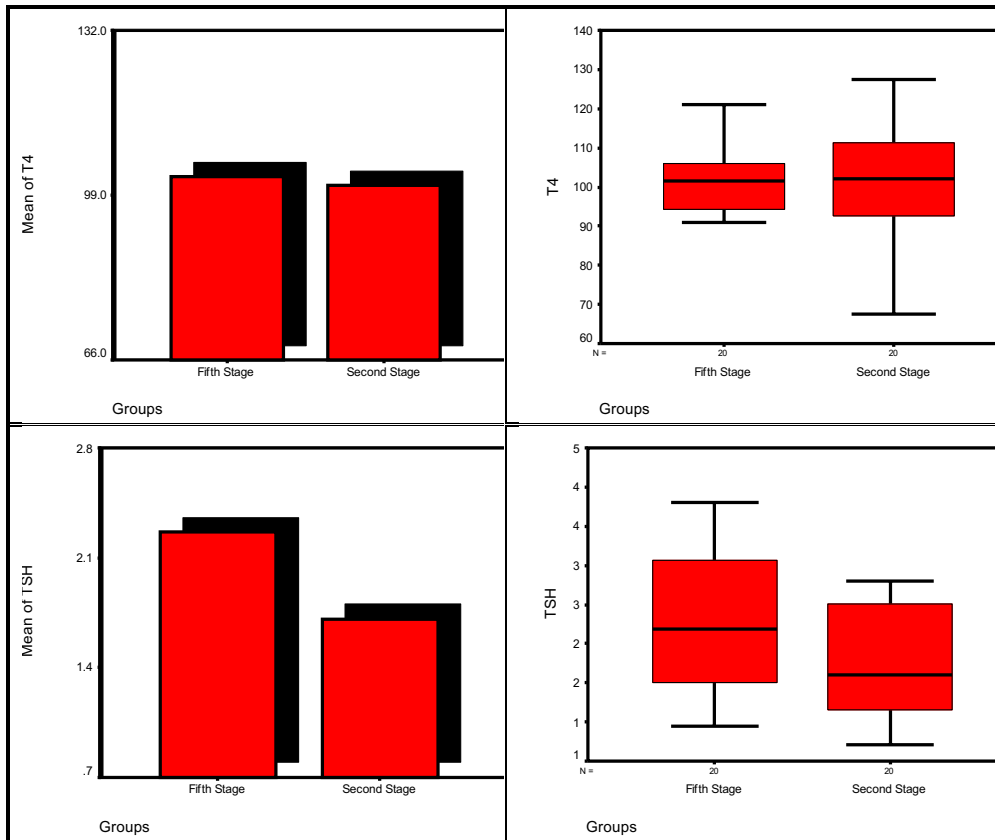


Figure (2): Mean values, and Stem-Leaf Plots for Thyroid test's readings distributed along different groups

The compound statistical hypothesis regarding Thyroid test readings in different groups was examined to determine if they originate from the same population. This assessment involved testing for equal variances using the Levene test and equal mean values using the Student t-test, as outlined in table (3).

Table (3): Assessment of Equal Variances and Mean Values for Shear Bond Strength Tests

Thyroid Tests	Testing Homogeneity of Variances		t-test- For testing Equality of Means	
	Levene Statistic	Sig. (*)	t-test	Sig. (*)
T3	0.002	0.968 (NS)	1.937	0.069 (NS)

T4	1.844	0.191 (NS)	0.264	0.795 (NS)
TSH	2.697	0.118 (NS)	1.374	0.186 (NS)

Testing Equal Variances and Mean Values:

No significant differences were found in variances and mean values tests, except for the T3 test (P=0.069), indicating a potential change linked to radiation exposure.

Creating Gold Standard Cutoff Points:

Receiver Operating Characteristic (ROC) curve analysis helps determine optimal cutoff values for diagnostic accuracy in Thyroid tests. The analysis considers both diagnostic and prognostic values, comparing the accuracy of two test groups for the same marker.

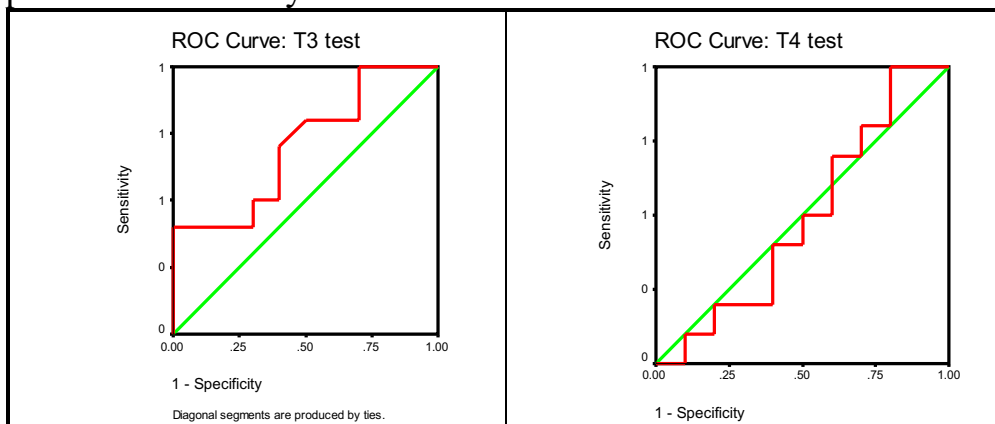
Table (4) displays cutoff points, sensitivity, specificity, and the trade-off between them. It also indicates the significance level for the testing area, with a 95% confidence interval, among fifth-stage and second-stage student groups in Thyroid tests.

Table (4): Statistics of ROC Curve for studied Marker concerning (Thyroid) test's readings

Thyroid tests	Cutoff Point	Sensitivit y	Specificit y	Area	Std. Error	Asymp. Sig.	Asymptotic 95% C.I.	
							Lb	Ub
T3	2.165	0.800	0.500	0.705	0.083	0.027 (S)	0.543	0.867
T4	91.545	0.900	0.200	0.490	0.094	0.914 NS	0.305	0.675
TSH	2.905	0.400	1.000	0.660	0.088	0.083 NS	0.488	0.832

The "T3" test marker achieved significant Area Under the Curve (AUC) at $P < 0.05$ in the controlled group, as did the TSH marker in contrast to the fifth student's group under the guidelines of the second student's group ($P = 0.083$) (15). This suggests a perfect discriminant status for the studied markers among the groups.

See Figure (3) for the ROC curve illustrating the discriminant performance of Thyroid tests.



