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Procedure for online submission of manuscript

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EDITORIAL

A Framework for Ethical Integration of Artificial Intelligence Tools in Medical Research and Writing

Fareeha Farooq[1], Farooq Azam Rathore[2]

The global landscape of medical research and writing over the last decade has been evolving rapidly. It got a major boost by the public launch of ChatGPT in November 2022. It has been further accelerated due to the widespread availability and easy access to a variety of artificial intelligence (AI) tools based on Large Language Models (LLMs).[1] The use of AI tools in medical research and writing is on the rise. However, many students, faculty members and researchers particularly in developing countries are still unclear on the transparent and ethical integration of the AI tools in research and writing. We propose a framework for the appropriate integration of AI in medical research and writing in context of a developing country like Pakistan. It highlights responsible and transparent use of AI tools, discuss authorship in the era of AI tools and how to ensure scientific integrity.

How AI Tools can Enhance Research and Writing

AI tools can help researchers with various steps of research and writing like brainstorming and refining research questions, creating questionnaires, detailed data analysis, creating outlines of the manuscripts and improving the readability by enhancing the language, grammar and syntax of the text.[2] This can potentially improve the efficiency and productivity of the researchers. However, there are some ethical challenges unique to the use of these AI tools that need consideration. It is important to establish and follow a framework for responsible and ethical use of AI in research and writing that promotes transparency, upholds the integrity of the research and maintains public trust in research findings.[3]

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Brainstorming Ideas and Creating Research Questions

The first step in a research project is conceptualizing research goals and brainstorming ideas. Before using AI tools, researchers must understand questions they aim to answer, and the potential impact it can create. This clarity helps in ensuring that AI tools will complement, not dictate, the direction of the research. This step should not be totally delegated to an AI tool. Any LLM can be used to generate and brainstorm a research question using appropriate prompts. AI tools like "Research kick" (https://www.researchkick.com/) are specifically created to brainstorm ideas and refine research questions.

Literature Review and Data Analysis

AI tools can be used to quickly scan millions of articles, identify the relevant literature and then extract information from the PDF files of the articles. "Semantic scholar" (https://www.semanticscholar.org/), world's first AI based search engine, offers filters, summaries (TLDR), citations, and key insights. Tools like Connected Papers, Scite and "Litmaps" create literature maps and graphs centered around a seed paper and identify gaps in the research landscape. It is important to check the output for quality, relevance, and up-to-date content. Cross-checking and manual review will prevent the inadvertent inclusion of biased, incorrect or outdated research. [4] Data files can be uploaded in the excel format to the LLMs like ChatGPT or Claude for data analysis. There are specific tools like Julius.ai which can be used for detailed data analysis.

Structuring and Refining Manuscripts

When the literature search, data collection and analysis is complete other AI tools can be used for structuring the manuscript. AI tools like ChatGPT, Claude or Gemini can organize the content into a coherent flow, outlining introduction, methods, results, and discussion sections. A critical review is mandated for depth, and missing nuances, adding expert insights. While the AI tools provide a starting point, and save time, researchers must expand the

final draft by adding their own analysis and thought process to draw meaningful conclusions. This is evident from recent analysis that compared reviews on various criteria, finding GPT-4 was superior in response time and knowledge breadth, while human reviews were stronger in accuracy, depth, and contextual understanding.[5] Once contents have been finalized, AI tools can improve the language, grammar and syntax of the manuscript. Grammarly, Hemmingway, Quill Bot, Paperpal and other LLMs can rephrase and simplify complex sentences, enhancing readability and flow of the manuscript particularly useful for non-native English researchers. However, it is important not to lose the personal voice and unique perspective of the researcher.

Ethical Challenges in AI Usage

Quality and Reliability of AI-Generated Outputs

A common issue encountered in using Artificial Intelligence tools is that recommended sources are either not accessible as links or articles are missing or taken from predatory journals. This raises questions about the reliability of the output. The problem of low-quality citations from predatory journals has been raised by experts in literature. [6] This challenge is compounded by the opaque nature of many AI systems, particularly deep learning models. Secondly, the AI generated outputs are not transparent as there is data and algorithmic bias and it is not clear if the AI output is generated on citation counts, impact factors, or some other criteria.[7]

AI "Hallucinations"

AI tools are prone to "hallucinations," generating fabricated or misleading content.[8] This can mislead researchers' understanding and potentially undermine the credibility of their work. Therefore, blind reliance of AI output must be avoided, and periodic manual cross-checking and validation of AI-generated outputs is recommended to mitigate these risks.

Ensuring Originality and Avoiding Plagiarism

Ensuring originality is a significant challenge when using AI in academic writing as it may generate content that closely resembles existing works. It may even produce text verbatim giving a high similarity index.[9] Therefore, plagiarism detection software must be used before submission. This additional layer of oversight will uphold academic integrity. The final manuscript should reflect researcher's own understanding, with AI serving only as a refining and supporting tool.

Transparency and Disclosure in AI Use

Transparency is another component of ethical AI use that needs attention. Researchers must disclose how AI tools contributed to their work, whether in the acknowledgments or methodology section of the manuscript. The International Committee of Medical Journal Editors (ICMJE)have recently updated their guidelines with a separate section on “How work conducted with the assistance of artificial intelligence technology should be acknowledged (Sections II.A.3 and 4 and IV.A.3.d)” and “Use of artificial intelligence in the review process (Sections II.C.2.and II.C.3)”.[10] This transparency is necessary to maintain trust within the academic community and shows responsible AI usage.

Evolving Ethical Guidelines

As AI technology continues to evolve, the ethical guidelines and frameworks also need to be reviewed and adapted to the rapidly changing scenario in academic writing. Staying up-to-updated on the latest developments in AI and adapting to new guidelines is necessary to ensure academic integrity. The role of AI in medical research is far from static, and researchers must be proactive in learning how to best leverage these tools ethically.

Conclusion

AI tools have a significant potential to enhance medical research and writing, particularly in resource-constrained settings. When used responsibly and transparently, these tools can streamline research processes and improve the quality of academic writing. However, they should remain assistants, not replacements, for human expertise. By adhering to a framework emphasizing ethical use, originality, and transparency, researchers can harness AI's power while preserving the integrity and quality expected in medical literature. While the future of AI in research is promising, vigilance and proactive adaptation are crucial to ensuring its ethical integration.

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ORIGINAL ARTICLE

To Compare Reduction in Exacerbation of Severe COPD with Double Inhaled Therapy Plus Roflumilast Vs Double Inhaled Therapy Alone

Jahangir Ali[1], Rubina Aman[2], Attiya Hameed[3], Hamza Masood[4]

ABSTRACT

Objective: To compare the efficacy of double inhaler therapy plus Roflumilast versus double inhaler therapy alone in reducing COPD exacerbations among patients with severe COPD.

Study Design: Quasi experimental study.

Place and Duration of Study: The study was conducted in Pulmonology department Pakistan Institute of Medical Sciences Islamabad, from 1-8-2019 to 1-8-2020.

Materials and Methods: A total of 126 COPD (GOLD stage III and IV) patients, on dual inhaled therapy with Long-Acting Beta 2 Agonists (LABA) and Inhaled Corticosteroids (ICS), who had one or more acute exacerbation in the preceding year were included in the study. Patients were divided into two groups A & B. Group A was assigned dual inhaled therapy plus Roflumilast 500mcg once daily, and Group B, dual inhaled therapy alone. Forced Expiratory volume 1 (FEV1*),* 6 minutes' Walk Distance (6mWD), modified Medical Research Council Scale for dyspnea (mMRC dyspnea scale) and number of acute exacerbations were assessed at baseline, and at one , three, six, nine and twelve months of treatment and compared. SPSS version 21 was used for analyzing the data. Categorical variables were computed as frequency and percentage. Mean and Standard Deviation for numerical variables. Chi square test was used to compare frequencies of categorical variables and independent sample t-test for Mean. Level of Significant was taken at $P \leq 05$.

Results: Twelve months after the start of therapy, group A showed significant improvement in FEV1, 6MWD, mMRC scale and acute exacerbations compared to group B (p values = 008*, 0.001*and 0.04* respectively).

Conclusion: Adding Roflumilast to dual inhaled therapy in severe COPD significantly improves lung functions, patients' functional status and frequency of acute exacerbations

Key Words: *Chronic Obstructive Pulmonary Disease*, *Forced Expiratory Volume, Forced Vital Capacity, GOLD Stage, Inhaler Therapy, Roflumilast.*

Introduction

COPD is a progressive disorder characterized by chronic inflammation of the airways and parenchymal lung destruction, leading to a decline in lung function. The course of COPD is complicated by acute exacerbations. Co morbidities like cardiac failure, hypertension, diabetes mellitus, and pneumonia also effect the clinical course.[1] Recurrent exacerbations are major determinants of reduction in lung function, and increase in morbidity and mortality. Acute exacerbations are defined as sustained worsening of a patient's condition beyond normal day to day variation that require a change in medication and or hospitalization. [1] Roflumilast a highly selective phosphodiesterase-4 (PDE4) inhibitor has been evaluated in the treatment of severe COPD and has revealed improvement in lung functions and reduction in acute exacerbations. PDE4 is a major cyclic-3',5'-adenosinemono-phosphate (cyclic AMP, cAMP)-metabolizing enzyme which is expressed on nearly all immune and pro-inflammatory cells. The increase in intracellular c AMP induced by roflumilast's inhibition of PDE4 is thought to mediate its disease-modifying effects.[2] It is given orally and has a bioavailability of 80%. It has been evaluated in the treatment of COPD in phase III/IV randomized double- blind trials that revealed improvement from baseline in Forced Expiratory Volume in first second (FEV1) and post

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bronchodilator Forced Vital Capacity (FVC).[1,3,4]

In Pakistan the prevalence of COPD is reported to be 2.1% among adults aged more than 40 years. [5] In rural areas of Pakistan, the prevalence of undiagnosed COPD is 31.1% [6] which imposes a significant health burden in Pakistan.

In this study we compared the effect of Roflumilast plus double inhaled inhaler therapy on lung functions, patients' functional status and frequency of acute exacerbations to double inhaled therapy alone in our population.

Materials and Methods

A quasi-experimental study was conducted over a period of one year at Pakistan Institute of Medical Sciences. A total of one hundred and twenty-six (n=126) diagnosed patients of COPD (Gold stage III and IV) who were on regular double inhaled therapy (LABA and ICS) and had one or more exacerbation in the previous year were enrolled. Written informed consent from the patients and approval from the ethics committee of Shaheed Zulfiqar Ali Bhutto Medical University SZAMBU /PIMS was taken prior to enrollment (Letter No. F.1-1/2015/ERBSZABMU/446 Dated 23-7-2019). The sample size was calculated by WHO calculator.

Patients were divided into groups A & B. Group A received dual inhaled therapy plus Roflumilast and Group B received dual inhaled therapy alone. Patients were assessed at baseline and after one month (follow up 1), three months (follow up II), six month (follow up III), nine months (follow up IV) and at twelve months (follow up V) for FEV1, 6mWD, m MRC dyspnea scale 0 to 4 : (0- breathlessness on strenuous exercise only ; 1 shortness of breath on walking fast or uphill; 2, walks slower because of breathlessness or has to stop to catch breath; 3, stops for breath after walking ~ 100 m or after few minutes on the level; and 4, too breathless to leave the house, or breathless when dressing or undressing).[7]

Improvement in m MRC dyspnea scale and number of exacerbations during the treatment year were assessed by detailed history and medical records of admission in ER or hospitalization at 12 months and compared in both groups.

Inclusion Criteria

Patients of COPD diagnosed by spirometry with FEV_1/FVC ratio less than 70%, and pre- and post-BDT FEV_1 of 30 to 49% of the predicted for Grade III and < 30% for Grade IV), smoking history of 20 pack years or more, at least one exacerbation of COPD in the previous year , on inhaled LABA and ICS regularly for the last one year and no exacerbation in the 4 weeks prior to inclusion in the study were included in the study .

Exclusion Criteria

Patients with less than one exacerbation in the previous year, those not using dual inhaler therapy, who had an acute exacerbation four week prior to enrollment and those with comorbidities like cardiac failure, asthma and bronchiectasis were excluded.

Data Analysis

SPSS version 21 was used for analyzing the data. Categorical variables like gender, symptoms (m MRC Dyspnea Scale,) were computed as frequency and percentage. Mean and Standard Deviation was computed for numerical variables like age, FEV1, FEV1/FVC. Chi square test was used to compare relative frequencies of categorical variables in both groups. Independent sample t-test was used to compare Mean, Level of Significant was taken at *P* ≤05.

Results

The total number of patients was 126, 63 in each group**.** The groups were comparable in age, gender, co-morbidities, COPD stage and baseline parameters of FEV1, FEV1/FVC and 6mWD ,COPD exacerbation in the previous year ,mMRC scale of dyspnea (Table I)

At 12 months after the start of therapy FEV-1 improved in both treatment groups, the improvement was better in Group A. The difference for FEV1 was statistically significant at 9 month (p=0.042*,) and at 12 months (p=0.008*). (Table II). The improvement in 6MWD in Group A was also significant. p=0.001*(Table III). Group A showed 15.9% in improvement in the m MRC scale compared to 4.8 % in Group B with P=0.04*. (Table IV) while 25.4% of patient in Group A showed reduction in acute exacerbations compared to 4.8% Group B P=0.001* (Table IV).

Discussion

The results of this study show that adding Roflumilaast to standard treatment of advanced COPD leads to improvement in lung functions and patients' functional status in addition to reducing the frequency of Acute exacerbations.

Table I: Baseline Characteristics Including Gender, Age, Co-Morbidities , COPD GOLD Stage, Lung Parameters and Number of Acute Exacerbations: n=126

Gender		Groups		Total
		A	B	
Male		41(65.1%)	43(68.3%)	84(66.7%)
Female		22(34.9%)	20(31.7%)	42(33.3%)
TOTAL		63(100.0%)	63(100.0%)	126(100.0%)
Different Age Groups				
40-55 YEARS		26(41.3%)	27(42.9%)	53(42.1%)
56-70YEARS		37(58.7%)	36(57.1%)	73(57.9%)
Mean age (years)		56.6±5.6	56.3±5.1	56.4±5.3
Baseline co Morbidities				
HTN	Present	12(19.0%)	13(20.6%)	25(19.8%)
	Absent	51(81.0%)	50(79.4%)	101(80.2%)
DM	Present	15(23.8%)	17(27%)	32(34%)
	Absent	48(76.2%)	46(70%)	94(74.6%)
IHD	Present	9(14.3%)	8(12.7%)	17(13.5%)
	Absent	54(85.7%)	55(87.3%)	109(86.5%)
Gold Stage				
STAGE III		39(61.9%)	43(68.3%)	82(65.1%)
STAGE IV		24(38.1%)	20(31.7%)	44(34.9%
Baseline Parameters				
FEV1 (ml)	MEAN	1042.3	1034.4	
	STD. DEV	299.1	306.9	
FEV1 (%)	MEAN	35.3	35.2	
	STD. DEV	8.2	8.3	
FEV1/FVC	MEAN	34.1	32.1	
	STD. DEV	14.9	13.4	
6MWD	MEAN	282.6	283.3	
	STD. DEV	112.6	111.9	

Number of Exacerbations During Previous year			
Number of exacerbations	A	B	TOTAL
1	6 (9.5%)	13(20.6%)	19(15.1%)
2	40(63.5%)	30(47.6%)	70(55.6%)
3	10(15.9%)	17(27.0%)	27(21.4%)
4	7(11.1%)	3(4.8%)	10(7.9%)

The improvement in 6MWD was significant at six months and FEV1 at nine months of starting Roflumilast .At twelve months the mMRC scale had improved in the treated group by 10.3% and the frequency the acute exacerbation by 15.9% . It is interesting to note that there was an overall

Table II: Comparison of FEV1 In Both Groups Overtime

FEVI (ml)	Groups	Mean	SD	P-value t-test
Baseline	A	1042.3	299.1	0.984
	B	1043.4	306.9	
Follow up 1	A	1072.4	295.2	0.721
	B	1053.3	307.1	
Follow up 2	A	1084.1	297.5	0.634
	B	1058.4	307.5	
Follow up 3	A	1094.7	299.1	0.616
	B	1067.6	306.2	
Follow up 4	A	1175.1	318.1	0.042*
	B	1070.1	308.5	
Follow up 5	A	1219.4	277.4	0.008*
	B	1079.3	305.5	

Table III: Comparison of 6MWD in both Groups Overtime

6mWD (m) At:	Group	Distance in meters	SD	P value t-test
Baseline	A	282.6	112.6	0.969
	B	283.3	111.9	
Follow up 1	A	322.1	112.1	0.132
	B	291.9	112.4	
Follow up 2	A	331.1	112.9	0.118
	B	299.3	114.2	
Follow up 3	A	356.6	114.3	0.013*
	B	305.4	114.5	
Follow up 4	A	363.5	109.2	0.016*
	B	314.8	113.8	
Follow up 5	A	395.1	111.2	0.001*
	B	323.4	112.8	

Table IV : Comparison of Improvement in Mmrc Scale and Acute Exacerbation in Two Groups at 12 Months

Improvement in exacerbations	A	B	Total	P value Chi sq test
Present	16 25.4%	3 4.8%	19 15.1%	0.001*
Absent	47 74.6%	60 95.2%	107 84.9%	
Improvement: mMRC Dyspnea Scale	Groups		Total	P-value chi-square-test
	A	B		
Present	10	3	13	0.040*
	15.9%	4.8%	10.3%	
Absent	53	60	113	
	84.1%	95.2%	89.7%	

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improvement in the all the parameters in both groups. Possibly because of a more supervised treatment and regular follow-ups.