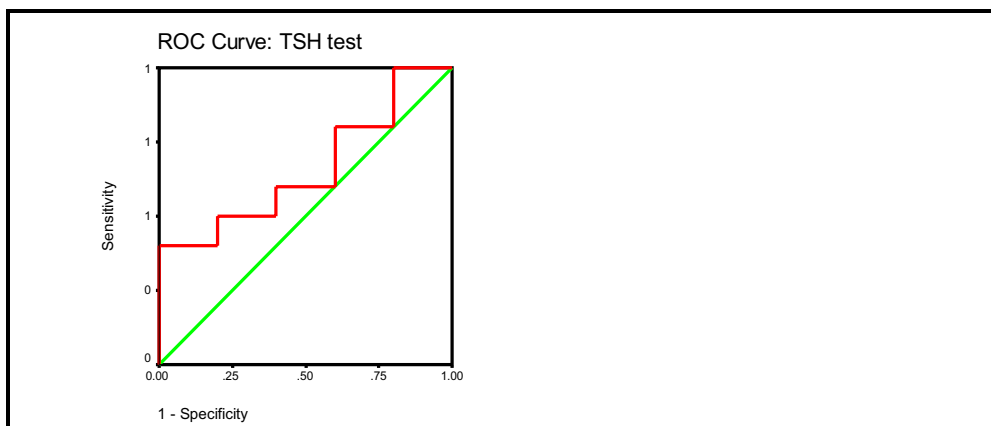


Figure (3): ROC Curve for Thyroid Tests - Fifth vs. Second Stage Students

4. Discussions

In different radiation techniques, peripheral radiation can damage the outfield organs; minimizing radiation-induced damage is a significant concern in treatment planning.

Therefore, the study of the dose received by the thyroid organ and the hormone levels before and after radiation exposure is an important issue. Hypothyroidism is reported as one of the most essential late side effects after neck radiation exposure, which includes the whole or a part of the thyroid gland.

In our study, we are evaluating the effect of dental X-ray radiation on thyroid function, and the results showed that no significant differences were accounted for at $P > 0.05$ concerning the testing of mean values, Several studies were in agreement with our study and have investigated the potential effects of dental X-rays, including periapical X-rays, on thyroid function. Scarfe et al. 2010 concluded that there was no evidence to suggest that dental X-rays significantly affect thyroid function tests (23).

Weitzel et al. 2012 found no significant difference in thyroid function between patients who had received dental X-rays and those who had not (24).

Singh et al., in 2017, found that there was no significant change in thyroid function tests after dental X-ray exposure, including

periapical X-rays. The study included 50 patients who underwent dental X-rays, and their thyroid function tests were measured before and after exposure (25).

Sedaghatfar et al. 2018 also found no significant association between dental X-rays and changes in thyroid function tests (26), This data suggests that the incidence of dental X-ray radiation-induced

Hypothyroidism could be reduced by reducing the radiation exposure of the thyroid gland by using specialized protective techniques for the thyroid gland.

According to a study by El-Hussiny et al. Exposure to ionizing radiation from medical imaging can lead to oxidative stress and DNA damage, which can affect thyroid function. The study suggests that radiation exposure should be minimized, particularly in vulnerable populations such as pregnant women and children (27).

5. Conclusion:

Our study on the impact of dental X-ray radiation on thyroid function reveals normal distribution patterns for T3, T4, and TSH readings across different stages. Although thyroid markers fall within the normal range for both stages, a notable increase in the fifth stage is explained by the ageing of radiological laboratory work for the fifth-stage students compared with the second-stage students. Statistical analyses, particularly ROC curve assessment, demonstrate significant discriminant ability for T3 and TSH; it is always advisable to wear a thyroid collar and adhere to safety protocols during dental X-ray procedures to minimize potential risks associated with ionizing radiation exposure. These findings underscore the importance of ongoing research in understanding the effects of dental X-ray radiation on thyroid function, suggesting a need for a prolonged, long-term study to explore these observations. Also, it is essential to acknowledge the potential for further investigation. While our current study focused on evaluating the specific impact on T3, T4, and TSH levels, a valuable avenue

for future research is exploring the effective radiation dose on thyroid gland function.

6. Limitations:

One limitation was the short period of thyroid hormone investigation after dental X-ray exposure, so further studies about the relationship between the absorbed dose values and thyroid hormones should be done.

There is no known direct effect of periapical X-ray on thyroid function tests. However, exposure to radiation from X-rays could have indirect effects on thyroid function.

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Assessing the Ergonomic Knowledge and Awareness of Dental Students: A Cross-Sectional Study

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Abstract

Background: Ergonomics is a foundational aspect of clinical dentistry, which must be practiced from the beginning of one's profession, as musculoskeletal disorders comprise nearly 11-98% of occupational health issues for dentists and ergonomics is among the top risk factors; thus, assessment is essential in preventing future MSD pain.

Objectives: The study aims to assess the student's knowledge concerning dental ergonomics after lectures were introduced to 3rd-year students in the community lab.

Methods: The study design consisted of a four-part online-based questionnaire among 312 third-year students from Al-Hadi University College, Department of Dentistry, Baghdad, Iraq. Questions focused on the basic knowledge of theoretical ergonomics.

Results: The majority of students have good knowledge about the theoretical part and ergonomic principles as 284 out of 312 (91%) answered positively about their ergonomic knowledge; unfortunately, most of the students lack awareness and detecting errors in sitting positions, as mere 70 out of 312 (22.4%) answer positions photographs correctly.

Conclusion: The basic knowledge of dental ergonomics among dental students needs more improvement; the study highlights a persistent need for expanded ergonomic education within the dental curriculum. The identified knowledge gaps emphasize the necessity for additional hours and lessons dedicated to practical applications. They are strengthening awareness about Musculoskeletal Disorders (MSD) to save the health of future practitioners.

Keywords: Dental ergonomic, Knowledge, Undergraduate students, musculoskeletal disorder.

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Introduction:

Ergonomics is a multidisciplinary field that aims to enhance health and comfort within the workplace. Despite numerous studies highlighting the significance of these principles in dentistry, a significant number of clinicians continue neglecting the incorporation of ergonomic guidelines within their dental practices (1–3). Dentists frequently compromise their posture to maintain the necessary precision during dental procedures, considering the high standards of their profession. The professionals prioritize the treatment procedure and dedicate extended hours without taking breaks, resulting in limited time for self-care (4, 5). As a result, there are long-term adverse consequences for healthcare providers' on the quality of their lives and their productivity in the workstation. This is primarily owing to the high prevalence of musculoskeletal disorders (MSDs).

Musculoskeletal disorders (MSDs) are common among practitioners, with research indicating the potential prevalence of musculoskeletal pain reaching 100% [6]. Therefore, maintaining an appropriate ergonomic posture is crucial when using various tools during diverse therapeutic procedures.

The elevated prevalence of musculoskeletal disorders (MSD) may be attributed to a lack of sufficient knowledge, limited awareness, unfavourable attitudes, and inadequate adherence to ergonomic practices. In developing countries, these deficiencies can be attributed to a lack of emphasis on various concepts of ergonomics during the training years. The scope of knowledge acquired during undergraduate training primarily focuses on positions involving operator chairs. There is a lack of standardized guidelines in the curriculum regarding this issue (7).

The dental curriculum should include ergonomic suggestions for the proper positioning of the patient, the dental equipment, and the dentist's posture while operating. Consequently, forming healthy postural habits preserves the ergonomic workstation while

providing clinical service (8). Dental schools should incorporate ergonomics instruction into their curricula from the start of preclinical training when students are still learning how to use mannequins and to reinforce this instruction while providing patient care (9, 10) Because students practice on dental mannequins are able to develop their psychomotor abilities in a risk-free environment (11).

Duong et al. (2010). (12) State that applying stages is simpler than relearning concepts and adjusting habits poorly practiced after learning knowledge correctly in the early stages.

Dental Ergonomics aims to alleviate cognitive and physical stress among dental professionals, with a dual purpose of preventing occupational diseases and enhancing the overall productivity and quality of dental procedures. This study's primary aim is to assess dental students' knowledge and awareness regarding Dental Ergonomics, a field dedicated to studying and enhancing the well-being of dentists. By gauging dental students' awareness and understanding level, our study seeks to contribute valuable insights into incorporating and promoting ergonomic practices within dental education. This, in turn, is anticipated to positively impact the future practices of these students, fostering a culture of proactive health and efficiency within the dental profession.

Materials and methods:

The study was a cross-sectional observational investigation. The sample was narrowed down to third-year undergraduate dentistry students of both genders from Al-Hadi University College, Department of Dentistry, Baghdad, Iraq (N = 312).

The selection of this specific sample was intentional, as these students were undergoing ergonomic lectures in the community dentistry laboratory. This course was part of the curriculum in the first semester of third year.

Research procedures included applying established rules and instructions for dental ergonomics to actual dental chairs while assessing the DMF (Decay, Missing, and Filling) index. The survey utilized a four-part, close-ended questionnaire. The initial section collected demographic information, the subsequent section included five dichotomous questions (Yes/No), the third section was consisted of multiple choice questions, and in the fourth section of the questionnaire, participants were presented with photographs depicting clinicians in various positions during dental procedures. Their task was to assess the correctness of the doctors' positions using a binary evaluation, categorizing them as either "correct" or "incorrect." The assessment covered key categories, including the general working position, head position, arm position, forearm position, and back position.

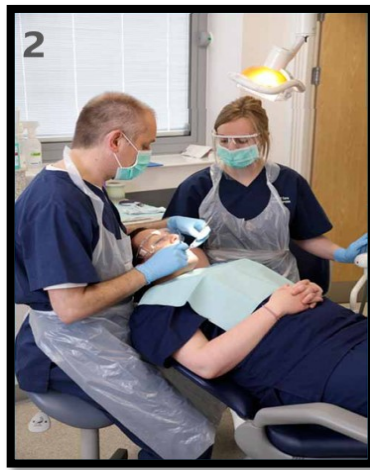
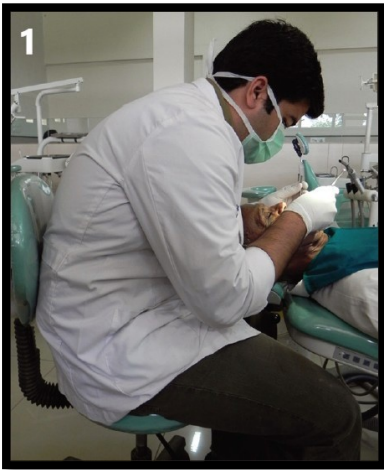




Fig.1 Photographs of working clinicians in different position during dental procedures.

The inclusion criteria consisted of students who attended the complete dental ergonomics class and applied these principles during clinical practice. In addition, the inclusion criteria for this study consisted of students who completed a questionnaire on dental ergonomics. These students were required to select only one answer for each question, while the exclusion criteria were applied to students with incomplete attendance or answers and students from other academic levels.

Data from the questionnaire were analyzed using SPSS. For each question, percentage and frequencies were calculated to determine the distribution of responses among students.

Results:

A total of 312 third-grade students from the Dentistry Department at Al-hadi University College participated in the online questionnaire, The majority (60.3%) were females, while males constituted (39.7%) of the sample. representing a response rate of 88.1% (312 out of 354).

Table 1 below presents the demographic distribution of participants, including age and gender:

Table (1) Demographic characteristics of participants.

Characteristics		No.	%
Gender	Female	188	60.3%
	Male	124	39.7%
Age	19-25	295	94.6 %
	More than 25	17	5.4 %

To enhance comprehension, the results section is organized into three parts corresponding to the three sections of the survey questionnaire.

Table 2 presents the responses of students regarding their knowledge about ergonomics. The participants were asked five questions, and their responses were categorized as either 'Yes' or 'No.'

Table (2) Distribution of responses based on dental students' understanding of ergonomics

Question	Yes N (%)	No N (%)
Q.1/Do you know what is meant by ergonomics?	307 (98.4)	5 (1.6)
Q.2/Do you know what are the health hazards caused by wrong dentist position?	310 (99.4)	2 (0.6)
Q.3/Do you know the popular operating postures that may cause MSD?	290 (92.9)	22 (7.1)
Q.4/Do you know the best posture of the dentist sitting?	309 (99)	3 (1)

Q.5/Do you know the best level of the dentist shoulders and site of elbow and upper arms?	308 (98.7)	4 (1.3)
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Table 3 presents the responses of students regarding the position of the dentist on the dental chair in relation to the patient. The participants answered five multiple-choice questions, each offering three options.

Table (3) Dentist Position on the Dental Chair

Questions		%
1. The preferable position by most of the dentists is.....	12 o'clock	2.9
	9 o'clock	10.9
	11 o'clock	86.2
2. The position of light to examine the upper teeth will be.....	Upper position	2.6
	Lower position	93.9
	Between	3.5
3. Thighs, arms and feet should..... with the floor	perpendicular	3.2
	parallel	93.6
	Not related	3.2
4. The neck and the back of the dentist should be as possible	inclined	0
	retruded	0.3
	straight	99.7
5. Elbow and lower arms should be	with the level of the waist	67.9
	with the level of the patient	7.7
	with the level of the waist and the patient	24.4

After calculating the final scores from the questionnaire, students' results were segmented into the following categories based on their proficiency in ergonomics:

High-level: Grades exceeding 75/100

Moderate: Grades ranging from 50/100 to 75/100

Low: Grades below 50/100

This categorization provided a clear understanding of the distribution and proficiency levels of the students' knowledge in ergonomics.

Table (4) Mean & SD Analysis of Exam Grades

Category	Mean	Standard Deviation
High level	87.47	5.48
moderate	70.27	4.5
low	47	0

Discussion:

During the latter part of the 20th century, there was a growing recognition of the need to operate in an ergonomically planned workspace. There are recommendations on this topic on the internet and in specialist publications. Regretfully, undergraduate students' inexperience in dental ergonomics is a fact and may result in health issues that arise later in life.

According to the results of this questionnaire study, which revealed that the majority of students learned during their third year of study was incredibly beneficial in situating the patient during dental procedures, the questions were a combination of knowledge-oriented and those involving awareness creates a robust framework for learning and assessment. While knowledge provides the theoretical foundation, awareness ensures the ability to apply that knowledge practically. In dentistry, this approach is crucial as it not

only ensures practitioners understand the theoretical underpinnings but also emphasizes the practical implications of correct positioning and procedures. Moreover, this dual approach supports critical thinking, enabling individuals to make informed decisions and adjustments in diverse clinical situations.

Students have weaknesses in detecting faults in dentist positions; this lack of knowledge of dental ergonomics is a global problem, as numerous studies from various regions of the globe have reached the same conclusion. For example, Cervera-Espert et al. (2018) discovered that 71% of the dental students enrolled at Valencia University in Spain did not use the dentist chair appropriately (13). Approximately sixty-six percent of the dental students at Mashhad University in Iran were at intermediate to high risk of suffering from MSD, and their postures required correction, according to Movahhed et al. (14).