Our results are comparable with other studies. In the REACT study Martinez FJ et al investigated the role of Roflumilast in decreasing the number of exacerbations of COPD [3].The study showed that the exacerbations were 13·2% lower in the Roflumilast group than in the placebo group. Rennard SI et al in their analysis of two randomized, double-blind, placebo-controlled trials comprising of 2686 patients showed that Roflumilast significantly decreased exacerbations by 14.3% compared with placebo.[8]

In a meta-analysis of six randomized controlled trials, Roflumilast was found to be superior to placebo in patients of severe COPD patients already on ICS/LABA combinations in improving FEV_1 as well as COPD exacerbation rate.[9]

In RE(2)POND a 52-week, phase 4, double-blind, placebo-controlled trial, Roflumilast failed to significantly reduce moderate and/or severe exacerbations in the overall population .But there was a reduction in rate of moderate to severe exacerbations per patient per year by 8.5 %. Roflumilast also improved lung function significantly.[9]

It is of interest to note the result of studies using inhaled corticosteroid fluticasone with long acting B2 agonist Vilantrol and monoclonal antibodies to IL5 in the reduction of exacerbations in a subset of patient COPD with high eosinophilc count.[10,11,12,13]

Similarly a differential response to Roflumilast was observed in subgroup of COPD patients who were older > 65 years, had comorbidities and Chronic bronchitis or bronchiectasis.[14]

We did not categorize our patients according to the type of cellular response (eosinophilc or neutrophilc) or phenotype .It would be interesting to see whether Roflulmilast was effective in a specific subgroup of COPD, or the effect was irrespective of the nature of inflammatory response and presence of comorbidities.

Albert RK et al found that adding azithromycin 250 mg daily to usual treatment of COPD patients for one year decreased the frequency of acute exacerbation, but was associated with slight increase in hearing loss and colonization with macrolide resistant microorganism.[15]

A retrospective observation study comparing the results of chronic azithromycin to Roflumilast however showed better out comes for Azithromycin.[16]

The role of pulmonary rehabilitation and assistance to remove secretions and ciliary functions also contribute to improvement in quality of life for COPD patients.[17,18]

We a did not study the side effect profile of Roflumilast. Zeng et al[19] observed the incidence of diarrhea, headache, nausea, weight loss, back pain, loss of appetite, and insomnia was notably higher in the Roflumilast group than in the placebo group. But overall safety profile has been found to be satisfactory and no increase in five-year mortality was reported in a review of the database cohort.[20]

A holistic approach to COPD management aiming at optimal bronchodilator and anti-inflammatory therapy supported by pulmonary rehabilitation and measures to reduce the frequency of acute exacerbations with medicine like roflumilast would improve the overall outlook for COPD.

Our study has several strengths. in addition to assessing the effect on COPD exacerbation we also studied the effect on indicators of functional status like 6mWD and mMRC dyspnea grades. We assessed the patients at multiple follow up visits that enabled us to monitor changes in lung functions and other functional parameters over the period of one year.

One of the limitations of our study ~~is~~ a relatively small sample size.

Conclusion

Adding Roflumilast to standard therapy for COPD reduces the frequency of acute exacerbations and improves lung functions.

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CONFLICT OF INTEREST

Authors declared no conflicts of Interest.

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Authors have declared no specific grant for this research from any funding agency in public, commercial or nonprofit sector.

DATA SHARING STATMENT

The data that support the findings of this study are available from the corresponding author upon request.

ORIGINAL ARTICLE

Moringa Oleifera Protects Against Fluoxetine Induced Damage to the Basement Membrane of the Seminiferous Tubules in Adult Male Rats

Ayesha Ali[1], Abdullah Qamar[2], Arsalan Manzoor Mughal[3], Farhan Akhtar[4], Rabya Khalid[5], Ayesha Fatima[6]

ABSTRACT

Objective: To explore the protective effects of fluoxetine and *moringa oleifera* on the basement membrane of seminiferous tubules in the adult male rat testis.

Study Design: Randomized Experimental Study.

Place and Duration of Study: The study was conducted at the Anatomy Department of Army Medical College, National University of Medical Sciences (NUMS) Rawalpindi, in collaboration with the National Institute of Health Sciences (NIH) Islamabad and Pak Emirates Military Hospital (PEMH) Rawalpindi, from 1st June 2022 to 1st May 2023.

Materials and Methods: Thirty male Sprague Dawley rats weighing 300 ± 50 grams with no obvious gross abnormality were randomly divided into three groups (n=10). Daily doses were administered via oral gavage for 8 weeks. The group A (control) received distilled water. The group B (experimental) received fluoxetine at a dose of 10 mg/kg/day, and the group C (experimental) was given *moringa oleifera* powder at a dose of 50 mg/30 g body weight. The rats were sacrificed and the disruption of the basement membrane of seminiferous tubules was assessed using a scoring system (0 to 3). The significance was calculated using cross tabs by applying Chi-Square test using SPSS version 22. The p value ≤ 0.05 was considered statistically significant.

Results: Group A rats had no disruption of basement membrane. In group B, 50% of specimens exhibited severe disruption, 40% had moderate disruption, and 10% had slight disruption. In group C, 10% of specimens showed moderate disruption, 30% showed slight disruption, and 60% had no disruption. A statistically significant difference was observed between groups B and C ($p < 0.05$).

Conclusion: Fluoxetine significantly disrupts the basement membrane of seminiferous tubules, adversely affecting spermatogenesis. Conversely, *moringa oleifera* demonstrates a protective effect against such disruptions indicating its potential therapeutic use.

Key Words: *Basement membrane, Fluoxetine, Moringa oleifera, Spermatogenesis, Testis.*

Introduction

Depression is a mood disorder that affects the physical and psychological aspects of a person.[1] It causes a persistent feeling of sadness and loss of interest in daily routine activities that were previously enjoyable.[2] Like other chronic diseases, depression can be debilitating however, it is often ignored and stigmatized.[3] Selective serotonin reuptake inhibitors (SSRIs) are the antidepressants most frequently prescribed to treat depression worldwide.[1] Despite its miraculous effects on relieving anxiety and depression, it also interferes with hypothalamic pituitary gonadal pathway (HPG), blocking dopamine receptors and increasing prolactin levels.[4] This in turn inhibits gonadotropin releasing hormone (GnRH) from hypothalamus, causing ultimately a decrease in testosterone levels leading to sexual dysfunction and affecting the process of spermatogenesis.[5] It also induces local testicular injury in both the interstitial and tubular compartments of testis which leads to infertility in males.[6] So, prevention of testicular toxicity has been considered an important strategy to restore fertility. Fluoxetine causes increase in the level of malondialdehyde (MDA) and lowers the level of superoxide dismutase (SOD) in testis and there is also

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evidence that it is protective against oxidative stress.[7] This redox condition is mostly caused by mitochondrial malfunction. The inhibition of the electron transport chain in damaged mitochondria results in the production of reactive oxygen species (ROS), depletion of energy, consumption of antioxidants, accumulation of cytotoxic mediators, and eventual cell death.[8]

Plants have been in use all over the world for fertility regulating characteristics. Some medicinal plants are widely used as aphrodisiacs to alleviate sexual dysfunction or as fertility boosting agents.[9] *Moringa oleifera*, locally known as "Lam" has been known as the "miracle tree" since ages.[10] It has got incredible nutritional and health benefits. Being rich in multiple macro and micronutrients it serves to cure a lot of diseases. Different parts of the plant such as leaves, flowers and seeds have potent therapeutic effects and are used as antidiabetic, anticancer, antiulcer, antimicrobial and antioxidant.[11] The plant is commonly found in India, Pakistan, Afghanistan, and Bangladesh. It is the drought resistant species of a mono generic family, the *Moringaceae.*[12] Antioxidant property of *moringa oleifera* is because of its specific constituents like flavonoids, carotenoids, phenol and vitamin A.[13] Carotenoids not only act as antioxidants but also protect against aging and cellular damage. Vitamin A content of *moringa* is important in regulating vision and reproduction.[14]

Phenolic and flavonoids compounds like gallic acid, chlorogenic acid and vanillin are also rich in *moringa oleifera*. Phenolics and flavonoids have been described to have a powerful antioxidant property and high ability to reduce protein oxidation and DNA damage leading to the inhibition of cellular injury.[10] There is little literature to support free radical hunting ability of *moringa oleifera* in terms of testicular toxicity. So, this study focused on the antioxidant property of *moringa oleifera* in ameliorating the testicular toxicity induced by fluoxetine in testis of adult male rats.

Materials and Methods

It was a randomized experimental study, (ERC/ID/216). The study was conducted at the anatomy department of Army Medical College, National University of Medical Sciences NUMS Rawalpindi in collaboration with the National Institute of Health Sciences NIH Islamabad and Pak Emirates Military Hospital PEMH Rawalpindi. The duration of the study was from 1st June 2022 to 1st May 2023. The rules and regulations regarding the handling and care of animals were strictly followed and set forth by the Ethics Review Committee of Army Medical College. Thirty male Sprague Dawley rats 3-4 months of age, having an average weight of 300 ± 50 grams were obtained from NIH Islamabad. Rats were randomly divided into three groups with 10 rats each and 5 rats housed in one cage. Rats were kept under the standard lab conditions of a daily photoperiod of a 12hr dark-light cycle. Rats were allowed free access to the standard lab diet and clean drinking water *ad libitum* for 08 weeks.

Fluoxetine capsules (20mg) were purchased from the local market, and powder was dissolved thoroughly in distilled water to make a 2% w/v solution of the extract. *Moringa oleifera* was also used in its finely grounded powdered form in sealed packages from the Pakistan Agricultural and Research Council PARC Islamabad. The powdered herb was dissolved in distilled water to make a 2% w/v solution, which was sieved to get an extract. The extract was used in the study.

The drug and herb were given in a single daily dose through oral gavage. The group A was kept as control and 5ml of distilled water was given. The groups B and C were the experimental groups. The group B was given fluoxetine 10mg/kg body weight dissolved in distilled water.[15] The group C was given both the drug and the herb, fluoxetine in the same daily dose as was given in group B and *moringa oleifera* in a dose of 50mg/30 grams body weight dissolved in distilled water.[12]

The rats were euthanized in transparent glass chambers with cotton soaked in diethyl ether. The sacrifice was done after the end of the experimental period 24 hours after the administration of the last dose. The right testis was selected for histomorphometry as a standard. The testes were placed in 10% formalin. The tissue processing was done in an ascending order of ethyl alcohol followed by processing in Leica TP 1020 tissue processor. Hematoxylin and Eosin H&E stains were used for staining. The histomorphometric analysis of histological sections was performed using a light microscope with a 10X eyepiece and a 10X objective lens, providing a total magnification of 100X.

The disruption of the basement membrane was analyzed using a scoring system (0 to 3). To maintain uniformity, tubules were counted moving from right to left in equally spaced consecutive fields. The disruption of basement membrane was then analyzed in each selected seminiferous tubule and scored from 0 to 3.[16] According to scale, 0= no disruption, 1=slight disruption (≤ 50% of the tubule cross section shows disruption, 2= moderate disruption (≥ 50% of the tubule cross section shows disruption, 3= severe disruption (≥ 70% of the tubule cross section shows disruption).[16]

Statistical Package for the Social Sciences version 22 (SPSS V.22.0) was used to analyze the data. The significance was calculated using cross tabs by applying Chi-Square test. The *p* value ≤ 0.05 was considered statistically significant.

Results

Group A rats had no disruption of basement membrane (Figure-I). In group B, 50% of specimens exhibited severe disruption, 40% had moderate disruption, and 10% had slight disruption (Figure-II). In group C, 10% of specimens showed moderate disruption, 30% showed slight disruption, and 60% had no disruption (Figure-III). A statistically significant difference was observed between groups B and C *(p < 0.05)*. (Table-I & Table-II).

Table I: Mean Values of The Disruption of The Basement Membrane of the Seminiferous Tubule of the three Experimental Groups (n=10).

	Scoring	Group A	Group B	Group C
Disruption of Basement Membrane	0 = No effect	10 (100%)	0 (0%)	6 (60%)
	1= Mild Disruption	0 (0%)	1 (1%)	3 (30%)
	2 = Moderate Disruption	0 (0%)	4 (40%)	1 (10%)
	3 = Severe Disruption	0 (0%)	5 (50%)	0 (0%)

Table II: Disruption of Basement Membrane Comparison Between Groups (n=10).

	Group A vs B	Group A vs C	Group B vs C
Disruption of basement membrane	<0.001	0.087	<0.001

Discussion

This study showed that fluoxetine, which is a commonly prescribed SSRI causes significant

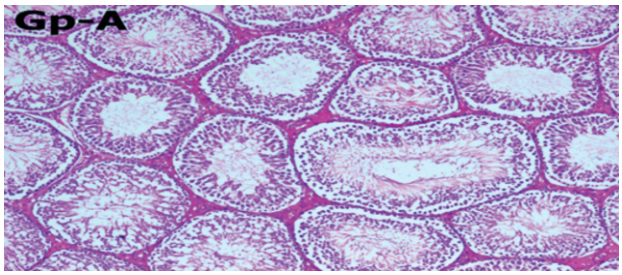

Figure 1: A Photomicrograph of Group A Showing no Disruption of the Basement Membrane of the Seminiferous Tubules (100X, H&E).

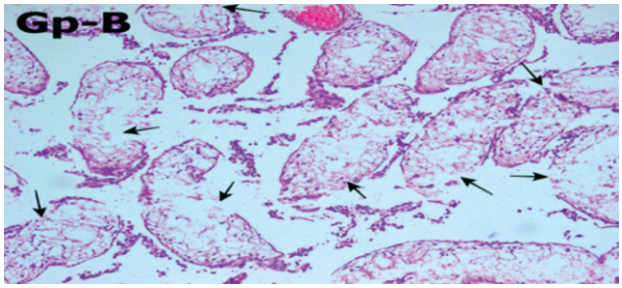

Figure 2: A Photomicrograph of Group B Showing Disruption of the Seminiferous Tubules (100X, H&E)

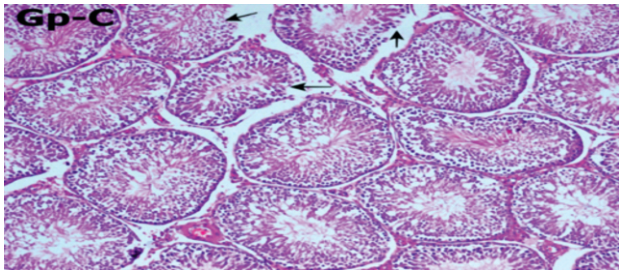

Figure 3 : A photomicrograph of Experimental Group C Showing Less Disrupted Seminiferous Tubules (f100X, H&E)

disruption in the basement membrane of the seminiferous tubules in the testes of male rats. In our study, the control group showed no distortion whereas the experimental group B treated with fluoxetine showed a higher percentage of severely distorted basement membranes followed by moderate distortion.

The current findings are in accordance with the study done by Asad A *et al*.,[16] where toxic effects of lead-induced oxidative stress and effected the basal lamina of the seminiferous tubules but in present study toxicity was induced by fluoxetine. Another study in line with the present study was done by Johnson *et al*.,[17] where chemical injury led to disruption of the basal lamina. Fluoxetine induces an imbalance between the prooxidants and antioxidants in the body which leads to production of ROS that causes lipid peroxidation and damages the

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susceptible membrane of seminiferous tubules rich in polyunsaturated fatty acids (PUFA).[18] Experimental group C treated concomitantly with *moringa oleifera* showed 10% moderate and 30% mild distortion. While 60% of tubules showed no distortion at all. This explained its occurrence due to the presence of naturally occurring antioxidants present in *moringa oleifera* like flavonoids, phenols, antioxidative vitamins, and antioxidative enzymes like quercetin in it.[19] A study conducted by Abd HH *et al.,*[20] also goes with the present study where antioxidants in *moringa oleifera* modulated oxidative stress and thus prevented testicular injury. Another study conducted by Naheed *et al.,*[21] goes with our study where presence of flavonoids and phenols in the medicinal herb protected the basement membrane of the seminiferous tubules from damage but in this study toxicity was induced by microwave radiations.

Study conducted by Opuwari *et al.,*[22] also credited antioxidant potential of *moringa oleifera* being responsible for enhancing testis defense against oxidative assault caused by reactive oxygen species (ROS) but the study was conducted on Wistar rats.

Another study conducted by Mohlala *et al*.,[23] also attributed oxidative stress in testis responsible for causing DNA damage, lipid peroxidation and protein oxidation in reproductive cells, whereas *moringa oleifera* owing to its antioxidant potential being rich in vitamin B, C, beta carotene, ferulic acid, gallic acid improves the histological parameters of the testis.

Our study is also supported by the research done by Habib *et al*.,[24] where vitamin E was found to have a potent protective effect on the basement membrane of the seminiferous tubules but the toxicity was induced by phthalate. Moringa has a rich concentration of vitamin E in it and serves to guard the integrity of the basement membrane of the seminiferous tubules.

Ayse Busra *et al*.,[25] also conducted a study showing the potent nature of antioxidant vitamin E responsible for raising the levels of endogenous antioxidants SOD (superoxide dismutase) and lowering the levels of MDA (malondialdehyde) which had a protective effect on testicular histology. But the study differs from ours as we made use of moringa herb that is rich in antioxidative vitamins C and E, but the above-mentioned study directly used vitamin E as an ameliorative agent.

This study has specifically focused on structural disruption of the basement membrane of the seminiferous tubules because of fluoxetine induced toxicity using a standardized scoring system, an area reported in very few studies. Also, the comparative evaluation of fluoxetine and *moringa oleifera* provides new insight into the protective role of *moringa oleifera* demonstrating its efficacy in mitigating the damage to basement membrane. This indicates its potential therapeutic use as a natural antioxidant for preventing drug induced testicular damage. These findings pave the way for future research into therapeutic strategies for reproductive toxicity.

Limitations and Recommendations

The study period should be longer to observe the toxic effects of fluoxetine and ameliorative effects of moringa herb. Biochemical analysis along with antioxidant markers can be added to value the outcome.

Conclusion

The study showed that fluoxetine has toxic effects on the testis of adult male rats by disrupting spermatogenesis showed by disruption of the basement membrane of the seminiferous tubules. *Moringa oleifera's* antioxidative properties counteract fluoxetine-induced testicular toxicity indicating its potential therapeutic use.

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CONFLICT OF INTEREST

Authors declared no conflicts of Interest.

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DATA SHARING STATMENT

The data that support the findings of this study are available from the corresponding author upon request.

ORIGINAL ARTICLE

Role of B-Scan Ultrasonography in Cataract Patients; A Single Centered Cross-Sectional Study

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ABSTRACT

Objective: To assess lesions of the posterior segment in pre-operative cataract patients using B-Scan ultrasonography and to determine various risk factors contributing to posterior segment lesions.

Study Design: A Descriptive Cross-Sectional Study

Place and Duration of the Study: The study was conducted in the Department of Radiology, Sahiwal Teaching Hospital from 10th June 2022 to 10th December 2022.

Materials and Methods: We enrolled 290 cases of cataracts including both genders and all ages, both with and without history of trauma. All cases underwent a B-Scan ultrasound to assess posterior segment pathologies. Patients having congenital lesions and with any history of surgery were excluded from the study. The data was analyzed using SPSS version 25.0. The frequencies and percentages of posterior segment pathologies observed on the B-Scan were calculated. The percentage of various co-morbidities contributing to posterior segmental lesions was also analyzed.

Results: The mean age of the subjects was 36.0 ± 23.2 years. 137 (47.2%) cases were females and 153 (52.7%) were males. Cataract was observed in 253 (87.2%) subjects without any trauma to eye. While studying various risk factors that increase the risk of lesions of the posterior segment, the most common were hypertension (17.5%) followed by diabetes mellitus (16.5%).

Conclusion: We concluded that B-Scan is a valuable and easily available modality to detect posterior segment pathologies in cataract patients.

Key Words: *B-Scan, Cataract, Posterior Segment Pathology, Ultrasound*.

Introduction

A cataract is defined as the cloudiness of the natural lens of the eye that causes blurring of vision. It occurs due to the breakdown of proteins in the lens.[1,2] It is considered to be the main cause of blindness all over the world and is more prevalent among elderly subjects. It contributes to blindness in over 12 million people. [2] It has also been reported to be the leading cause of blindness in 15.2 million cases and also the leading cause of moderate to severe visual impairment in 78.8 million cases.[3] The overall prevalence of cataracts in our country is 7.41 % with almost 19.43 % cases being pre-senile cataracts.[4]

Cataract affects the quality of life of patients as it causes disturbances with vision. Currently, surgery is the only option to get rid of cataracts with a good rate of success. The vision is restored by replacing the opaque natural lens of the eye with an artificial lens.[5] Cataract surgery is crucial to avoid secondary complications of cataracts such as glaucoma and it also improves the quality of life of patients.[6]

Ophthalmologists require detailed evaluation before proceeding with surgical procedures. Imaging modalities are of great value in this regard. Different imaging techniques are available to assess the supporting structure of lenses and to evaluate pathologies of posterior segments in pre-operative cataract patients. Among them, B-Scan ultrasonography is a simple and readily available modality.[7]

Different posterior segment lesions that can be seen on B-Scan include retinal detachment, vitreous hemorrhage, posterior vitreous detachment, intraocular foreign body, posterior staphyloma, etc. The pre-operative identification of significant posterior segment lesions timely impacts the post-operative prognosis of vision as well as helps to modify the surgical strategies. Furthermore, B-Scan

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is a non-invasive and cost-effective technique, it can be used over the course of treatment to evaluate the response to treatment.[8]

A significant research gap exists in current literature regarding the evaluation of posterior segment pathologies using non-invasive B-Scan ultrasonography. Moreover, the effectiveness of anterior segment surgeries can be compromised due to untreated posterior segment lesions and no data has been reported from our region regarding the efficacy of B-Scan in evaluating posterior segment lesions in pre-operative cataract patients. So, we planned this study to determine the efficacy of B-Scan to determine posterior segment pathologies in cataract patients as a pre-operative workup and to determine various risk factors that enhance the probability of posterior segment pathologies.

Materials and Methods

This descriptive cross-sectional study was conducted in the Department of Radiology, Sahiwal Teaching Hospital Sahiwal, from 10th June 2022 to 10th December 2022, after the approval from the Institutional Review Board (Sr.No. 12/IRB/SLMC/SWL). The sample size of 290 was calculated using the WHO calculator, taking the prevalence of cataract 7.41 %, keeping confidence interval 95 % and absolute precision 0.05%. The data was collected through a non-probability consecutive sampling technique. The inclusion criteria of our study were patients of both genders, all age groups, and both with and without a history of trauma. Patients having congenital lesions and with any history of surgery were excluded from the study. The informed consent was taken, and their B-Scan ultrasound was performed using an e-Esaote Mylab twice ultrasound machine equipped with a real-time linear high-frequency probe of 7-12 MHZ by consultant Radiologist having completed postgraduation. B.Scan images were obtained in all sections such as axial, coronal, and sagittal. The data was analyzed using SPSS version 25.0. Frequencies and percentages of posterior segment pathologies observed on the B-Scan were calculated. The percentage of various co-morbidities contributing to posterior segmental lesions was also analyzed.

Results

The mean age of our subjects was 36.0 ± 23.2 years. In our study, 137 (47.2%) cases were females and 153 (52.7%) were males as shown in Figure 1 (a). In our study, 253 (87.3%) subjects developed cataracts without any prior history of trauma while only 37 (12.7%) cases had a history of trauma as shown in Figure 1 (b).

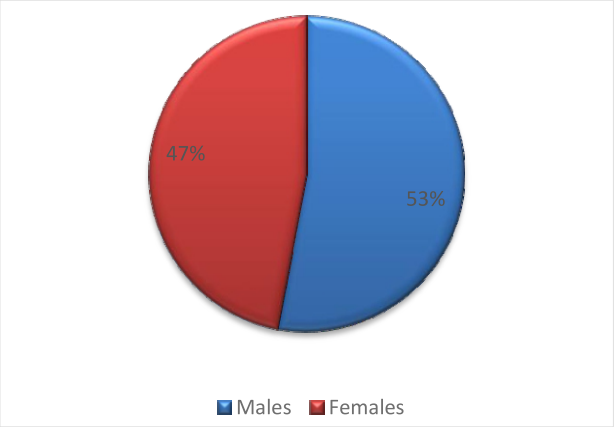

Fig 1 (a): Gender Distribution

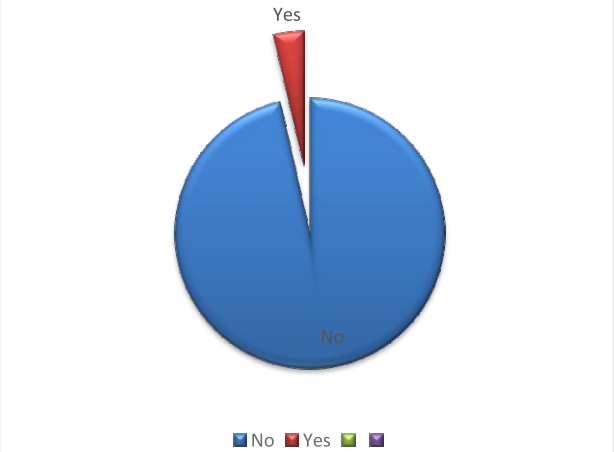

Fig 1(b): Distribution of Patients According to History of Trauma to Eye

Regarding risk factors contributing to pathologies of the posterior segment, 48 (16.5%) patients had diabetes mellitus, and hypertension was present in 51 (17.5%) cases, while only 4 (3.79 %) patients were smokers as shown in Figure 2.

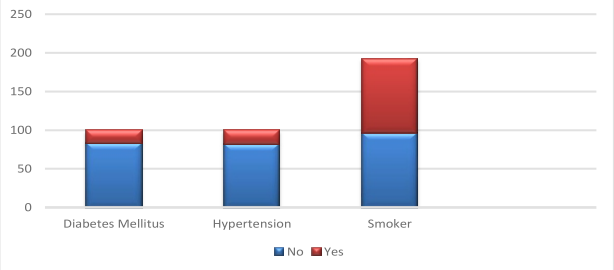

Fig 2 :Risk Factors contributing to Posterior Segment Lesions

The most common posterior segment pathology found in this study was vitreous hemorrhage followed by retinal detachment. In contrast, intraocular foreign body and choroidal detachment were the least frequently observed as shown in Table I.

Table I: Distribution of Posterior Segment Lesions (n=290)

Posterior Segment Pathologies	Frequency (n)	Percentage (%)
Retinal Detachment	48	16.7
Vitreous Hemorrhage	54	18.6
Posterior Vitreous Detachment	20	6.9
Posterior Staphyloma	17	5.9
Intraocular Foreign Body	11	3.9
Choroidal Detachment	11	3.9

Discussion

The findings of the study conducted make a remarkable contribution by highlighting efficacy of B-Scan in detecting posterior segment lesions of eye, as it is a non-invasive and cost-effective modality. The mean age our study showed is 36.0 $\pm$ 23.2 years which coincides with previous literature as shown by a study by Mencucci R *et al.,*[9] that the incidence of cataracts increases with growing age.

Our study demonstrated more males being affected by cataracts and posterior segment lesions, which is in contrary to the findings of a study by Prasad M *et al*.,[10] that showed a higher incidence of cataracts and blindness among females.Some other studies[11,12] also demonstrated more burden of cataracts among females.

The number of patients developing cataracts following trauma in our study was minor (12.7%). A study by Günaydın, NT *et al*.,[13] demonstrated the majority of traumatic cataracts were seen in children. Another study by Trivedi RH *et al*.,[14] showed that posterior capsule opacification is more commonly found in patients developing cataracts after trauma.

Our study successfully demonstrated the key risk factors that contribute to the development of lesions of the posterior segment in cataract patients that will provide valuable insight for clinicians to detect at risk patients before they contribute to more serious complications. These included diabetes mellitus, hypertension, and smoking. A study conducted in Lahore by Taseer Z *et al*.,[15] also demonstrated these as a potential factor in the development of cataract.

Our results showed the most common lesion of the posterior segment to be vitreous hemorrhage followed by retinal detachment. A study by Ullah MA *et al*.,[7] found retinal detachment to be the most commonly found posterior segment pathology followed by vitreous hemorrhage and posterior vitreous detachment. This indicates that clinicians must be aware of most common lesions while assessing the patients in our region.

A study by Chaudhury M *et al*.,[16] concludes B-Scan is of great utility in assessing posterior segment pathologies in pre-operative cataract patients. Another study by Gareeballah A *et al*.,[17] demonstrated posterior vitreous detachment to be the most common pathology of the posterior segment that they found in their patients followed by vitreous hemorrhage. Pre-operative identification of vitreous hemorrhage is crucial as presence of hemorrhage can complicate surgery, and knowing about it beforehand allows surgeons to adjust their techniques accordingly, thus potentially improving surgical outcomes.

In a study carried out in Saudi Arabia by Parrey MU *et al*., [18] among various posterior segment lesions detected, 6 % of cases showed retinal detachment, vitreous hemorrhage was detected in 5.3 % of cases, and posterior vitreous detachment in 1.3 % of cases. A study conducted by Shakour MA *et al.,* [19] demonstrated pathologies in the posterior segment of the eyes in 47.63 % of cases with vitreous abnormalities being most common (46.2%) and retinal detachment being least common (1.3 %).

Limitations of the Study

Certain senile changes such as retinal vein occlusion, macular degeneration, and glaucomatous changes in patients with cataracts could not be assessed which may contribute to suboptimal improvement in visual acuity after surgery. More studies recruiting many patients to evaluate the usefulness of the B-Scan in pre-operative assessment of cataract patients should be carried out.

Conclusion

Our study concluded that B-Scan is a simple, cheap, and easily available modality that helps surgeons in the pre-operative assessment of cataract patients to detect posterior segment pathologies.

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CONFLICT OF INTEREST

Authors declared no conflicts of Interest.

GRANT SUPPORT AND FINANCIAL DISCLOSURE

Authors have declared no specific grant for this research from any funding agency in public, commercial or nonprofit sector.

DATA SHARING STATMENT

The data that support the findings of this study are available from the corresponding author upon request.

ORIGINAL ARTICLE

Knowledge of Obstructive Sleep Apnea (OSA) Among Dentists; A Cross-Sectional Study

Muhammad Sajid[1], Asfia Saeed[2], Afsheen Akhtar[3], Saqib Arshad Khan[4], Sheze Haroon[5], Ayesha Usmani[6]

ABSTRACT

Objective: The objective of this study was to evaluate the knowledge of general and specialist dental practitioners working in teaching hospitals in Islamabad regarding the diagnostic criteria, referral practices, treatment options, and clinical management of patients with obstructive sleep apnea (OSA).

Study Design: Cross-Sectional Analytical Study.

Place and Duration of Study: Islamabad Dental Hospital, over six months from 7th September 2021 to 10th March 2022.

Materials and Methods: A questionnaire was prepared by merging the "Obstructive Sleep Apnea Knowledge and Attitude" (OSAKA) questionnaire with validated published questionnaires. Then validation was done by conducting a pilot study on 20 graduated dentists, giving Cronbach's alpha value of 0.759. It comprised 30 close-ended items on risk factors, signs and symptoms, consequences, diagnostic tools, and obstructive sleep apnea (OSA) management. The questionnaire was distributed to 215 dentists working in the teaching hospitals in Islamabad. The data was analyzed using IBM SPSS Statistics, version 25. The normality of data was checked using a box plot and the Shapiro-Wilk test. A one-way ANOVA/Kruskal-Walli's test was then used to assess the difference between the groups for designation, experience, and discipline. The post hoc Tukey's test was used for pair-wise comparison and *p* value ≤ 0.05 was considered significant.