The vast majority of dental students (89%) at Jizan University in Saudi Arabia exhibited only mild to moderate postural awareness during clinical practice, according to research by Kanaparthi et al. (2015) (15). One hundred twenty-five dentistry students from various schools were surveyed using a questionnaire in research performed in Riyadh, Saudi Arabia. Results showed that a little over half of the sample (53%) had some prior knowledge of dental ergonomics (16). Furthermore, a study conducted at Tanta University in Egypt revealed that a mere 39% of dental students demonstrated knowledge of dental ergonomics (17). Furthermore, a study conducted at the School of Dentistry in Aracatuba, Brazil, revealed that a mere 35% of dental students adhered to ergonomics principles while doing clinical procedures (18). Comparable findings were seen among students enrolled at a dental institution located in Mumbai, India. Specifically, it was shown that 81% of these students lacked knowledge about dental ergonomics (19).

Dental professionals may have MSD symptoms as early in their careers as during their training (20). These aches and pains often

manifest gradually and are frequently disregarded until they become chronic, persistent, and difficult to cure (21, 22). Implementing the concepts of dental ergonomics to reduce or eliminate MSD-associated symptoms among dentists has been established in several prior studies (23). The adage "prevention is better than cure" supports the idea that dental students would benefit from learning the fundamentals of dental ergonomics before engaging in any clinical practice. In reality, information regarding dental ergonomics and MSD is the only knowledge directly linked to dental students' or dental professionals' well-being. At the same time, all other disciplines are taught to treat patients.

Conclusion:

Early integration of dental ergonomics principles in the curriculum is essential to prevent musculoskeletal disorders (MSDs) among dental students. The acquisition and reinforcement of ergonomic knowledge during preclinical and clinical training are critical for the long-term well-being of future practitioners. Emphasizing correct clinical working posture throughout the training process, not just in specific modules, is critical. Despite a foundational understanding, students often grasp the significance of ergonomics in the later stages of their undergraduate training. Early emphasis on adhering to ergonomic principles is crucial in minimizing MSD risks in their future careers. The escalating prevalence of MSDs in sedentary jobs, including dentistry, necessitates comprehensive ergonomics training. Recognizing the link between improper ergonomics and musculoskeletal problems is vital for effective intervention. Integrating hands-on workshops and ergonomic training into the curriculum is proactive, ensuring a healthier and longer career for aspiring dentists.

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A scientific study that outlines practical directions for surgical practices in light of the Corona epidemic patients, COVID-19

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دراسة علمية حول التوجهات العملية للممارسات الجراحية في ظل وباء مرضى
كورونا COVID-19

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Abbreviations	اختصارات الدراسة
المصطلح باللغة الانكليزية	المصطلح باللغة العربية
MCI : Mass Casualty Incident	أحداث الإصابات الجماعية
PPE: Personal Protection Equipment	معدات الحماية الشخصية
FFP: Filtering Facepiece	مرشح الوجه
COA : COVID Operating Areas	منطقة عمليات مرضى كوفيد
IRHW	النفائات الصحية ذات المخاطر المعدية
HEPA	هواء جسيمات عالي الكفاءة
RSI	الانبوب المخصص للادخال لرتة المريض في حالة الاختناق (مانع الاختناق)
Intensive care units (ICU)	وحدة العناية المركزة
Operating Room (OR)	غرفة العمليات
Medical Gowns	العباءة الطبية
Intubation Technique	تقنية التنظير الرغامى

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المقدمة

يؤكد وباء COVID-19 الحالي على أهمية الاستخدام الواعي للموارد المالية والبشرية. ويعد الحفاظ على الموارد والقوى العاملة أمراً بالغ الأهمية في مجال الرعاية الصحية الحديثة. لذلك فمن المهم ضمان قدرة الجراحين والمهنيين المتخصصين على العمل خلال الوباء وبذل الجهد الواعي لتقليل العدوى في هذا القطاع.

ان ارتفاع معدل الوفيات داخل هذه المجموعة سيكون امراً غير مرغوب فيه. وعليه فان هذه الدراسة تهدف إلى وصف المسارات السريرية الموصى بها للمرضى المصابين بفيروس كوفيد-19 الذين يحتاجون إلى رعاية جراحية حادة لا يمكن تأجيلها. كما يتوجب على جميع المستشفيات تنظيم بروتوكولات مخصصة وتدريب القوى العاملة كجزء من الجهود المبذولة لمواجهة الوباء الحالي بكل صورته.

الخلفية العلمية للدراسة Study Scientific Background

يتطلب وباء COVID-19 الحالي سرعة استجابة للكوارث والاصابات الجماعية. ويعد الحفاظ على الموارد المالية والبشرية أمراً بالغ الأهمية وكذلك يعد التنظيم الجيد والنهج الوقائي إلزامي في مرحلة معينة تسمى التخفيف (mitigation).

ولغرض تقليل استنفاد الموارد بشتى انواعها، يجب التفكير جيداً والتوازن في استخدام الأجهزة الجراحية وكذلك الموظفين المهنيين في مجال الصحة. يعد الجراحين والعاملين المتخصصين بشكل عام مورداً قيماً خلال وقت الاستجابة. لذلك يجب تجنب قدر الامكان من تعرض الموظفين المتخصصين الى الاصابة بوباء كورونا وذلك لأغراض الحفاظ على القدرة على مواجهة حالات الطوارئ الجراحية والأنشطة المرتبطة بها والتي ستستمر في الحدوث أو ربما تزيد خلال مدد غير محددة.

في واقع الامر، فان أي نقص في الفرق المتخصصة (الجراحين والموظفين الصحيين) والذي يحدث أثناء الجائحة لا يمكن معالجته بسهولة عن طريق إعادة دمج الموظفين المتقاعدين (مثلاً) واعادتهم الى الخدمة أو تجديد الرتب بموظفين جدد، الأمر الذي سيرتبط حتماً بانخفاض ملحوظ في مستوى الرعاية الصحية بشكل عام.

يجب تأجيل جميع الإجراءات الجراحية على جميع المرضى المشتبه في إصابتهم بـ COVID-19 اثناء اوقات الاصابة حتى يتم التأكد من إزالة العدوى من هؤلاء المرضى بشكل نهائي. وإذا تعرض عدد كبير من كبار الجراحين لمرضى مصابين بـ COVID-19، فإن احتمال إصابتهم بالعدوى كبير ويحتاجون إلى عزل ذاتي وهو أمر حقيقي ويمكن أن يؤدي إلى نقص خطير في الخبرة العليا (الجراحين) داخل الفرق الجراحية.

يجب مراعاة استخدام الموارد بعناية عند التخطيط للإجراءات المجدولة، لا سيما فيما يتعلق بالمواد والموظفين والأجهزة وأسرة العناية المركزة ومكونات الدم، إلخ. قد تكون رعاية المرضى ذوي الموارد الكثيفة أمرًا مثيرًا للجدل أثناء الإصابة بالاختلال المعرفي المعتدل. تهدف هذه الدراسة إلى وصف المسارات السريرية الموصى بها للمرضى المصابين بفيروس COVID-19 الذين يحتاجون إلى رعاية جراحية طارئة ومستعجلة لا يمكن تأجيلها.