Results: Almost 208 participants were familiar with the term sleep apnea. The overall knowledge scores were 12.82 ± 4.30. A statistically significant difference was noted between the knowledge scores with designation (*p* value 0.014) and clinical discipline (*p* value 0.028). Dunn's post hoc comparison showed a significant difference between the specialists and demonstrators (*p* value 0.001) and Bonferroni's post hoc test showed a significant difference between OMFS and periodontology (*p* value 0.047), and between oral medicine and periodontology (*p* value 0.030).

Conclusion: Although most dentists were familiar with sleep apnea, many participants lacked knowledge about its diagnosis and management.

Key Words: *Obstructive Sleep Apnea (OSA), Hypertension, Polysomnography, Periodontitis*.

Introduction

Obstructive sleep apnea (OSA) is a common sleep disorder characterized by cessation of breathing for 10 seconds or more, due to intermittent episodes of partial or complete collapse of upper airway obstruction.[1] It results in repeated awakening during sleep leading to daytime sleepiness.[1] Several factors contribute to the development of OSA, including high body mass index (BMI), male gender, advancing age, smoking, alcohol consumption and craniofacial irregularities like small and retrognathic mandible, hyperplastic palatine tonsils or uvula, high-arched palate, macroglossia, deviated nasal septum and inferiorly displaced hyoid bone.[2]

OSA is considered a clinically significant sleeping disordered breathing (SDB) as it can lead to the development of chronic diseases affecting the pulmonary, cardiovascular, and neurocognitive systems.[2] Benjafield *et. al*. [3], estimated that globally, about 1 billion people aged 30-65 years are affected

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by OSA and 425 million of those have moderate to severe OSA.

Polysomnography is considered a gold standard diagnostic tool for OSA.[4] However, it requires patients to sleep at the clinic overnight, making it unfeasible for patients especially when they are not familiar with the outcome of sleep disorders which restricts them from getting the polysomnography done. Additionally, it is not readily available and requires trained physicians to operate.[4] In this regard, dentists and general physicians are primary healthcare workers who can play an important role in the early diagnosis of OSA.

OSA has been linked to oral diseases like periodontitis, dental caries, and other oro-facial problems.[5] Dentists can help in the early diagnosis of the condition through intra-oral examination for the oral features of OSA, following a detailed history using validated OSA screening questionnaires such as Berlin, STOP-BANG, and Epworth sleepiness scale.[6] Dentists also play an integral role in educating patients regarding the importance of OSA management and can successfully manage mild to moderate cases of OSA by providing oral appliances to patients to reposition the jaws forward to prevent pharyngeal occlusion.[7] Additionally, they can work collaboratively with other healthcare professionals to ensure comprehensive management of OSA for their patients.

Studies evaluating the level of knowledge about OSA among medical students and physicians have been conducted in Pakistan, however, limited data is available on the knowledge among dental practitioners. Since patients often visit dentists regularly, even when they may not require a visit to a physician for many years, dentists can serve as the first healthcare workers to identify unidentified OSA. Evidence suggests that many dental practitioners may not be familiar with the diagnostic criteria, appropriate referral procedures, or treatment options available for patients with OSA. This knowledge gap can hinder the timely diagnosis and management of OSA, leaving patients at risk of severe complications. Therefore, the objective of this study was to assess the knowledge regarding diagnostic criteria, referral, treatment options, and clinical practice regarding OSA patients, among general and specialist dental practitioners working in teaching hospitals in Islamabad. The findings from this study can serve as a guideline to encourage dental practitioners to update their knowledge, ultimately helping to prevent life-threatening complications associated with the disease.

Materials and Methods

A cross-sectional study was conducted at Pakistan Medical and Dental Council (PMDC) approved public and private dental colleges in Islamabad including Islamabad Medical and Dental College, Shifa College of Dentistry, Rawal Institute of Health Sciences, HBS Medical and Dental College, School of Dentistry and Islamic International Dental College, Pakistan. The study was conducted over 6 months, from 7th September 2021 to 10th March 2022 after obtaining approval from the IRB of Islamabad Medical and Dental College (IMDC/DS/IRB/189).

The human resource departments of recognized dental colleges were then contacted to obtain a list of dental faculty and post-graduate residents (PGR) working in the clinical departments of these institutes. Approximately 481 graduated dentists (168 HOs, 83 PGR, 150 demonstrators and 80 specialists) were identified. Using the Rao soft calculator, an estimated sample size of 215 was calculated with a 95% confidence level, and a 5% margin of error, based on 54% 'proportion of good knowledge' found in recent medical graduates as reported in published data.[8]

After adjusting the sample size for each group, the questionnaires were distributed using convenient sampling among house officers, postgraduate residents, demonstrators, and specialists working in different clinical disciplines of dentistry. The questionnaire was formulated by combining the questions of “Obstructive Sleep Apnea Knowledge and Attitude” (OSAKA) with a validated published questionnaire.[19] A pilot study involving 20 graduated dentists was conducted to validate the newly developed questionnaire, giving Cronbach's alpha value of 0.759. The final questionnaire comprised 30 closed-ended items categorized into five sections including risk factors, signs and symptoms, consequences, diagnostic tools, and management of obstructive sleep apnea. The knowledge of participants was assessed regarding common risk factors associated with OSA including age, gender predisposition, weight, craniofacial variation and

sleep posture. Awareness of common signs and symptoms of OSA such as fatigue, insomnia, bruxism, and headaches were also evaluated. Knowledge of potential systemic health impacts of untreated OSA including diabetes, hypertension and cardiovascular diseases was also assessed. Familiarity of participants with commonly used diagnostic methods for OSA such as polysomnography (PSG), STOP-Bang questionnaire, Berlin questionnaire and the Epiworth sleepiness scale was recorded. Lastly, awareness of the effectiveness of various management strategies, such as continuous positive airway pressure (CPAP), uvulopalatopharyngoplasty, oral appliances and lifestyle changes was evaluated.

The data was analyzed using IBM SPSS Statistics, version 25 (IBM Corp., Armonk, NY, USA). Mean ± standard deviation was used to summarize the overall and group-wise knowledge scores. The normality of each group of designation, experience, and discipline was assessed using a box plot and the Shapiro-Wilk test. A one-way ANOVA/Kruskal-Walli's test was then used to assess any possible significant difference between the groups for designation, experience, and discipline. The post-hoc Tukey's test was further applied for the pair-wise comparison. The p value ≤ 0.05 was considered statistically significant.

Results

The 30-item questionnaire was then provided to 215 dentists including 36 (16.7%) specialists, 52 (24.2%) demonstrators, 40 (18.6%) postgraduate trainees, and 87 (40.5%) house officers. Each group of dentists was given a proportional representation in the sample. There were 88 (40.9%) participants with less than or equal to 1 year of experience. As far as clinical discipline is concerned, the majority (40%) were on rotation followed by operative dentistry 45 (20.9%) and oral medicine 25 (11.6%) as shown in Table I.

Table I: **Knowledge Score Comparison Within Demographic Variables (N=215)**

Demographics	f (%)	Knowledge Score (mean ± S.D)				*p* value
		Risk Factors	Signs and Symptoms	OSA Management	Mean ± S.D /Mean Rank	
Overall	215	6.80 ± 2.30	3.48 ± 1.56	1.42 ± 0.94	12.82 ± 4.30	
Designation [a]						
Specialist	36 (16.7%)	7.28 ± 2.5	4.06 ± 1.51	1.69 ± 0.98	134.78	0.014*
Demonstrator	52 (24.2%)	6.25 ± 2.21	3.21 ± 1.46	1.44 ± 0.96	91.89	
Postgraduate resident	40 (18.6%)	7.28 ± 2.11	3.18 ± 1.68	1.48 ± 0.88	110.48	
House officer	87 (40.5%)	6.70 ± 2.30	3.54 ± 1.53	1.26 ± 0.93	103.99	
Experience (years)						
≤ 1	88 (40.9%)	6.73 ± 2.30	3.56 ± 1.53	1.27 ± 0.93	102.02	0.112
2 - 5	53 (24.7%)	6.62 ± 2.11	3.11 ± 1.45	1.45 ± 0.89	96.10	
> 5	74 (34.4%)	7 ± 2.43	3.65 ± 1.64	1.57 ± 0.98	118.76	
Clinical discipline [c]						
On rotation	86 (40%)	6.70 ± 2.32	2.53 ± 1.54	1.27 ± 0.94	12.49 ± 4.40	0.028*
OMFS [b]	13 (6%)	7.08 ± 1.75	4.15 ± 1.73	2 ± 0.82	14.54 ± 3.97	
Operative dentistry	45 (20.9%)	7.02 ± 2.35	3.31 ± 1.54	1.31 ± 0.95	12.78 ± 4.11	
Orthodontics	8 (3.7%)	6.75 ± 1.28	3.75 ± 0.71	1.63 ± 0.74	13 ± 2.39	
Prosthodontics	22 (10.2%)	7.23 ± 2.47	3.68 ± 1.49	1.64 ± 0.95	13.68 ± 4.75	
Periodontology	15 (7%)	5.2 ± 2.65	2.13 ± 1.92	1.20 ± 1.01	9.6 ± 5.19	
Oral medicine	25 (11.6%)	7.04 ± 2.05	3.76 ± 1.27	1.68 ± 0.90	14.04 ± 2.89	

[a] Kruskal-Wallis test,
[b] Oral and Maxillofacial Surgery,
[c] One-way ANOVA,
* Statistically significant: p value ≤ 0.05

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Almost all participants 208 (96.7%) were aware of the term “sleep apnea” but only 29 (13.5%) and 27 (12.6%) had some idea of the Berlin Questionnaire and Epworth Sleepiness Scale respectively. These are the well-known and commonly practiced diagnostic tools for OSA. Among the first 21 items in the questionnaire (score range 0 - 21), 10 questions were about risk factors (score range 0 - 10), 6 questions were about signs and symptoms (score range 0 - 6), and 3 questions were about OSA management (score range 0 - 3).

The mean and standard deviation for overall knowledge and each sub-section is given in Table I. The overall knowledge scores (mean ± standard deviation) were reported as total = 12.82 ± 4.30, risk factors = 6.80 ± 2.30, signs and symptoms = 3.48 ± 1.56, and OSA management = 1.42 ± 0.94. The knowledge scores were further stratified concerning designation, experience, and clinical discipline. Since the group sizes were unequal so, first, the Shapiro-Wilk test of normality and Levene's test of homogeneity of variances were applied as shown in Table II. The groups were not statistically significant for clinical discipline suggesting that the normality assumption was fulfilled and leading to the one-way ANOVA. As for the designation and experience, most of the groups were statistically significant, suggesting that the normality assumption is violated and leading to the Kruskal-Wallis test. Levene's test was not statistically significant for all of the variables suggesting that the homogeneity of variances assumption is fulfilled and all groups in designation (*p* value 0.634), experience (*p* value 0.127), and clinical discipline (*p* value 0.09) have equal variances.

When compared for the knowledge score, there was a statistically significant difference between the designation (chi-square statistic 10.658, *p* value 0.014) and clinical discipline (F-statistic 2.419, *p* value 0.028). No statistically significant difference was observed between the experience groups (chi-square statistic 4.375, *p* value 0.112). Further, Dunn's post hoc comparison showed a significant difference between the specialists and demonstrators (*p* value 0.001) and Bonferroni's post hoc test showed a significant difference between OMFS and periodontology (mean difference 4.94, *p* value 0.047), and between oral medicine and periodontology (mean difference 4.44, *p* value 0.030).

To assess the level of knowledge among the dentists, Bloom's cut-off points were used as poor (less than 60% i.e., <12), moderate (60% - 79% i.e., 12 - 16), and good (80% - 100% i.e., >16). Based on this categorization, 75 (34.9%) dentists had poor, 91 (42.3%) moderate, and 49 (22.8%) had a good level of knowledge shown in Figure 1.

Table II: Normality Assessment for Each of the Groups of Designation, Experience, and Clinical Discipline

	Groups	Shapiro-Wilk test *p* value	Levene's test *p* value
Variables Designation	Specialist	0.011	0.634
	Demonstrator	0.153	
	Postgraduate resident	0.169	
	House officer	0.002	
Experience (Years)	≤ 1	0.002	0.127
	2 – 5	0.314	
	> 5	0.002	
Clinical Discipline	On rotation	0.002	0.09
	OMFS[1]	0.100	
	Operative dentistry	0.069	
	Orthodontics	0.050	
	Prosthodontics	0.256	
	Periodontology	0.825	
	Oral medicine	0.290	

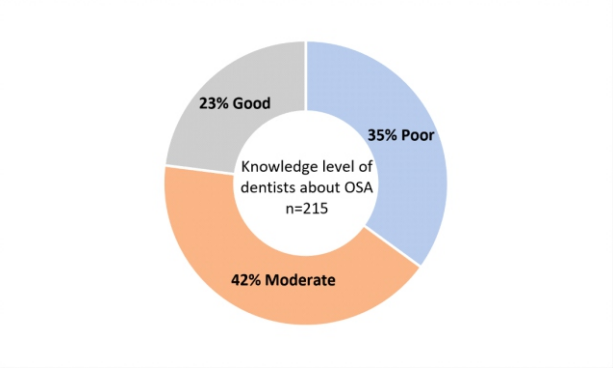

Figure 1: The Level of Knowledge Among the Dentists (n=215)

Discussion

Dentists are mostly the first contact healthcare providers frequently involved in discovering, referring, and even treating undiagnosed cases of OSA. Routine examination of the upper airway of dental patients facilitates screening them for OSA. However, a deficiency of information regarding OSA

in the dental curriculum can lead to an increased number of patients with undiagnosed OSA.[10]

Most respondents were aware of the term "OSA", yet the overall knowledge score was 12.82 indicating a low level of knowledge of the risk factors, signs, symptoms, and management of OSA. The overall knowledge level of OSA of most of the respondents was moderate (42%), followed by poor (35%) and good (23%). A similar study by Simmons *et al.,*[11] revealed an OSA knowledge score of 73.6% among dentists and 63.9% for all physicians. Another study conducted by Alzahrani *et al.,* [10] on 352 dentists assessing their knowledge and attitude towards sleep apnea found that although 80.6 % had previous knowledge of OSA, 65.58% scored below 12 in total knowledge score, whereas the mean total knowledge score was 9.86. They did not find any significant difference in mean total knowledge based on gender, professional title, or practice sector. Kale *et al.,* [12] concluded from a study involving 112 dentists that most of the dentists were aware of the definition, general findings and risk factors of OSA, however, they had a lack of information regarding screening, diagnosis, treatment planning and referral of OSA patients. Chauhan *et al.,* [13] concluded that 50% of dentists correctly answered questions related to symptoms and diagnosis of OSA but had poor knowledge about the pathophysiology, risk factors, complications and treatment.

A significant difference in the knowledge of OSA between specialists and demonstrators was noted. Swapna *et al.,* [14] discovered statistically significant differences in the responses related to awareness of OSA based on specialty and educational qualification. Their study concluded that there was a huge lack of knowledge among final-year students, interns, and general dentists. Additionally, in the current study, dentists working in pediatric dentistry had the highest knowledge score followed by dentists working in the department of oral medicine and oral & maxillofacial surgery, while dentists in periodontology obtained the lowest score. These results agreed with a previous study, where pediatric dentists had a mild-to-moderate level of knowledge and positive attitude toward OSA but these dentists lag in their training regarding the practical aspect.[15]

Conclusion

We concluded that the knowledge regarding diagnostic criteria, referral, treatment options, and clinical practice of OSA patients is deficient among general and specialist dental practitioners working in teaching hospitals in Islamabad.

Recommendation

This lack of knowledge could be attributed to the lack of training of dental practitioners at both undergraduate and postgraduate levels. So, the findings of the study emphasize the need to integrate comprehensive OSA education into the dental curriculum to train dental practitioners, so they can contribute to early diagnosis, referral or treatment of patients with sleep disorders.

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CONFLICT OF INTEREST

Authors declared no conflicts of Interest.

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DATA SHARING STATMENT

The data that support the findings of this study are available from the corresponding author upon request.

ORIGINAL ARTICLE

Exploration of Placenta Accreta Spectrum with Placenta Previa and Previous Cesarean Section

Safia Bibi[1], Saleem Javed[2], Grannaz Mengel[3]

ABSTRACT

Objective: To determine the frequency and association of placenta accreta spectrum with placenta previa and previous cesarean sections.

Study Design: Retrospective observational study

Place and Duration of Study: Obstetrics and Gynaecology Unit-2, Bolan Medical Complex Hospital, Quetta, from 1st January 2023 to 31st December, 2023.

Materials and Methods: The clinical records of all pregnant women who had cesarean section for placenta previa and were diagnosed as a case of placenta accreta spectrum were reviewed. Results were calculated and analyzed using Microsoft Excel 13. Data was presented in number and percentages and mean ± SD for qualitative and quantitative variables respectively.

Results: Out of 812 cesarean sections performed during the study period, 4.4% were due to placenta previa. The incidence of Placenta Accreta Spectrum (PAS) was 1.4 per 1000 deliveries and 1.6% of total cesarean sections. Most of the cases of placenta previa were type IV (58%). In patients having placenta accrete spectrum, majority of cases were previous three LSCS (38%) and previous four LSCS or more (31%). In all PAS cases, 38.5 % were accrete, 46% were increta and 15.5 % were percreta. Uterine sparing management to achieve haemostasis and preserve fertility was done in 77% of cases.

Conclusion: Placenta accreta spectrum is becoming more common due to rise in cesarean sections rates. The risk of PAS and placenta previa can be reduced by decreasing the rate of primary cesarean sections. A multidisciplinary team approach will help to reduce the morbidity and mortality associated with PAS.

Key Words: *Cesarean Section (CS), Morbidity, Placenta Accreta Spectrum, Placenta Previa.*

Introduction

Morbidly adherent placenta is abnormal adherence of the placenta to the nearby uterine wall. It is the result of abnormal decidualization due to a defect in the endometrial-myometrial junction, which typically occurs in the vicinity of a uterine scar.[1] Placenta accrete occurs when the villi are only superficially attached to the myometrium; in placenta increta, the villi invade the myometrium deeply; and in placenta percreta, the villi pass through the myometrium, crosses the serosa, and then enter the surrounding viscera and tissues. These are the three types of morbidly adherent placenta. The more recent term for these conditions, placenta accrete spectrum (PAS), refers to all three types together.[2]

1927 Irving et al first reported PAS with an incidence of only 0.12 in 1000 women.[1] Its occurrence has increased roughly 13-fold in the US in recent years as a result of the sharply rising rate of cesarean deliveries, which has increased from 5.8% to 32.9%.[3] The prevalence of placenta accreta spectrum is rising globally; it was 1 in 25,10 women in the 1970s, 1 in 533 in 2002, 4 in 1000 women in 2003, and 1 in 272 women in 2016.[4,5]

Placenta previa following a prior cesarean section is the most important risk factor for development of PAS. In pregnant women, the chance of developing placenta previa rises with repeated cesarean sections, 1% in previous one LSCS rising to 1.7%, 2.8%, and 10% in previous, two, three and four cesarean sections respectively.[6] In patients with placenta previa who have had prior cesarean sections, the risk of PAS is 3%, 11%, 40%, 61%, and 67% for the first, second, third, fourth, and fifth or more repeat cesarean deliveries, respectively.[7]

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Uterine surgeries like prior curettage, removal of intrauterine adhesions, myomectomy and cornual resection of ectopic pregnancy also contribute to placental invasion.[8]

PAS is a potentially fatal condition because it causes life-threatening intrapartum and postpartum haemorrhage. The complications associated with PAS include massive blood transfusions, peripartum hysterectomy, prolong surgery time, urological injuries, admission to the intensive care unit, and potentially fatal placental haemorrhage.[9] The use of MRI and ultrasonography has improved both the diagnosis and treatment of these cases. PAS identified prenatally and planned treatment by multidisciplinary team comprising a neonatologist, obstetrician, urologist, and anesthesiologist in a tertiary care center, improves the prognosis.[10]

In majority of PAS cases, the c-section is recommended at 34-36 weeks to improve maternal and fetal outcomes. Cesarean hysterectomy without removal of the placenta from uterus, is the safest and most appropriate method for preventing massive blood loss.[11] In recent years, new surgical methods have been explored to improve pregnancy outcomes during cesarean section and to preserve the uterus. These methods include intrauterine balloon placement, ligation or embolization of both uterine arteries, iliac arteries balloon embolization, manual removal of placenta with uterine packing, uterine compression sutures and placental bed suturing.[12]

Due to the rising rate of c-sections, an increased number of PAS cases are reported in our hospital. Majority of them present with antepartum hemorrhage in emergency labor ward in very serious condition. The objective of the study is to find association and retrieve prevalence of PAS with previa and cesarean section. It will help us to formulate a protocol, emphasizing the antenatal diagnosis and best management approach.

Materials and Methods

This descriptive study of one year was carried out in gynae unit-2 of Bolan Medical Complex Hospital Quetta from 1st Jan 2023 to 31st Dec 2023. The study was approved by the local ethical review committee (OBG/HOD/2024-249-250 dated 2nd July 2024). All pregnant women who had cesarean section for placenta previa and the cases of PAS which were diagnosed either intra-operatively or on ultrasound preoperatively were included in the study. The clinical record of all patients was retrieved from their medical files, and operation theatre registers. The demographic profile which includes parity, age, history of previous cesarean sections and gestational age was recorded and analyzed. Additional haemostatic procedures to control blood loss i.e. uterine artery ligation, internal iliac ligation, uterine packing, peripartum hysterectomy were recorded. Results were calculated and analyzed using Microsoft Excel 13. The frequency and percentages were calculated for qualitative variables while mean and standard deviation were calculated for quantitative variables.

Results

During the study period, the total number of deliveries were 9306 and total number of cesarean sections were 812. Out of which 36(4.4%) cesarean sections were performed due to placenta previa. Out of 36 cases of placenta previa, PAS was diagnosed in 13 patients. So, the prevalence was 1.4 per 1000 deliveries and 1.6% of total cesarean sections. The frequency of PAS in placenta previa was 36.1%. Most of the cases of placenta previa were type IV (58%), followed by type III (25%) and type II (17%). The mean age of patients was 32.25±5.23, mean gestational age 34.52±2.26 weeks and mean parity was 6.4 ±3.23. table I. In patients having placenta accreta spectrum, 1(7.7%) had a history of previous 1 LSCS, 3 (23%) had previous 2 LSCS, 5(38%) had previous 3 LSCS and 4(31%) were previous 4 LSCS or more. Out of all 13 PAS cases, 38.5 % were accreta, 46% were increta and 15.5 % were percreta. (Table-II). With regard to management, additional hemostatic procedures like uterine packing was done in 31% of cases, internal iliac ligation along with uterine packing done in 46%, and peripartum hysterectomy in 23% cases. (Table-III).

Table I: Demographic Characteristics of Patients with Previous Cesarean Section and Placenta Previa n=36

Variables	Statistics (mean +SD)
Age	32.25±5.23
Parity	6.4±3.23
Gestational age (weeks)	34.52±2.26
Degree of placenta previa	Frequency and %
Type II	7 (17%)
Type III	9 (25%)
Type IV	21 (58%)

Table II: Frequency of Placenta Accreta Spectrum with previous Uterine Scar. n=13

Previous Scar	Accreta	Increta	Percreta	Total PAS no%
1 LSCS	0	1	0	1(7.7%)
2 LSCS	1	1	1	3(23%)
3 LSCS	2	2	1	5(38.5%)
≥ 4 LSCS	2	2	0	4(30.8%)
Total	5 (38.5%)	6(46%)	2(15.5%)	13(100%)

Table III: Hemostatic Procedures in PAS n= 13

Hemostatic procedures	No (%)
Uterine packing	4(31%)
Internal iliac ligation+ uterine packing	6(46%)
Peripartum hysterectomy	3(23%)

Discussion

The prevalence of placenta accreta spectrum is rising over the past four decades and it is linked to the increased rates of cesarean sections.[2] In our study, the prevalence of PAS was 1.4 per 1000 deliveries which is comparable with the studies of Akhtar T et al[13], 1.83 per 1000 deliveries and Jaiswal N et al [14],1.2 per 1000 deliveries. Other studies in Pakistan showed slightly higher frequencies of placenta accreta spectrum, 3 per 1000 in study of Rehman S[15], and 4.74/1000 deliveries in the study of Tahir N. et.al[16]. While Akhtar O et al[17], reported a very high incidence of 9.3/1000 deliveries. This rise is very alarming as PAS is associated with high maternal morbidity and mortality and it is often a nightmare for obstetricians.

A direct association has been observed between PAS and prior cesarean sections. In our study, history of past Cesarean scar was found in 100% of cases of PAS. In which 7.7% of patients with a history of previous one uterine scar, 23% in patients with previous two scars, 38% in patients with previous three scars, 31% in previous four or more scars. According to a study done at the tertiary care hospital in Lahore[18], out of all the patients with PAS, 47.3% had one previous CS, 29.9% had previous two CS, and 22.9% had previous three or more CS. Similar study by Rehman S[15] described 0.6% in patients with absence of previous scar and 80% in previous 4 scars. These results demonstrate that the incidence of PAS rises with previous scars. So, the number of primary scars should be reduced.

The management of PAS is quite challenging. Obstetricians prefer conservative management, when fertility must be conserved. In our study uterine sparing management to achieve haemostasis was done in 77% of cases which is comparable with other studies in which expectant or conservative management done in 78 to 80% cases[19]. While peripartum hysterectomy was done in only 23% of patients in our study. In a study conducted in Bahawal Victoria Hospital, 58% of patients had peripartum hysterectomy whereas uterine sparing surgery was done in 42% of cases.[13] Rehman S[15] did peripartum hysterectomy in 48.5% of patients in his study. Varlas VN et al, showed high rates of peripartum hysterectomies (83.4%)[20].

In our study, the frequency of PAS in cases of placenta previa was 36.1%. In which 58% were placenta previa type IV, 25% were placenta previa type III and 17% were type II. Other studies reported a 40.49%[21] and 30.6%[22]incidence of placenta accreta among women who were diagnosed placenta previa antenatally. Kayem et al[23] found in his study PAS rate of 21% in anterior low-lying placenta (type I) and 33% when placenta previa (type III, IV). The rate of PAS ranged from 5% for previous one cesarean section to 63% for three or more previous cesarean with placenta previa in his study.

Conclusion:

Placenta acreta spectrum (PAS) is becoming more common in present-day obstetrics due to increased rates of cesarean sections. The risk of PAS and placenta previa can be reduced by decreasing the rate of primary cesarean sections. A multidisciplinary team approach in the surgical management for placenta previa with repeat cesarean will help to reduce the associated morbidity and mortality with PAS. Conservative management, when fertility has to be preserved, has high success rates.

Limitations of Study

The study is retrospective and carried out only in one unit of tertiary care hospital.

Recommendations

The risk of PAS and placenta previa can be reduced by decreasing the rate of primary cesarean sections. Preservation of future fertility through conservative management of placenta accreta spectrum carries a high risk of complications for the mother and should only be performed in hospitals with sufficient expertise. Further research on this subject should be done to establish clear guidelines.

Conflict of interest: None

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CONFLICT OF INTEREST

Authors declared no conflicts of Interest.

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ORIGINAL ARTICLE

Estimation of Mandibular Bone Density Loss in Diabetes Mellitus Using Cone Beam Computed Tomography

Cek Dara Manja[1], Olivia Avriyanti Hanafiah[2], Pitu Wulandari[3], Jihan Nadhira[4]

ABSTRACT

Objective: The study's goals were to use cone beam computed tomography (CBCT) to estimate the percentage of bone density loss in individuals with type 2 diabetes mellitus (T2DM) that is observed in the condyles, angulus, and symphysis. It will also analyze the differences in mandible bone density between T2DM and Non-Diabetes Mellitus (DM).

Study Design: An analytical observational study used a cross-sectional research design.

Place and Duration of Study: Dental Radiology Installation of the Dental and Oral Hospital, Universitas Sumatera Utara, Medan City, North Sumatra Province, and the Pramita Medan Clinical Laboratory from 2 October – 22 December 2023.

Materials and Methods: The study included fifty CBCT radiographs from T2DM patients and fifty non-DM patients aged between 25 and 60. Bone density measurements were taken from a 10x10 region of interest (ROI) at the symphysis, angulus, and condyle. These measurements were assessed in axial, sagittal, and coronal planes. On-Demand, 3D software was used for radiograph analysis. Data processing included univariate and bivariate analyses, with an independent T-test applied for comparative purposes.

Results: The study estimated bone density reduction in T2DM patients as 40.922% at the condyle, 32.686% at the angulus, and 26.957% at the symphysis. A significant difference in mandibular bone density between T2DM and non-DM patients was found (*p-value* <0.05). For non-DM patients, the bone density values were 264.087 HU at the condyle, 630.717 HU at the angulus, and 554.600 HU at the symphysis.

Conclusion: T2DM patients had lower mandibular bone density than non-DM patients. The condyle showed the highest percentage loss, followed by the angulus and symphysis.

Key Words: *Bone Density; Cone-Beam Computed Tomography; Diabetes Mellitus; Mandible.*

Introduction

Diabetes is a chronic illness with various underlying causes.[1] According to the International Diabetes Federation (IDF), it is estimated that 537 million people worldwide will have diabetes in 2021.[2,3] Ninety-five percent of those with diabetes have type 2, which is the most common form of the disease.[4] Hyperglycemia in type 2 diabetes can lead to lower bone mineral density and increased risk of fractures due to increased calcium excretion and inflammatory response triggered by advanced glycation products.[5] This reduces insulin-like growth factor 1 levels, impacting bone development and synthesis.[4] Ongoing debate exists on the impact of type 2 diabetes on bone mineral density (BMD). Some studies suggest reduced BMD, while others show normal or enhanced BMD.[5] For instance, a study by Xu Y found increased osteoporosis and osteopenia frequency over four survey cycles among type 2 diabetes patients. The study examined BMD decline at the femoral neck in both type 2 diabetes patients and non-diabetic individuals from 2005 to 2014.[6]

The density of the lower jawbone affects implant integration and orthodontic treatment. Evaluating bone quality is crucial during dental implant therapy, and BMD is just one of several factors that influence integration.[7] Due to its benefits in providing anatomical as well as three-dimensional (3D)

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information in the coronal, sagittal, and axial viewing directions from images of the root, bone, nerves, and significant structures at the implantation site, cone beam computed tomography (CBCT) has been used extensively in implant dentistry. Because one of the functions of CBCT is to look at bone quality linked with BMD, it thus aids in dental implant planning to improve treatment outcomes by providing crucial information regarding the ideal implant dimensions and position according to the available bone.[8,9] Compared to CT, CBCT provides imaging findings with a lower radiation dosage and a higher resolution (submillimeter resolution). [10-12]

The studies that have been conducted usually only measure bone density in areas adjacent to the teeth or the apical region of the teeth, even though this study will obtain bone density values in T2DM patients, especially in the condyle, angle, and symphysis areas, which are susceptible to fractures. In addition, bone density values also affect implant osseointegration, healing after extraction, or other surgical procedures. Previous studies on bone density values typically only measure the apical region of the teeth, but the areas in this study often experience fractures. In addition, the results of this study will add to the existing literature.[13] The investigation's goal was to determine the percentage of bone loss in people with type 2 diabetes mellitus observed at the condyle, angulus, and symphysis by comparing T2DM and non-DM mandibular bone density using CBCT analysis.

Materials and Methods

The cross-sectional study design utilized in this analytical observational study was authorized by the Health Research Ethics Committee of the Universitas Sumatera Utara under letter number 1024/KEPK/USU/2023. This study was carried out in phases, including field surveys and CBCT radiographic tests, and began on 2 October 2023 and ended on 22 December 2023. The study was completed at the Pramita Medan Clinical Laboratory and the Dental Radiology Installation of the Dental and Oral Hospital, Universitas Sumatera Utara, Medan, North Sumatra Province. Patients with managed diabetes mellitus and intact mandibular cortical bone met the inclusion criteria for CBCT radiography. The radiographic device used is Orthopantomograph® OP300. Cliniview™ software for processing and viewing digital X-ray images. Open architecture and DICOM® format images for planning software and 3D viewing. DICOM® is the registered trademark of the National Electrical Manufacturers Association for its standards publications relating to digital communications of medical information. The image detector is a complementary metal-oxide semiconductor (CMOS), the field of view (FOV) is 13x15 cm, the image voxel size is 85 µm–300 µm, the scan time is 10–20 s, the exposure time is 8,1 s, pulsed X-ray image volume sizes (HxW) 61mm x 78mm, 90 kV, 5 mA, and 771 mGycm^2.

CBCT radiography was used in this investigation on Bataknese patients, aged 25–60 years, including 25 women and 25 men with T2DM and non-DM patients categorized by gender. The sample comprised 50 non-DM patients aged 25-35 years, and 50 T2DM patients, including 12 patients aged 35-40 years and 38 patients aged 41-60 years. The sampling technique employed in this study was purposive sampling. The American Diabetes Mellitus Association's methodology was used to establish the patient's diabetes status, with the HbA1C number serving as a proxy for the patient's three-month cumulative glycemic history.[14] Lesions, fractures, or using a fracture fixation device were considered exclusion criteria. According to Creswell and Creswell (2018), a sample size of 100 is often chosen because it provides a good balance between analytical capability and practical constraints in research, such as time and cost.[15] Therefore, this study used 100 samples, consisting of 50 CBCT radiographs from T2DM patients and 50 CBCT radiographs from non-DM individuals.