مدخل الى الدراسة Study Introduction

يجب معاملة جميع المرضى المشتبه بإصابتهم بفيروس COVID-19 والذين يحتاجون إلى تدخل جراحي على أنهم إيجابيون حتى يثبت العكس وذلك من أجل تقليل انتشار العدوى ويجب أن تكون المسارات المبرمجة والمحددة لأخصائي الرعاية الصحية الذين يعتنون بهؤلاء المرضى متاحة بشكل واضح وجلي.

ان عملية تخصيص موظفين متخصصين لأدوار الإدارة الرئيسية لمرضى COVID يعد أمرًا بالغ الأهمية وذلك للحد من انتشار COVID-19 والسيطرة عليه.

يجب تدريب جميع الموظفين بشكل خاص على ارتداء معدات الحماية الشخصية (PPE) وخلعها والتخلص منها بعد استخدامها مباشرة، بما في ذلك الأقنعة من المستوى 2 أو 3 من (FFP) اعتمادًا على مستوى المخاطر، وكذلك حماية العين، والتخلص من القفازات فوراً وعدم التعقيم المتكرر لها، وكذلك العباءات والقفعات والجواريب (الجدول 1).

وعليه يجب ألا يتوقف مرضى الجراحة الذين يمرون عبر مبنى غرفة العمليات في غرفة التخدير أو غرفة الإنعاش أو أي مكان آخر غير غرفة العمليات المخصصة لمرضى COVID. ويجب أن يتم نقلهم مباشرة إلى غرفة العمليات المحددة التي يجب أن تكون موسومة بشكل واضح وبعلامات على الابواب لتكون واضحة للعيان.

في حالة كون الإجراء الجراحي المقرر للمريض المصاب لا يتطلب تخديرًا عامًا، يجب على المريض الاستمرار في ارتداء القناع الواقي طوال مدة الإجراء الجراحي إذا سمحت الحالة السريرية بذلك (الشكل 1).

نقل المرضى	مدخل الى منطقة العمل	الاعداد او التشغيل	ردهة الجراحة	غرفة العمليات	الافاقه
شؤون الموظفين (كل مايتعلق بالموظفين)	ارتداء معدات الحماية الشخصية الكاملة				
	تخصيص بعض الأفراد للمريض الواحد ولمختلف المراحل				
			بمجرد دخول المريض يمنع الموظفون من الدخول او الخروج		
الطريق	مسار ثابت لانتقال المريض أقصر وقت ممكن لوصول المريض معزول وبعيد عن الناس				

	تعقيم المصاعد من قىء المريض غير المتوقع تجهيز غرفة انتظار للمرضى الموجودين في قسم الطوارئ قبل نقلهم إلى غرفة العمليات		
المواد			يتم استبدال المواد جميعاً قبل بدء كل إجراء هناك عربات مخصصة أو سلة معدنية لنقل المواد حاول قدر الإمكان عدم إعادة الملئ أثناء الجراحة
المريض		نقل المريض مباشرة على سرير العمليات	يجب أن تتم مرحلة التعافي بعد الجراحة في غرفة العمليات نفسها ، قبل نقل المريض الى الجناح
		غرفة العمليات المخصصة ، الأقرب إلى مدخل مناطق عمليات COVID	إغلاق الابواب بعد دخول المريض ، إشارة تنبيه واضحة توضع على الأبواب استبدال المواد بمعدات الحماية الشخصية من خارج معدل متزايد لدورة تبديل الهواء (25 تبديل بالساعة)
الجهاز او الوسيلة	توفير نقالة مخصصة توفير سيارة إسعاف مخصصة		يجب تعقيم الأجهزة المخصصة للمريض بعد كل استخدام أو بعد كل تلوث محتمل بالفيروسى العالى التأثير Covid-19

يجب أن يتم تغيير معدات الحماية الشخصية باتباع إجراء محدد مسبقاً وخلال كل مرحلة
يجب تنظيف كل سطح وكل جهاز طبي كهربائي باتباع إجراءات محددة مسبقاً
وخلال كل مرحلة
يجب اتباع بروتوكول آمن ومحدد مسبقاً يستخدم لاغراض التخلص من المواد المستخدمة للمريض المصاب.

شكل رقم 1، يوضح طريقة إدارة مواقع العمليات الجراحية لمرض كوفيد-19

من المهم التأكيد على كيفية حماية جميع المرضى غير المصابين بـ COVID-19. ويجب توفر مسارات منفصلة تم إنشاؤها لإبقاء المرضى المشتبه بهم والمصابين بعيداً عن المرضى الغير مصابين بـ COVID-19. وكذلك ارتداء معدات الوقاية الشخصية والأقنعة لجميع المرضى غير المصابين بـ COVID-19 أثناء اجراء عمليات النقل داخل المستشفى وذلك من أجل تقليل مخاطر العدوى في حالة الاقتراب من مريض مصاب بـ COVID-19.

ان التخطيط الدقيق وفصل المرضى المصابين بـ COVID-19 قد يساعد في تقليل النقص في الموظفين المرتبط بالانتشار الفيروسي المنفلة وغير المنضبط.

Patient's Locations

اماكن تواجد مرضى COVID-19

COVID-19

يجب تخصيص مناطق محددة لمرضى COVID للأوقات الطارئة. ويجب أن يكون أقرب مدخل إلى مبنى غرفة العمليات هو المدخل الأول ومخصص لمرضى COVID-19 تحديداً. وعليه يجب استخدام غرف العمليات بترتيب القرب من مدخل مبنى غرفة العمليات عند تنفيذ عدة إجراءات جراحية في وقت واحد وذلك من أجل تقليل التلوث البيئي في مبنى غرفة العمليات قدر المستطاع.

اجراءات نقل المصابين بـ COVID-19

يجب أن يكون عملية نقل المريض من وإلى مناطق العمليات COA في أسرع وقت ممكن. ويجب أن يكون المسار المباشر المحدد مسبقاً قصيراً قدر الإمكان وبعيداً عن المرضى الآخرين والأشخاص غير المصابين بشكل عام داخل المستشفى لتقليل فرص اصابة الآخرين بالمرض.

فإذا كان المطلوب نقل المريض بين المستشفى (داخل البناية الواحدة) أو النقل داخل المستشفى (بين المباني الأخرى) ، فيجب استخدام سيارة مخصصة

لعملية نقل المريض المصاب (سيارة اسعاف او سيارة اخرى مخصصة لنقل المصابين بـ COVID-19)، وينبغي تدريب وتجهيز أفراد النقل على وجه التحديد بمعدات الحماية الشخصية PPE ويتم الاحتفاظ بمقصورة المريض في سيارة النقل منفصلة عن السائق. يمكن استخدام وحدة الاحتواء الحيوي (Biocontainment).



إذا تم نقل المريض من مكان الى مكان مجاور اخر، فيمكن استخدام نقالة وتنطبق جميع التدابير الطبية الاحترازية على استخدام تلك النقالة وعلى الموظفين المسؤولين عن عملية النقل وعلى المريض نفسه (الجدول 1، الشكل 1)، أثناء وبعد اكتمال النقل مع ضرورة التعقيم الفوري للجميع (الجدولان 2 و 3). وفي حالة حدوث أي تلوث غير متوقع أثناء النقل (أي تقيؤ المريض أو غير ذلك)، يجب إجراء تعقيم مخصص مناسب. قد يثبت وجود فريق تنظيف متخصص ومدرب بشكل خاص على مدار الساعة طوال أيام الأسبوع من خدمة التنظيف المحلية المتعاقد عليها.