CBCT radiographs were performed on patients due to clinical indications that required detailed anatomical assessment. The questionnaire provided identified several patients with non-DM and T2DM. Radiation exposure of 771 mGycm^2 was justified by clinical need and research value, with doses managed according to As Low As Reasonably Achievable (ALARA) principles to ensure safety while improving diagnostic and research outcomes. A digital sensor system, a PC running Microsoft Windows XP Professional OS, Cliniview software version 10.1.2, and OnDemand 3D software are the equipment and supplies used in this study.

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The condyle, angulus, and symphysis bones on both sides of the mandible were used to identify the ROI (region of interest) for the research method (Figure 1). On CBCT, the decision is made in a sagittal orientation. A vertical line that touches the most posterior area of the ramus and condyle is drawn to determine the measurement area on the condyle bone. A vertical line tangent to the most anterior region of the condyle is drawn; both lines are made parallel. A horizontal line perpendicular to the vertical line in the condyle neck or the most concave area is drawn. An ROI of 10x10 is created. The determination is made from the sagittal direction of view. Following that, measurements were made in the axial, sagittal, and coronal viewing orientations. Create a horizontal line in the middle of the angulus perpendicular to the vertical line; create an ROI of 10x10; and determine the measurement area on the angulus bone by drawing a vertical line that touches the most posterior area of the ramus and angulus. The determination is made from the sagittal direction of view. Following that, measurements were made in the axial, sagittal, and coronal viewing orientations. Draw a perpendicular line through the center of the symphysis bone to get the measuring area; the resulting ROI is 10x10.

Data normality was assessed with the Kolmogorov-Smirnov test, while homogeneity was evaluated using the Levene test. Subsequently, the data were analyzed with the Independent T-test. Parametric tests were employed in this study because of the data gathering the assumptions of normal distribution and homogeneity of variances. The coronal viewing direction is used to calculate the measuring area. Following that, measurements were made in the axial, sagittal, and coronal viewing orientations. By comparing the mean bone density of T2DM and non-DM patients, the estimated percentage of bone density decline can be calculated.

Results

The individuals in the study sample ranged in age from 25 to 60 years. There were 25 women and 25 men among the T2DM patients furthermore to those without DM according to gender. Drawing from the two declared children, it may be concluded that all samples are Bataknese. The study's findings demonstrated a substantial ($p<0.05$) difference in bone density between those with DM 2 and those without (Table I). T2DM patients' average cone density value was 108.07 HU lower than that of non-DM patients. T2DM patients had an average angular density of 206.157 HU, which was lower than that of non-DM patients. Compared to non-DM, symphysis density in T2DM had a lower average value of 149.503 HU. T2DM patients had a lower average bone density than non-DM individuals based on the total average bone density value. These findings indicate that DM patients have less bone density. According to Table II, the condyle had the largest percentage drop in bone density (40.922%), followed by the angulus (32.686%) and the symphysis (26.957%) in T2DM patients.

Table I: The Difference in Mandibular Bone Density Values on CBCT Radiographs Between T2DM and Non-DM Patients

Bone Density		Mean (HU)**	Standard Deviation	p-value	95% Confidence Interval	
					Lower	Upper
Condyle	DM***	156.017	51.924	<.0.001*	-70.429	1.053
	Non-DM	264.087	109.394			
Angulus	DM	424.560	43.927	<0.001*	-357.007	-291.305
	Non-DM	630.717	298.337			
Symphysis	DM	405.097	45.912	<0.001*	-474.882	-411.674
	Non-DM	554.600	225.426			

*Independent T-Test; significant $p < 0.050$ is considered
**Hounsfield Unit (HU)
***Diabetes Mellitus

Table II: The Percentage of DM Patients' Decreased Bone Density

Bone Density		Mean (HU)*	Percentage $(\frac{Mean\ DM}{Mean\ Non\ DM} \times 100\%)$	Percentage decreases $(100\% - x\%)$
Condyle	T2DM**	156.017	59.078%	40.922%
	Non-DM	264.087		
Angulus	T2DM	424.560	67.314%	32.686%
	Non-DM	630.717		
Symphysis	T2DM	405.097	73.043%	26.957%
	Non-DM	554.600		

*Hounsfield Unit (HU)
**Diabetes Mellitus

Discussion

This study revealed a significant difference ($p<0.050$) in bone density between the T2DM and non-DM groups, with the T2DM group showing markedly lower bone mineral density (BMD) compared to the non-DM group. Among the numerous regions examined, the condyle exhibited the highest density at 40.922%, followed by the angle at 32.686%, and

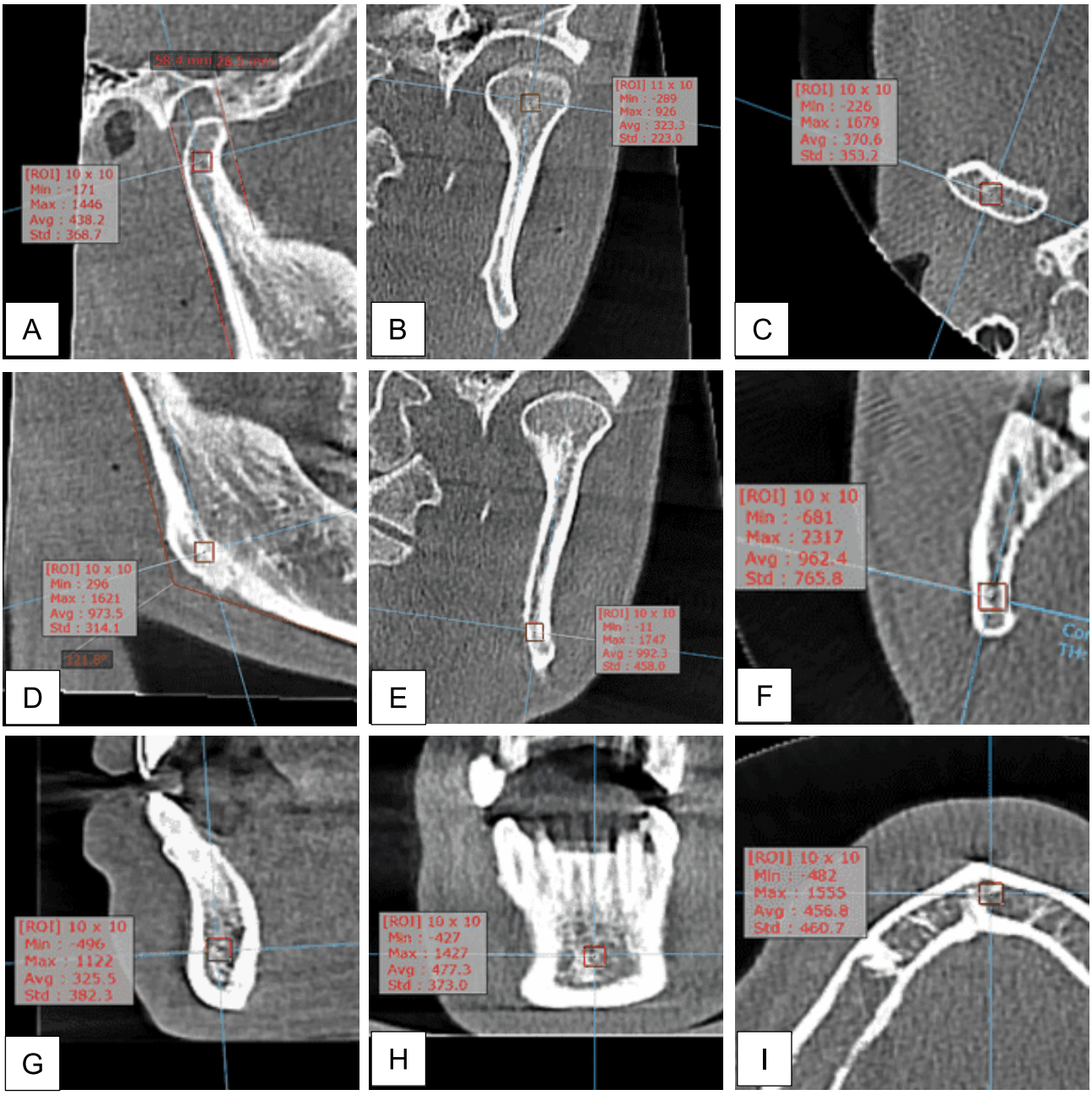

Figure 1. ROI-based density measurement: 10x10 (A) sagittal view at the right condyle; (B) coronal view at the right condyle; (C) axial view at the right condyle; (D) sagittal view at the right angulus; (E) coronal view at the right angulus; (F) axial view at the right angulus; (G) sagittal view at the symphysis; (H) coronal view at the symphysis; (I) axial view at the symphysis

the symphysis at 26.957%. According to David et al.'s analysis of the study's data, patients with type 2 diabetes have significantly lower bone mineral density. Therefore, the primary screening instruments for more accurately assessing the bone mineral density of individuals with diabetes are the Mental Index (MI), Antegonial Index (AI), and Gonial Index (GI).[16] Similarly, an investigation by Al Ansari et al. revealed that compared to implants implanted in non-DM patients, diabetes patients had a significantly increased chance of implant failure and a larger marginal bone loss.[4]

The data supporting a link between poor bone density and diabetes mellitus is insufficient, according to Qiu J's[5] systematic review and meta-analysis. Subgroup analysis revealed no statistically

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significant difference in the probability of low bone density between T1DM and low bone density, nor between women and men in developed or developing nations and T2DM patients. This may be because the etiology of T2DM varies throughout patient populations and can be caused by obesity, aging, diabetes complications, duration of diabetes, and medication. Variable circumstances also arise in osteoporosis and type 2 diabetes.[5.] It is anticipated that the study's findings would give a general overview of mandibular bone density assessment in people with diabetes using CBCT, demonstrating how variations in bone density lead to a decrease in bone mineralization. Therefore, when developing a treatment strategy for the mandibular bone, the practitioner must exercise caution. Future studies based on sectioning are anticipated to use more sophisticated technology and look at gender differences in people with various kinds of systemic diseases.

This study does, however, have certain biases and limitations. For instance, there was no gender discrimination in the study, the area of focus was narrow, and the length of diabetes was not considered. Moreover, the study sample included people whose ages ranged widely from 25 to 60. This may result in bias because aging and menopause can promote bone loss even in the absence of diabetes, which could be a complicating factor. Osteoporosis is a chronic and long-term bone illness that is more common in men over 65 and in women over 55, approximately, since as bone loss grows with age, so does its frequency.[17] This phase is characterized by accelerated bone remodeling brought on by estrogen deficiency, which results in bone density loss.[18]

Involutional osteoporosis affects both men and women and is more strongly associated with aging.[19] Type I osteoporosis, also known as postmenopausal osteoporosis, is a subtype of involutional osteoporosis that primarily affects women between the ages of 51 and 75 and is characterized by fast bone loss. Osteoporosis develops due to a variety of reasons. Certain elements, such as those related to the environment and certain hormones, can be changed. The following are examples of environmental factors: nutritional factors, which raise the risk of heart disease and stroke; low calcium intake; vitamin D deficiency due to nourishing problems; poor absorption or low exposure to sunlight; excessive protein intake in an unbalanced diet; and excessive phosphate or salt intake. The following factors are known to directly increase the risk of osteoporosis: (a) calcium loss through urine[20]; (b) sedentary lifestyle, anaerobic exercise, and excessive mechanical load; (c) chronic pharmacological treatment, such as anticonvulsants, glucocorticoids, tranquilizers, or chemotherapy; (d) consumption of coffee, alcohol, or smoking; and (e) body weight, which accounts for 15% to 30% of the variation in bone mineral density (BMD) at any age and in any bone region measured.[21]

Among the endocrine factors are: (a) conditions related to low bone mass, such as delayed menarche or menstrual cycle changes; (b) menopause, either surgically or naturally, before the age of 45; (c) hormone-infertile women; and (d) premenopausal estrogen deficiency caused by anovulation because of anorexia nervosa, excessive exercise, mental stress, etc. As far as Western nations are concerned, they are the most significant risk factors for osteoporosis.[22] Given that they can be changed to lower the risk of osteoporosis, it is crucial to examine these modifiable risk factors.

Conclusion

Compared to non-DM patients, T2DM patients had reduced mandibular bone density. The condyle experienced the greatest projected percentage loss in bone density, with the angulus and symphysis closely behind.

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Conflict of Interest

The authors declared no conflict of interest

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CONFLICT OF INTEREST

Authors declared no conflicts of Interest.

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DATA SHARING STATMENT

The data that support the findings of this study are available from the corresponding author upon request.

ORIGINAL ARTICLE

A Comparative Analysis of Duration of Third Stage of Labor with or without Placental Cord Drainage in Females Undergoing Term Delivery

Seemal Tajasar[1], Anees Fatima[2], Nida Siddique[3], Huma Afridi[4], Aliya Shahzadi[5], Qurat-Ul- Ain Zulfi[6]

ABSTRACT

Objective: The purpose of this study was to compare the duration of the third stage of labor between two groups of females undergoing term delivery: those undergoing placental cord drainage and those not undergoing this procedure.

Study Design: Comparative interventional Study.

Place and Duration of Study: Gynecology and Obstetrics Department, Imran Idrees Teaching Hospital, Sialkot for six months duration from 19-01-24 to 24-07-24.

Materials and Methods: A comparative study (ref: 2023/IITH/RA/006) at Imran Idrees Teaching Hospital, Sialkot involving 186 women (aged 18-40, parity <5, term pregnancies) selected via non-probability consecutive sampling. Randomly divided into two groups (n=93 each), Group A received placental cord drainage and active third-stage labor management, while Group B had immediate cord clamping. Demographic data and labor duration were recorded throughout the study period. SPSS 23 analyzed data, utilizing independent t-tests ($p \leq 0.05$). Stratification by gestational age, BMI, and parity was performed. Results provide insights into the efficacy of drainage of the placental cord in managing labor

Results: Average time of the third stage of labor was notably reduced in Group-A (5.25 ± 0.80 minutes) compared to Group-B (7.94 ± 1.03 minutes) having p-value of 0.0001. This significant reduction was consistent across all stratifications by age, gestational age, parity, and BMI, indicating that draining placental cord effectively reduces the length of the third(last) stage of labor.

Conclusion: Effectively draining placental cord, shortens the last stage of labor in term SVD(spontaneous vaginal deliveries), potentially reducing maternal morbidity and mortality. This straightforward intervention should be considered for routine obstetric practice to enhance maternal outcomes and improve the overall quality of care. Further research on its long-term effects is recommended.

Key Words: *Labor, Labor Duration, Maternal Morbidity, Obstetric Practice, Placental Cord Drainage, Third Stage of Labor.*

Introduction

The World Health Organization characterizes normal birth as the occurrence of a low-risk pregnancy culminating in a spontaneous, vertex delivery between the 37th and 42nd weeks of gestation, ultimately yielding a healthy outcome for both mother and child.[1] Labor consists of three stages: the first involves contractions and cervical dilation, the second, birth of the baby, and the third concludes with placental expulsion, aided by contractions, typically within 5-30 minutes, often assisted by controlled cord traction and medication to prevent post partum hemorrhage.[2] The third stage is a critical phase in the process of birth. The management of this stage has been a subject of ongoing investigation and debate in obstetric care. Two approaches are employed clinically to handle the third stage of labor: expectant and active management. The natural delivery of the placenta, often referred to as the 'after-birth', is known as expectant management of the third stage of labor. In contrast, active management of the third stage of labor involves the administration of prophylactic uterotonics, early

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clamping of the umbilical cord, and controlled traction to expel the placenta to aid placental delivery.[3] Active management of the third stage of labour is highly effective at preventing postpartum haemorrhage. Among the various techniques explored in active management of labor , controlled cord traction and administration of uterotonic agents play a crucial role in reducing postpartum haemorrhage rates.[4] An extended last stage of labor is linked with more chances of postpartum hemorrhage, maternal morbidity, and the need for other medical or surgical interventions.[5] Placental cord drainage, a relatively newer approach, involves the passive extraction of blood from the placenta through an elevated umbilical cord by releasing the clamp the previously clamped umbilical cord on maternal side after delivery of the baby and permitting the blood from the placenta to flow into a suitable receptacle.[6] Advocates of this technique suggest that it may facilitate the prompt release of the placenta by reducing blood volume within the placental vessels, thus potentially shortening the last stage of labor.[7] A study indicated that applying cord drainage led to a decreasing last stage of labor compared to those without cord drainage.[8] According to a parallel-group randomized trial after implementing umbilical cord drainage, the last stage of labor exhibited a notably reduced duration. In the group undergoing drainage, the average length of the last stage was around 7.1 ± 1.01 minutes, whereas in the comparison group, the duration averaged 10.4 minutes, with a standard deviation of 3.2 minutes, demonstrating a significant difference ($P < 0.001$).[6] In an Egyptian study, differences in the lengths of the third stage were noted among three groups ($p < 0.05$). The control group (C) exhibited a longer time span of the final stage of labor at 8.80 ± 4.92 minutes compared to Group A, where oxytocin was administered, showing a duration of 7.72 ± 2.72 minutes, and Group B, with cord drainage, with a duration of 5.52 ± 2.04 minutes; suggesting effectiveness of cord drainage technique.[9]

One more randomized trial in Egypt showed that placental cord drainage significantly shortened the third stage of labor by 2.6 minutes compared to the control group (4.5 ± 1.7 vs. 7.1 ± 2.9 minutes; $t=5.788$, $p<0.001$), confirming its effectiveness as an intervention.[10]

A comparable study conducted in Pakistan, findings suggested a notable shortening of the last phase of labor within cord blood drainage cohort, averaging around 8.5±3 minutes, contrasted with the other group, which averaged 11±5.3 minutes; the observed p-value indicated statistical significance at 0.001.[11]

This study aimed to compare the duration of the third stage of labor between females undergoing term delivery with and without placental cord drainage. By shedding light on the potential advantages or drawbacks of placental cord drainage during term deliveries, the study findings may guide healthcare strategy formulation and elevate standards in the treatment of pregnant individuals and their newborns.

Materials and Methods

This comparative research was carried out in the Department of Gynecology and Obstetrics, at Imran Idrees Teaching Hospital, Sialkot, over a six-month period following the approval from Ethical Review Board (reference no. 2023/IITH/RA/006). Altogether 186 women participated with 93 women in each group.

The criteria for including the participants were women from the age of 18-40 years, having a parity of less than 5, presenting in labor at term (gestational age greater than 37 weeks), and undergoing normal vaginal delivery. The exclusion criteria were women with antepartum hemorrhage (as identified through clinical examination), HTN(defined as blood pressure greater than 140/90 mmHg), diabetes (blood sugar levels greater than 186 mg/dl), abnormal placental positions such as placenta accreta or previa (as identified through ultrasound), scarred uterus due to previous c section or any uterine surgery, twin pregnancies, fibroid uterus (as identified through ultrasound), deranged clotting profiles or bleeding disorders (based on history and investigations), and those on anticoagulation therapy.

Following approval from the hospital's ethical committee, 186 women who met the selection criteria were recruited from the labour room. Data, including maternal age, parity(previous pregnancy), and duration of gestation, were collected. After enrollment through consecutive sampling, participants were randomly allocated into two groups using the lottery method to ensure unbiased

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distribution of the subjects. were then randomly divided into two groups using probability simple random sampling method specifically implemented through a lottery method. Each participant drew a slip of paper from a non-transparent container immediately after consenting to participate. The slips were equally divided into Group A (placental cord drainage with active management of the third stage of labor) and Group B (immediate cord clamping). This approach ensured that each participant had an equal chance of being assigned to either group, thereby minimizing selection bias.

Group A consisted of females who underwent drainage of placental cord along with active management of the last stage of labor, which included uterine stimulation by massaging, gentle cord traction, and an injection of syntocinon. For this group, the placental end of the cut maternal end of the umbilical cord was not clamped immediately following delivery of baby and was left unclamped to allow blood drainage into a vessel till blood stopped, and duration was recorded. Group B consisted of women who did not receive placental cord drainage; instead, severed end of the placenta was kept fastened. The women were then followed until the expulsion of placenta, the duration from initiation of the last labour stage to the placental delivery was recorded.

Data were gathered using a proforma and subsequently recorded and analyzed using SPSS version 23. Quantitative data including numerical variables, such as maternal age, gestational age, and the length of the last stage of labor, was assessed by mean and standard deviation. Parity was described by using frequency. The average length of last stage and the incidence of retained placenta were analyzed for comparison between the two groups using used t-tests for independent samples, with confidence level of 95% p-value was set to be ≤0.05 as significant. Further stratification of the data was performed for gestational age, body mass index (BMI), and parity.

Results

Out of 186 cases (93 in each group) women who met the selection criteria were enrolled to evaluate the average span of Third stage of labor experiencing SVD (spontaneous vaginal delivery) at term among those who underwent cord drainage and those who did not.

Table I: Age of Patients & Gestational Age

Characteristic	Group-A	Group-B
Age Distribution		
18-30 years	57 (61.29%)	49 (52.69%)
31-40 years	36 (38.71%)	44 (47.31%)
Mean Age (years ± SD)	29.18 ± 2.89	30.37 ± 2.31
Gestational Age Distribution		
37-39 weeks	68 (73.11%)	66 (70.97%)
>39 weeks	25 (26.89%)	27 (29.03%)
Mean Gestational Age (weeks ± SD)	38.73 ± 1.24	38.77 ± 1.28

Table I This table outlines the age and gestational age distributions of participants in Group-A and Group-B

Table II: Parity and BMI

Characteristic	Group-A	Group-B
Parity Distribution		
1-2 parity	52 (55.91%)	49 (52.69%)
3-4 parity	41 (44.09%)	44 (47.31%)
BMI		
Mean ± SD	29.60 ± 2.33	29.95 ± 2.55

Table II This table presents parity distribution and body mass index (BMI) among participants in Group-A and Group-B

The age distribution analysis revealed that in both the groups, most of patients were within the 18-30 years age group, comprising 61.29% and 52.69% respectively. Conversely, a smaller proportion, 38.71% in Group-A and 47.31% in Group-B, were aged as 31-40 years. The mean age for Group A was 29.18 years (± 2.89), slightly lower than Group B's mean age of 30.37 years (± 2.31). Regarding gestational age, a significant majority in both groups were at 37-39 weeks, with 73.11% in Group A and 70.97% in Group B. The remaining participants, 26.89% in Group A and 29.03% in Group B, had a gestational age of>39 weeks. The mean gestational age for Group A was 38.73 weeks (± 1.24), comparable to Group B's mean gestational age of 38.77 weeks (± 1.28)

Table III A comparative analysis of the mean duration of the third stage of labor between Group A and Group B

Table III presented a comparison of the mean length of the third(last) stage of labour between Group A and Group B, with stratification by various factors. In the overall comparison, Group A exhibited a mean duration of 5.25 minutes (± 0.80), whereas Group B shows a longer mean duration of 7.94 minutes (± 1.03), having a p-value of 0.0001. The table further

Table III: Comparative Analysis of the Average Duration of Third Stage Labour

	Group A	Group B	P-Value
Overall	Mean: 5.25 ± 0.80 min	Mean: 7.94 ± 1.03 min	0.0001
Age Stratification	18-30: 5.12 ± 0.76 min	18-30: 7.82 ± 1.01 min	0.0001
	31-40: 5.44 ± 0.84 min	31-40: 8.07 ± 1.04 min	0.0001
Gestational Age Strat.	37-39: 5.18 ± 0.77 min	37-39: 7.77 ± 1.09 min	0.0001
	>39: 5.13 ± 0.69 min	>39: 7.62 ± 1.06 min	0.0001
Parity Stratification	1-2: 5.19 ± 0.81 min	1-2: 7.11 ± 1.02 min	0.0001
	3-4: 5.23 ± 0.86 min	3-4: 7.19 ± 1.05 min	0.0001
BMI Stratification	≤30: 5.24 ± 0.88 min	≤30: 7.36 ± 1.01 min	0.0001
	>30: 5.34 ± 0.79 min	>30: 7.41 ± 1.14 min	0.0001

showed subgroup comparisons, including stratification by age groups (18-30 years and 31-40 years), gestational age categories (37-39 weeks and >39 weeks), parity (1-2 and 3-4), and BMI (≤30 and >30).

Discussion

The practice of draining the cord could diminish the placenta's volume and surface area, potentially enhancing detachment of placenta and promoting contraction of uterus, thereby increasing the area where separation occurs.[12,13]

In this study the overall comparison reveals that Group-A had a significantly shorter mean length of third stage of labor (5.25 ± 0.80 min) compared to Group-B (7.94 ± 1.03 min), with a highly significant p-value of 0.0001. This suggests that the observed difference in mean durations between the two groups is statistically significant. A study by Karimi N et al documented that drainage of the placental cord effectively reduces the third stage of labor duration.[6] A Randomized control trial found a statistically significant decrease in the placental cord drainage group's time until placenta separation signals appeared (3.5583±0.83915) compared to the control group.[15,16] Age is an important demographic factor that may influence the length of last stage of labor. Stratification by age groups (18-30 years and 31-40 years) shows consistent results, with Group-A demonstrating shorter mean durations compared to Group-B within each age category. This suggests that the benefit of draining umbilical cord in reducing the span of the third stage of labor is consistent across different age groups.

Gestational age at delivery is another crucial determinant of obstetric outcomes. Like age stratification, the stratification by gestational age categories (37-39 weeks and >39 weeks) demonstrates a shorter average duration of the last stage of labor in Group A compared to Group B, regardless of gestational age. This finding along with similar work done by Kaba et al. indicated that draining the cord drainage remains effective irrespective of gestational age at delivery. Parity, or the number of previous pregnancies, may influence the dynamics of labor. The consistent shortening of the last stage of labor with umbilical cord drainage across parity categories suggests that the intervention is equally effective in nulliparous and multiparous women. This finding underscores the generalizability of the intervention across different obstetric populations.[17] The analysis hierarchy by parity (1-2 and 3-4) also reveals a consistent pattern, with Group A exhibiting shorter mean durations of the third stage of labor in comparison with Group B within each parity category. This suggests that the efficacy of drainage of placental cord is not influenced by parity status. A similar also highlighted that there is no significant role of parity on span of third stage of labor.[11] Maternal BMI(body mass index) is a potential confounder in obstetric outcomes. The finding that draining the placental cord reduces the length of last stage of labor regardless of maternal BMI category indicates its robust efficacy across varying body compositions. Stratification by BMI categories (≤30 and >30) demonstrates that Group-A had shorter mean durations of the third stage of labor in comparison of Group B across both BMI groups. This finding indicates that the effect of cord drainage is independent of maternal BMI. Study done by Mohamed et al. also emphasize on the role of BMI in placental cord drainage.[18] The results are consistent with other studies that have investigated the draining of umbilical cord on the span of the final stage of labor. As explained in a study of McDonald et al., highlighting the efficacy of interventions such as placental cord drainage in reducing postpartum hemorrhage and found that draining cord significantly decreases the span of the third stage of labor.[19] To summarize, the study provides robust evidence supporting the use of the technique of

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draining placental cord as a practical intervention to shorten the length of last stage of labor in women experiencing normal delivery(SVD) at term. These findings have important implications for obstetric practice, potentially reducing the risk of postpartum hemorrhage and improving maternal outcomes.

Conclusion

This study confirms that placental cord drainage significantly shortens the third stage of labor in term deliveries, with the duration averaging 5.25 minutes for treated women versus 7.94 minutes for controls, a statistically significant difference (p = 0.0001). The benefits were consistent across all demographic and physiological strata tested. The findings support incorporating placental cord drainage into standard obstetric practice to improve maternal outcomes by reducing the risks associated with prolonged labor.

Limitation of the Study

The study was conducted at a single center, making it difficult to generalize the findings to other clinical settings with different patient demographics or healthcare practices. Additionally, the measurement of the third stage of labor duration was subjective and reliant on healthcare staff, which could introduce inconsistencies due to the absence of standardized timing protocols.

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CONFLICT OF INTEREST

Authors declared no conflicts of Interest.

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DATA SHARING STATMENT

The data that support the findings of this study are available from the corresponding author upon request.

ORIGINAL ARTICLE

Features of Structural Organization of The Human Facial Nerve

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ABSTRACT

Objective: The aim of the study was to investigate the intra-trunk structure of the facial nerve at different age periods.

Study Design: Cross-sectional comparative study

Place and Duration of Study: The data was collected from forensic morgues and clinical hospitals, as well as maternity hospitals in Baku, along with specimens from the primary museum collection of the Department of Human Anatomy. The study was conducted from November 2021 to May 2024.

Materials and Methods: Facial nerves were studied in corpses of those who died suddenly or because of various injuries, i.e. practically healthy people. The microscopic anatomy of the facial nerve was examined in 126 samples. To analyze the internal structure of the facial nerve, from trunk of the facial nerve were collected. Age groups – from fetus to old age. Araldite-Epon blocks were created from these samples following standard electron microscopy procedures. Quantitative indicators obtained during the research were conducted in the IBM Statistics SPSS-26 program with the application of variation and dispersion methods.

Results: The results of the research show that the facial nerve at the level of the stylomastoid foramen of an adult person has a diameter that fluctuates on the right within the range of 1697.4±51.1 μm, and on the left 1630.4±56.1 μm. This indicator is quite stable and changes little throughout a person's mature age. In cross-section, the nerve has an oval or irregular shape. The determining factors can be considered manifestations of asymmetry, individual and age-related variability.

Conclusion: The data obtained allow us to consider that the entire complex of morphological and functional restructuring of the facial nerve represents only individual links in the dynamics regarding the structural organization of the human peripheral nervous system.

Key Words: *Facial Nerve, Myeloarchitecture, Myelin Fibers, Nerve Bundles, Perineurium.*

Introduction

Questions of the intra-stem structure of peripheral nerves represent one of the most interesting pages of neuromorphology. In developing these issues, the basic patterns of morphogenesis and functional properties of the nervous system were established. To date, significant material has been accumulated on the intra-trunk structure of peripheral nerves and neural sheaths, the processes of myelination of myelinated nerve fibers, their age-related characteristics and a number of other issues have been shown.[1,2,3] It has been established that various parts of the peripheral nervous system are represented by nerve conductors that differ significantly from each other in light and electron microscopic organization as well as in functional properties. It is no coincidence that in recent decades the attention of many researchers has again been drawn to the examination of the morphology of the facial nerve, taking into account clinical practice and plastic surgery.[4,5,6] At the same time, a number of unresolved issues related to the morphology of the facial nerve still remain: there is no complete information about the age-related features of the intra-trunk structure of the facial nerve. Clinical manifestations and diagnostic accuracy of facial nerve lesions are primarily associated with the characteristics of its anatomical structure, and the prevalence of these lesions can be attributed to the nerve's susceptibility due to its unfavorable anatomical positioning. At the same time, the intra-trunk structure of the facial nerve has not yet been studied fully enough from the standpoint of modern morphology. The available data often require

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confirmation, often contradict each other, and, ultimately, do not allow for a complete, clear idea of the microscopic structure of the facial nerve. The issues of age morphology, considering the functional features of the nerve, have not yet been sufficiently developed, which is of fundamental theoretical and applied importance. At the same time, the solution of these issues can significantly deepen our understanding of the processes of myelination and intra-trunk reorganizations in the facial nerve, which will undoubtedly contribute to the further development of effective surgical methods and therapeutic measures associated with neurological, traumatic and other lesions of the facial nerve. Based on the above, the purpose of this study is to examine the age-related characteristics of the intratrunk structure and myeloarchitectonics of the facial nerve.