يجب على أي مريض بـ COVID-19 ارتداء قناع جراحي، وقفازات مقاومة للماء، وكذلك غطاء للرأس ايضاً، وأغطية أحذية أثناء النقل يمكن التخلص منها لاحقاً. ويجب تعقيم أيدي المريض قبل اجراء النقل ويجب على الناقلين المتخصصين تعقيم ايديهم وارتداء معدات الحماية الشخصية قبل النقل ويجب تقليل الاتصال بالمرضى المصابين فضلاً عن تنبيه أي شخص يعبر مسار مريض مصاب بشكل استباقي لتقليل الاتصال. ستساهم اللوجستيات الحديثة والنظامية في تقليل الخسارة في الارواح لكلا الطرفين (المرضى والناقلين لهم). ان استخدام حاويات مخصصة (مخصصة للمواد ذات المخاطر المعدية) ويمكن التعرف عليها جيداً بوضع علامات دالة عليها وعلى ما تحويه من مواد خطرة. واخيرا يجب نقل مرضى COVID-19 بأكثر الطرق احتراقاً وسرية ممكنة لتقليل الانزعاج لهم ولتقليل الاعباء على الموظفين الناقلين وتحديد المناطق المخصصة للمرضى المصابين بشكل استباقي في قسم

الطوارئ ويجب تبسيط اجراءات نقل المريض المصاب من قسم الطوارئ إلى مواقع اجراء العمليات لتجنب جميع الاتصالات والملامسات غير الضرورية وعلى كل مستشفى يجب ان توفر مسار مُحدد مسبقا ومحدد خطوة بخطوة لمرضى COVID.

الجدول 1 يوضح بعض من معدات الحماية الشخصية الضرورية

الفائدة منها	صورة المادة	مختصره العلمي	اسم المادة علميا	اسم المادة
تصفية الهواء وغالبا ماتستخدم هذه الاقنعه لحماية فريق فحص Covid-19 وفريق علاج مرضى الفيروس من الإصابة بفيروس كورونا.		FFP2	FFP2 Filtering Facepiece Facial Mask	قناع الوجه-2 قناع تصفية هواء يصل لغاية %94
تصفية الهواء وغالبا ماتستخدم هذه الاقنعه لحماية فريق فحص		FFP3	FFP3 Filtering Facepiece Facial Mask	قناع الوجه-3 قناع تصفية هواء يصل لغاية %99

<p>Covid-19 علاج مرضى الفيروس من الإصابة بفيروس كورونا.</p>				
<p>وهي عباءات المستشفى التي يرتديها المهنيون الطبيون لحماية المعدات شخصية (PPE) من أجل توفير حاجز بين المريض والمهني.</p>		<p>PPE Gown</p>	<p>Medical gowns</p>	<p>العباءات الطبية</p>
<p>تستخدم لحماية اليدين. قفازات واقية مصنوعة من مطاط النتريل. لديهم مقاومة كيميائية جيدة ، وخصائص فيزيائية</p>		<p>NG</p>	<p>Nitrile Gloves Or NBR Gloves</p>	<p>Nitrile قفازات</p>

<p>جيدة ، وخصائص مضادة للكهرباء ، الساكنة ، وأنماط مريحة ، ويستخدمو ن على نطاق واسع في مصانع الإلكتروني ات وعمليات التفتيش الطبية</p>				
<p>حماية قصوى للشخص من التلامس او التعرض للمصابين</p>			<p>Tyvek suit</p>	<p>تايفيك بدلات</p>
<p>تستخدم لحماية العينين من الحبيبات المتطايرة أو من الماء أو الكيمائيات</p>		<p>Goggles</p>	<p>safety glasses</p>	<p>نظارات واقية أو أقنعة</p>
<p>حماية الشعر من التلوث بوصفه ناقلًا حيويًا وفعالاً للمرض</p>				<p>أغطية رأس يمكن التخلص منها</p>

واكثر عرضة للملامسة				
حماية القدمين والاحذية بوصفها ناقلًا حيويًا وفعالاً للمرض من الاماكن المصابة الى الاماكن غير المصابة.				أغطية أحذية طويلة يمكن التخل ص منها
لتعقيم اليدين بفعالية حيث يزيل الكحول الكائنات الحية الدقيقة من أيدي الأفراد بشكل أكثر فعالية			Alcoholic hand hygiene solution	محلول كحول لتنظافة اليدين
تستخدم لاغراض التخدير			Anesthet ic Trolleys	ادوات التخدير مجموعة بعربة واحدة مخصصة للغرض نفسه

من المهم تقليل العدد الإجمالي للعاملين في المناطق المخصصة لمرضى Covid-19 كلما كان ذلك ممكناً ، ومن المهم تقليل عدد الأشخاص الذين يعملون فيها حتى في حالات الإصابة الواحدة .

وهذا الاجراء يجب أن ينطبق أيضاً على الحالات التي تتعرض لنوبات الفيروس بصورة متكررة. يمكن تنظيم العمليات لمرضى COVID من خلال نوبة عمل مخصصة عند الطلب. قد يتطلب ذلك أنشطة ليلية أو خارج ساعات العمل لتحسين استخدام الموارد. قد يسهل هذا النهج الفصل بين مرضى COVID والمرضى غير المصابين بـ COVID ، والذين سيستمررون في طلب الرعاية الجراحية.

اما معدات الوقاية الشخصية PPE والمخزون اللازم لنظافة اليدين (Alcoholic hand hygiene solution) فيجب تجديدها باستمرار داخل مناطق تشغيل COVID وان تكون المنطقة المعقمة والمخصصة حصرا لمرضى COVID مجهزة بمعدات الوقاية الشخصية ، ومعقمات نظافة اليدين ، وصناديق النفايات الصحية ذات المخاطر المعدية فضلا عن التعامل مع "الصدرية الطيبة" بشكل مناسب والذي يحتمل أن تكون مصابة والتقليل من استخدام الادوات المخصصة لتسهيل نقل المرضى، كما ويجب إبقاء جميع أبواب المناطق المخصصة لمرضى Covid-19 مغلقة تماما (بما في ذلك مساحات التعقيم) ونقل أي معدات غير ضرورية بعيداً عن طريق عبور مرضى COVID-19.

المسؤولية الكاملة لتولي المناطق المخصصة لمرضى COVID-19

يجب إيلاء اهتمام خاص لما يعد ممارسة روتينية في الأوقات التي لا يوجد فيها فيروس كورونا. ويجب أن يقتصر الموظفون المسؤولون عن المرضى المصابين أو المشتبه في إصابتهم على الموظفين الذين يشاركون بشكل كبير في كل إجراء عادي خارج المرض والاحتفاض بسجل خاص لجميع العاملين المشاركين في الإجراءات الخاصة بالمرضى الذين يحتمل إصابتهم. ويجب على الموظفين المجهزين بمعدات الوقاية الشخصية الكاملة استقبال المريض في المنطقة المخصصة لمرضى كورونا ونقل المريض إلى غرفة العمليات لتقليل التلوث البيئي في المناطق الأخرى. وبعد انقضاء مدة العناية بالمريض ، يتم نقل المريض على صالة العمليات في غرفة العمليات المخصصة لذلك.

يجب على جميع المرضى الذين لم يدخلوا بعد الى المستشفى من ارتداء قناع جراحي واق ويجب أن تظل السجلات الطبية المخصصة لهم خارج غرفة العمليات ويجب الرجوع إليها في حالة توفر كل جديد اثناء تحديثها.

الجدول 3 إدارة مرضى COVID-19 الجراحي

يجب التعامل مع جميع المرضى المشتبه بهم أو المصابين بأقصى قدر من
على جميع الأفراد الذين يتعاملون مع المريض ارتداء معدات الوقاية
يجب حماية عمليات النقل للمرضى.
نقل المرضى المصابين بأقل قدر ممكن من التنقلات في داخل المستشفى.
أن تكون طرق النقل مخططة بدقة وأن تكون قصيرة قدر الإمكان.
أن تكون المنطقة المخصصة لمصابي COVID منطقة مفصولة .
تخصيص غرفة مصابي COVID قريبة قدر الإمكان من مدخل مبنى
يفضل استخدام مواد يمكن التخلص منها لاحقاً.
استخدام الحد الأدنى من المواد لكل تدخل مع المرضى المصابين.
أن يكون أفراد النقل هم أنفسهم من مصدر النقل إلى الوجهة المقصودة.
إغلاق أبواب غرفة العمليات بمجرد دخول المريض إليها
على العاملين (أي الجراح وطبيب التخدير والممرضات والفنيين) دخول
غرفة العمليات في الوقت المناسب لتقليل التعرض للمرضى المصابين
يجب ألا يغادر الموظفون المشاركون في التدخل الجراحي الى غرفة
العمليات أثناء الإجراء
ينصح باستخدام عدد كبير من دورات تبديل الهواء بغرفة العمليات (اكثر
من 25 دورة تبديل بالساعة الواحدة)
تبقى الوثائق السريرية للمرضى المصابين خارج غرفة العمليات
جميع المواد المستخدمة من الانواع الذي يمكن التخلص منه في نهاية كل
التخلص من جميع الأسطح والأجهزة الطبية الكهربائية وتنظيفها وتطهيرها
بدقة
إزالة معدات الوقاية الشخصية والتخلص منها خارج غرفة العمليات في
مناطق خلع مخصصة لضمان عدم انتقال الفيروس إلى عامل الرعاية
الصحية
تطهير غرف العمليات ومناطق الارتداء / الخلع المحيطة في أسرع وقت
ممكن بعد كل إجراء
على جميع الأفراد المعنيين الاستحمام ، كلما أمكن ذلك وبعد كل إجراء
أن تتم مرحلة التعافي بعد الجراحة في غرفة العمليات ، قبل نقل المريض
الى وحدة العناية المركزة

إعداد غرفة العمليات OR Preparing

غرف العمليات ذات الضغط السلبي ستكون مثالية لتقليل مخاطر العدوى وتقليل المعدات المحفوظة في كل غرفة إلى ما هو ضروري تمامًا على أساس كل حالة على حدة ومدى أهميته بالنسبة إلى المريض المصاب. وبمجرد بدء العملية ، يجب بذل كل الجهود لاستخدام ما هو متاح في الغرفة وتقليل انتقال الموظفين داخل / خارج غرفة العمليات لتقليل مخاطر العدوى.

يجب استبدال العربات المخصصة لعدة التخدير (Anesthetic Trolleys) بأخرى مُعدة مسبقًا ومخصصة بأقل مخزون كافٍ وتحضير جميع المواد الجراحية المطلوبة (مثل الغرز والشفرات والمباضع الطبية) بشكل استباقي في سلة أسلاك فولاذية قابلة للتعقيم المتكرر فضلًا عن استخدام حاويات النفايات الصحية ذات المخاطر المعدية المخصصة للأدوات المصايب والحادة والتي يمكن التخلص منها. كما ويجب أن يكون المحلول الكحولي لنظافة اليدين متاحًا دائمًا ويوصى بتجنب استخدام الأجهزة غير المستخدمة بشكل شائع وغير الضرورية للغاية. ويفضل استخدام المواد التي يمكن التخلص منها بشكل عام ، بما في ذلك الصديريات الطبية. يجب على جميع العاملين (أي الجراح وطبيب التخدير والمرضات والفنيين) دخول غرفة العمليات في الوقت المناسب بهدف تقليل الوقت الذي يقضيه داخل غرفة العمليات نفسها. بمجرد دخولهم غرفة العمليات وان لا يغادروا حتى تكتمل العملية ، وبمجرد خروجهم لا يجب عليهم الدخول مرة أخرى.

العناية الشخصية للأفراد

على جميع العاملين ارتداء معدات الوقاية الشخصية المطلوبة قبل مقابلة المريض المصاب. يجب أن يقوم موظفو استقبال المريض داخل غرفة التعقيم الخاصة من أداء نظافة اليدين وارتداء معدات الوقاية الشخصية الكاملة. أثناء رعاية المرضى المصابين وتغيير القفازات فورًا بعد ملامسة المواد المصايب (الأشياء ، الأسطح ، إلخ) أو في حالة حدوث أي ضرر.

ارتبطت بعض الإجراءات التي يُحتمل أن تتولد من جرائها بعض الجزيئات الضبابية من زيادة انتقال الفيروس ، لذلك يجب ارتداء قناع FFP3 من قبل العاملين الذين يعملون بالقرب من المريض أثناء هذه الإجراءات.

بالنظر إلى قابلية الانتقال الفيروسي السريعة ، فمن المهم ارتداء أقنعة أو نظارات واقية لحماية العين من التعرض المحتمل للجزيئات الفيروسية.

يجب تفضيل معدات مجرى الهواء (intubation techniques) التي يمكن التخلص منها وتوفرها بصورة دائمة لتلافي حالات الاختناق للمرضى المصابين وان يكون الطاقم الطبي والتمريض مجهزاً بمرشحات FFP3 ويفضل تقنيات التهوية (intubation techniques) مع أعلى فرصة للنجاح لأول مرة لتجنب تكرار أجهزة مجرى الهواء.

في نهاية هذه الإجراءات ، يجب على جميع الموظفين الذين يقومون بالإجراء مباشرة استبدال الزوج الأول من القفازات وغيرها من معدات الوقاية الشخصية على الفور في حالة وجود مخاطر تلوث شديدة (أي في حالة حدوث القيء أو السعال أو غير ذلك).

إدارة أثناء الجراحة Administration During the Operation

يجب أن يظل باب غرفة العمليات مغلقاً في جميع الأوقات ويجب تثبيت العلامات الواضحة عند دخول الغرفة وتقليل توفير المواد غير الضرورية داخل غرفة العمليات أثناء الجراحة لتلافياً لتلوثها. كما يجب على الممرضة الدورية المتخصصة بالكشف عن المرضى وبالتعاون مع جراح العمليات المتخصصة من توقع ما هو مطلوب منها أثناء العملية وقبل البدء بالعملية.

يفضل أن يقوم الجراحون المتخصصون من إجراء العملية بما هو متاح في غرفة العمليات وارجاع المعدات الضرورية بوساطة موظفين خارج غرفة العمليات وان لا يغادر الموظفون الموجودون في غرفة العمليات أثناء الجراحة الغرفة ابدا الا بعد تغييرهم (اجراء التعقيم الكامل لهم) وتغطية الأجهزة الطبية الإلكترونية المستخدمة والأسطح الأخرى داخل صالة العمليات بغطاء واقى مناسب ومعقم بشكل كافٍ في نهاية العملية ويتم التخلص منه لاحقاً. سيقوم الفريق الجراحي بارتداء القناع الجراحي المفلتر بفلتر FFP2 وارتداء أغطية أحذية طويلة قبل القيام بإجراءات العملية وان يرتدي جميع الأفراد الذين هم على اتصال مباشر بالمرضى زوجاً مزدوجاً من القفازات في جميع الأوقات ، حتى أثناء الجراحة وبعد مغادرة المريض لغرفة العمليات ، يجب أن تتيج اللوجيستيات أكبر وقت ممكن قبل الإجراء التالي ، لتقليل احتمال تلوث الهواء ويجب زيادة دورات تبادل الهواء كلما أمكن ذلك إلى 25 تبادل / ساعة [2] فضلا عن تنظيف جميع المناطق المعرضة لخطر التلوث وتطهيرها (كما تم ذكره في الجدول رقم 2). كما ويجب بذل الجهود لتقليل مخاطر التلوث المرتبطة بالعينات المرسلّة إلى قسم علم الأمراض.

نزع ملابس / نزع معدات الوقاية الشخصية لأغراض التخلص منها

يجب على الموظفين غير المشاركين بشكل مباشر في رعاية المريض مغادرة غرفة العمليات في نهاية العملية وإزالة جميع معدات الوقاية الشخصية في منطقة خلع مخصصة . والوصول إلى منطقة نظيفة فقط بعد اكتمال إجراء الخلع والتخلص من جميع معدات الوقاية الشخصية المستخدمة من خلال حاويات النفايات الصحية ذات المخاطر المعدية واستبدال المقشر بعد كل إجراء بعد الاستحمام كلما أمكن ذلك. ويجب على الموظفين المسؤولين عن نقل المريض بعيداً عن غرفة العمليات اتباع طرق وصول منفصلة وارتداء معدات الوقاية الشخصية مختلفة عن تلك التي يتم ارتداؤها في غرفة العمليات.

جدول رقم(2) جدول تسلسل التطهير (تسلسل التعقيم السطحي والكهربائي الطبي)

1. نظف بمحلول مشتق من الكلوروفورم
2. شطف وجفف
3. تطهير بمحلول مشتق من الكلور بتركيز $\leq 0.1\%$ أو 1000 جزء في المليون ؛ يجب أن يكون وقت التطهير أعلى من دقيقة واحد.

تعليمات لإزالة معدات الوقاية الشخصية

يجب أن يتوخى أخصائي الرعاية الصحية كل الحرص حتى لا يصاب بالعدوى أثناء إزالة معدات الوقاية الشخصية ؛ يجب أن يتم ذلك من خلال إجراء مناسب يمنع إعادة تلوث ملابس المشغل ويديه. من المحتمل أن يكون الزوج الأول من القفازات ملوثاً بشدة ويجب إزالته أولاً واعتبار جميع معدات الوقاية الشخصية الأخرى مصابة أيضاً وإزالتها بعناية أثناء إجراء الخلع ، خاصةً إذا كان المريض يعاني من السعال. يجب إزالة غطاء الحذاء وغطاء الرأس لاحقاً. بعد ذلك يجب نزع قناع الوجه والنظارة مع الحرص على التعامل مع القناع من أربطة الأذن ودون لمس جانبه الخارجي. يجب إزالة الزوج الثاني من القفازات حيث يجب إجراء آخر معدات الوقاية الشخصية وتطهير اليدين بمحلول كحولي مائي بدقة على الفور بعد ذلك.

التعقيم البيئي (التعفير)

يتم تطهير غرفة العمليات ومناطق الاستبدال المحيطة بها في أسرع وقت ممكن بعد كل إجراء ، مع إيلاء اهتمام خاص لجميع الأشياء المستخدمة عند

رعاية المرضى المصابين. وبالمثل ، يجب تعقيم جميع المناطق التي مر بها مرضى COVID بعناية أيضًا وعلى جميع الأفراد المساهمة في الحفاظ على بيئة نظيفة بما في ذلك الأرضيات والأسطح بشكل عام. يجب التخلص من جميع المواد التي يحتمل أن تكون مصابة للاستخدام مرة واحدة من خلال حاويات النفايات الصحية ذات المخاطر المعدية وتطهير المواد القابلة لإعادة الاستخدام وغسلها وتجفيفها و / أو تطهيرها / تعقيمها ، بناءً على احتمالية الإصابة فضلا عن تنظيف المعدات الطبية الكهربائية (مثل جهاز التنفس الصناعي ، والمعدات الإشعاعية) بمحلول مشتق من الكلوروفورم ، وشطفها وتجفيفها ، ثم تطهيرها بمحلول كلورو تنفيس بتركيز $\leq 0.1\%$ أو 1000 جزء في المليون (أجزاء في المليون) مع وقت تلامس أعلى من دقيقة واحدة (الجدول 2). يجب ارتداء معدات الوقاية الشخصية الكاملة أثناء إجراء التعقيم واستخدام المواد التي يمكن التخلص منها فقط (على سبيل المثال ، قفازات مزدوجة ، منشفة ورقية) للتنظيف واخيرا التخلص من أي شيء يمكن التخلص منه داخل غرفة العمليات أثناء العملية من خلال حاويات النفايات الصحية ذات المخاطر المعدية ، حتى لو لم يتم استخدامها.

التخلص من النفايات من خلال النفايات الصحية ذات المخاطر المعدية

يُصح بإعداد حاوية مخصصة للنفايات الطبية الخطرة خارج غرفة العمليات على الفور، للتخلص الفوري من جميع المواد الملوثة التي يمكن التخلص منها ومعدات الوقاية الشخصية. يجب إغلاق الحاويات وإغلاقها قبل نقلها إلى نقطة التجميع التخلص من جميع الأدوات الحادة في حاوية بلاستيكية صلبة مخصصة وارتداء معدات الوقاية الشخصية عند إغلاق ونقل الحاويات وإزالتها فورًا واستبدال أي حاوية تالفة أو ملوثة على الفور.

الصدريات الطبية المصنوعة من الكتان

يمكن أن تكون الصدريات الطبية ملوثة ولذلك يجب التعامل معها ونقلها بعناية الى مناطق التخلص الفوري بهدف منع انتشار العدوى ويفضل الغسيل الذي يستخدم لمرة واحدة ، عندما يكون ذلك ممكناً. يجب التعامل مع جميع النفايات (الشراشف ، وأكياس الوسائد ، والقضبان العرضية ، وما إلى ذلك) ، ولا توضع على الأسطح أو الأرضيات ، ولكن مباشرة داخل حاويات مخصصة وإحكام إغلاقها وإرسالها على الفور للتنظيف والتعقيم ، مما يحد من تركها خارج غرفة العمليات.

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