Materials and Methods

The microscopic structure of the facial nerve was analyzed in 126 specimens. The material was obtained by mutual agreement in forensic morgues and clinical hospitals, maternity hospitals in Baku, and preparations from the collection of the fundamental museum of the Department of Human Anatomy were also used. During microscopic examination, we pay attention to the features of the intra-trunk structure of the facial nerve: the number of bundles, the thickness of the peri- and epineurium, the content of myelin fibers in the nerves, and their topography. The composition of myelinated and unmyelinated fibers, along with their topography, caliber, and thickness, was also assessed. Samples were fixed in a solution containing 2% paraformaldehyde, 2% glutaraldehyde, and 0.1% picric acid, prepared in 0.1 M phosphate buffer (pH 7.4). Araldite-Epon blocks were created from the specimens according to established protocols used in transmission electron microscopy. Semi-thin sections (1–2 µm) cut from the blocks on a Leica EM UC7 ultramicrotome were stained with methylene blue, Azure II, or toluoid blue, viewed under a Primo Star microscope (Zeiss), and photographs of the relevant areas were captured using a Canon EOS D650 digital camera. Ultrathin sections were examined with a JEM-1400 transmission electron microscope at a voltage of 80–120 kV, and electrograms were obtained.[7,8]

The obtained digital data were statistically processed using medical statistics methods considering modern requirements. The average values of the obtained samples (M), their standard errors (m), minimum (min) and maximum (max) values of the series were calculated, and the frequencies of occurrence of the studied qualitative features in the series were determined. For a preliminary assessment of the difference between the variation series, the parametric Student's t-test and the assessment of the difference between the shares were used. Then, to check and clarify the obtained results, a non-parametric criterion was used - the Wilcoxon (Mann-Whitney) U-test. For comparison and probabilistic assessment of differences between the values of the compared groups with a small number of variants ($n<30$), we used the nonparametric Wilcoxon (Mann-Whitney) rank U-test. For this purpose, the numerical values of the compared samples were arranged in ascending order in one common row and ranked (numbered 1, 2, 3, etc.). When identical indicators were encountered in the ranking process, a lower number was assigned alternately to the indicators from the first and second compared groups. Calculations were performed on a computer using an EXCEL spreadsheet.[9] The results of the study were recorded, and the data were entered into appropriate tables for subsequent statistical processing.

Results

The results of the study showed that all structural components are registered on the cross section of the facial nerve in fetuses: connective tissue stroma, blood vessels and conductive elements. On average, the diameter of the nerve in the fetus reaches 236.4±29.7 µm on the right, 241.1±35.4 µm on the left. Connective tissue sheaths are already formed: the nerve trunk is surrounded by epineurium 29.7±2.0 µm thick, on the right 27.3±1.6 µm on the left. Each nerve bundle is surrounded by a perineural sheath reaching 16.6±0.9 µm on the right, 16.4±0.6 µm on the left. When studying the myeloarchitectonics of the facial nerve, a “nested” distribution of myelinated nerve fibers in the fetus is often noted, the total number of which reaches 305.9±50.5 in the right nerve, 319.9±50.5 in the left. In childhood, the cross-sectional diameter of the

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nerve on the right is 1205.9±53.6 μm, on the left 1097.4±55.5 μm. At the same time, the thickness of the epineural sheath increases. In the right nerve, this indicator was within 74.9±5.9 μm, in the left nerve this growth interval is 69.7±3.6 μm. Along with the increase in the thickness of the epineural sheath, the degree of development of the perineural sheath practically does not change. The ratio of the content of connective tissue stroma and conductive elements in the facial nerve shifts in favor of the latter: thus, the total area occupied on the cross-section by all myelin fibers in childhood is 17.1±1.4% in the right nerve, 16.1±1.1% in the left. The most variable indicator in childhood is the total number of myelin fibers. In childhood, the right nerve contains 3646.0±313.4, and the left 3278.0±299.0 of all types of myelinated fibers. Myelination of nerve fibers in postnatal ontogenesis has not only quantitative but also qualitative manifestations. Myelin sheaths have more pronounced tinctorial properties, they are more chromophilic. The most stable period in the structural and functional organization of the facial nerve is mature age. The facial nerve of a person in mature age has a diameter that fluctuates within 1697.4±51.1 on the right, 1630.4±56.1 μm on the left. This indicator is very stable and changes little throughout mature age. In the trunk of the human facial nerve, the number of nerve bundles is 6.0±0.51 on the right, 6.5±0.53 on the left. The central sections of the trunk are usually occupied by two or three large bundles, and in its peripheral sections there are several small bundles, usually represented by several dozen myelinated fibers. A feature of the bundle structure of the nerve is the regularity that the smaller the size of the bundles, the greater their number, and vice versa. Sometimes the nerve is composed of a small number of large bundles that differ little in shape from each other. The thickness of the perineurium is determined primarily by the diameter of each nerve bundle and fluctuates within the limits of 56.1 ± 5.6 μm on the right, 52.8 ± 5.5 μm on the left. The epineural sheath of the nerve is well developed. The thickness of the epineural sheath is 137.9±2.1 μm on the right and 135.5±6.0 μm on the left. Myelinated nerve fibers are the main structural elements of the nerve trunk in the facial nerve. In absolute figures, the total number of all myelinated nerve fibers in the right facial nerve is 5982.5±413.1, in the left 5277.3±513.5. It should be noted that by the end of mature age, the structure of the facial nerve gradually loses stability and is subject to certain involutional changes. In old and senile age, the indices of the connective tissue stroma of the nerve increase. The diameter of the nerve on the right in old age is within 1671.4±4.2 μm, on the left - 1659.1±4.6 μm, although the number of myelinated nerve fibers not only does not increase but decreases to a certain extent. The increase in the diameter of the cross-section is due to the increase in the thickness of its connective tissue sheaths. This is especially clearly manifested on the part of the epineural sheath, the thickness of which in old age reaches 135.4±1.8 μm on the right and 136.1±2.2 μm on the left, respectively. The previously established ratio between connective tissue and conductive elements acquires a clearly expressed tendency towards an increase in connective tissue stroma. For example, if in the right nerve in old age, the total area occupied by connective tissue is 89.4±1.0%, on the right, then the same indicator in old age reaches 82.3±2.0%. At the same time, there is a decrease in the percentage of the total area of conductive elements.

Table I: Micrometric Indices of the Facial Nerve

Indicators		Age groups			
		Fruit	Childhood	Mature	Old age
Diameter of the cross-section of the nerve trunk (in μm)	L	241,1±35,4	1097,4±55,5	1630,4±56,1	1659,1±4,6
	R	236,4±29,7	1205,9±53,6	1697,4±51,1	1671,4±4,2
p		<0,001	<0,001	<0,001	<0,001
The number of nerve bundles in the nerve trunk	L	2,7	3,7	6,0	4,7
	R	2,4	3,1	6,5	4,9
p					
Epineurium thickness (in μm)	L	27,3±1,6	69,7±3,6	135,5±6,0	136,1±2,2
	R	29,7±2,0	74,9±5,9	137,9±2,1	135,4±1,8
p		<0,001	<0,05	<0,001	<0,005
Perineurium thickness (in μm)	L	16,4±0,6	36,5±2,1	52,8±5,5	89,4±4,9
	R	16,6±0,9	38,3±2,0	56,1±5,6	93,1±9,5
p		<0,001	<0,005	<0,001	<0,001
Total number of myelinated nerve fibers	L	319,9±50,5	3278,0±299,0	5277,3±513,5	1855,7±62,3
	R	305,9±50,5	3646,0±313,4	5982,5±413,1	2360,0±52,6
p		<0,001	<0,001	<0,001	<0,001

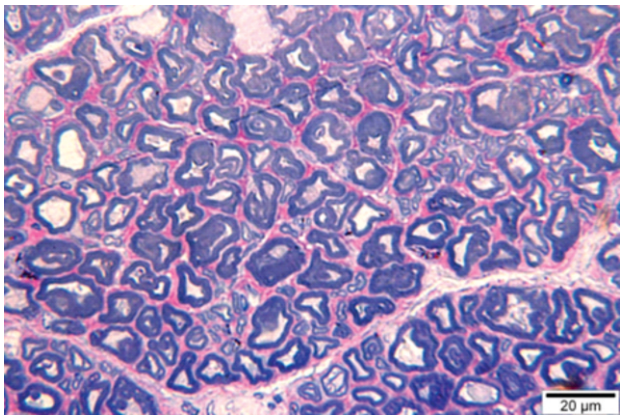

Figure 1. Intra-trunk structure of the facial nerve Age – 21 years Ultrathin sections of 50-70 nm thickness taken from the blocks were stained first with 2% uranyl acetate solution and then with 0.6% pure lead citrate prepared in 0.1 N NaOH solution. Ultrathin sections were examined under a JEM-1400 transmission electron microscope at 80-120 kV and electrograms were recorded

Discussion

A differentiated approach to the treatment of patients of different ages, the allocation of pediatric surgery and gerontology as independent branches of medicine, requires further study of the variability of organs and nerves in individual age groups. In this regard, further study of age-related features of the anatomy of the facial nerve can contribute to the improvement of surgical techniques. In our work, the criteria for morphological maturity of nerves were quantitative estimates of myelinated fibers of individual categories in the nerves of different ages. In the study, the intra-trunk structure of the facial nerve was studied. In this case, the myeloarchitectonics and age dynamics of the intra-trunk structure of the facial nerve were studied for the first time. In this regard, the novelty of the data obtained on the age-related myeloarchitectonics of the nerve is of interest. At the early stage of postnatal ontogenesis, the content of myelinated nerve fibers differs significantly; their total area is more than half the diameter of the nerve, the rest is accounted for by connective tissue structures. In the fetus, the predominant type is small, myelinated fibers. As the body grows the number of fibers in the facial nerve increases, and the ratio of their variety changes. It must be assumed that a significant part of the myelinated nerve fibers in the early stages of ontogenesis is undifferentiated myelinated fibers. In subsequent development, small, myelinated fibers pass into the category of medium and large myelinated nerve fibers. According to the data obtained, the fascicular structure of the nerves is established already during the period of intrauterine development and undergoes further restructuring in postnatal ontogenesis. Regardless of age, they can be either few-fascicular or multi-fascicular. Starting from childhood, the structure of the nerve acquires a more uniform character: the overwhelming majority of nerve fibers have a clearly formed sheath. It should be noted that the cross-sectional diameter of the nerve fibers does not always depend on the thickness of the myelin sheath; small, myelinated fibers may have a pronounced sheath and vice versa, large fibers are often surrounded by a very thin myelin sheath. The results of our studies are consistent with the data[10,11,12] on individual and age-related variability of the facial nerve. In this regard, there is no fundamental difference from similar processes occurring in other structures of the nervous system.[13, 14,15] Considering the morphological changes in the studied nerves in old and senile age, it should be noted that they are manifested both from the side of the conductive elements and the connective tissue stroma of the nerve. The total number of myelinated fibers decreases, the myelin sheath becomes thinner, loses its tinctorial properties. In some areas it is fragmented, unevenly stained with dyes. The results obtained are consistent with the materials presented in the works of [16,17] in relation to other peripheral nerves.

Conclusion

Thus, individual variability of the nerve is expressed in the number and size of nerve bundles, connective tissue elements, changes in the number and spectrum of myelinated fibers in different age periods. In the dynamics of the formation of the intra-trunk structure of the facial nerve and its branches, three main periods of development are noted: Period I intrauterine development up to and including childhood, when active growth and differentiation of myelinated nerve fibers and connective tissue are noted; Period II includes mature age, when the main indicators of nerves acquire relatively stable parameters; Period III occurs in old age, which is accompanied by involutional shifts and destabilization of conductive and stromal elements.

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Recommendations

The results obtained can be recommended and find practical application in the interpretation of the variety of symptoms of inflammatory polyneuritis and neuralgic syndromes and serve as the basis for the development and implementation of effective treatment methods.

Conflict of Interest

Authors declared no Conflicts of Interest

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DATA SHARING STATMENT

The data that support the findings of this study are available from the corresponding author upon request.

ORIGINAL ARTICLE

Efficacy of On-Site Evaluation in EBUS-Guided Transbronchial Needle Aspiration Versus Cell Block

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ABSTRACT

Objective: To determine Rapid onsite evaluation (ROSE) effectiveness, sensitivity and specificity during Endoscopic ultrasound guided Transbronchial needle aspiration (EBUS TBNA) and compare it with cell blocks prepared during same process.

Study Design: Diagnostic Accuracy Study

Place and Duration of Study: Pathology department of Akhtar Saeed Medical College and Watim Medical and Dental College, from June 15, 2023, to June 15, 2024.

Materials and Methods: After getting approval from ERB, a written informed consent was taken from all the enrolled 110 patients who went through EBUS-TBNA in Farooq Hospital and Watim general Hospital depending upon inclusion and exclusion criteria. The age limit was more than 20 years and less than 65 years, including both genders. ROSE, EBUS TBNA and cell blocks of the patients diagnosed on CT scan with mediastinal or hilar masses were analyzed.

Results: Diagnostic parameters were calculated using ROC Curve analysis in SPSS version 23. Sensitivity of EBUS-TBNA with ROSE was discovered to be 95%, specificity was 60%, positive predictive value and negative predictive value were calculated to be 98.1% and 96 % respectively. Procedure's diagnostic accuracy of process with ROSE was 98%.

Conclusion: This study concludes that ROSE performed during EBUS TBNA has high sensitivity, moderately effective specificity and high concordance rate with cell block examination. It serves as a valuable adjunct to limit procedure time, enrich sample collection and benefit patient's well-being.

Key Words: *Cell Block, EBUS TBNA, Mediastinal, ROSE.*

Introduction

Pakistan is one of countries facing high prevalence of infectious lung diseases including tuberculosis as well as neoplastic diseases presenting as mediastinal or pulmonary pathologies. In the past various diagnostic modalities had been used to diagnose these diseases with variable outcome.[1] However very few studies have been done in relation to efficacy of diagnostic modalities of these commonly encountered mediastinal pathologies.

Transbronchial needle aspiration guided by endobronchial ultrasound is the sampling method that uses ultrasound combined with bronchoscopy to visualize air ways and various key nodal stations which are difficult to access on bronchoscopy alone.[2] It has served as excellent tool that is not only minimally invasive but also has excellent sample yield in cases of mediastinal masses/ lymphadenopathy detected on computed tomography scan.[3] It has been used more successfully for staging in known cancer patients as well as in benign and infectious pulmonary and mediastinal diseases as compare to other diagnostic modalities including standard flexible bronchoscopy and transthoracic needle aspiration.[4]

In addition, it allows access to a wider range of lymph nodes in the mediastinum than conventional mediastinoscopy.[5] Bronchoscopy alone is unable to assess all lesions lying within and outside the upper air way. In past bronchoscopist and clinicians were not sure of adequacy of material sampled during

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EBUS TBNA and that if lesion under question is approached or not.[6]

During recent years, introduction of rapid onset evaluation (ROSE) during EBUS TBNA by a cytopathologist not only addressed these difficulties but also reduced number of non-diagnostic samples and reduced additional biopsies by providing instant feedback of obtained material without altering the diagnostic efficacy of the procedure.[7]

Rapid onset evaluation is a procedure based on morphological examination of the cells that permits on-site evaluation of the site in a matter of minutes to determine whether the material acquired during the bronchoscopy is adequate and a preliminary diagnosis in most cases, however it is more costly and less available.[8] Several factors may influence diagnosis including reactive mesothelial cells, germinal center cells, may be misdiagnosed as malignant and neuroendocrine tumor, and metastatic cells of signet ring cell carcinoma mimics benign cells on rapid on site evaluation.[9] The cytopathologist also need to be careful of normal endobronchial cells mimicking epithelioid histiocytes and metaplastic cells lining air ways resembling malignant cells as such cells may lead to false positive results on rapid on site evaluation.[10]

The rationale of our study was to assess the efficacy of ROSE in EBUS TBNA cases which provide insight into its role in improving diagnostic outcomes, patient care and healthcare efficacy. Such research could validate ROSE as a standard adjunct in EBUS-TBNA procedures especially, in high stake diagnoses such as lung cancer.

Materials and Methods

This diagnostic accuracy study was conducted at Pathology department of Akhtar Saeed Medical College and Watim Medical and Dental College, from June 15, 2023, to June 15, 2024

The study included 110 cases of EBUS TBNA , collected through convenient sampling technique after approval from ERB, that comprises ROSE findings along with EBUS TBNA smears and cell block of the same patient diagnosed on CT scan with pulmonary, mediastinal or hilar masses while patients with severe hypoxemia, poorly managed heart failure and newly developed myocardial infarction were excluded. The analysis included slides with adequate tissue, good preservation and accurate staining while slides with poor quality, ambiguous morphology, contamination or irrelevant diagnosis were excluded.

Sample collected for EBUS TBNAs was laid on dry cleaned slides. Some of the slides were air dried while others were placed in Coplin jars containing 90% ethanol, to be wet fixed. The sections were stained using Hemacolor and Hematoxylin Eosin (H&E). Rapid onsite analysis of all cases was carried out by principal investigator. EBUS TBNA slides were examined under a light microscope the very day of the procedure. The diagnosis on the TBNA was confirmed by the consultant histopathologist. Biopsy/cell block samples preserved in 10% formal saline were received in the departments of Histopathology, Akhtar Saeed Medical College and Watim Medical and Dental College. Final diagnosis was made after examination of the cell block/biopsy after viewing the slides separately by consultant histopathologists at low power (4x, 10x objective), medium power (20x objective) and high power (40x objective), which was not influenced by the expression made on rapid onsite evaluation of the same case. The clinical and histopathological data was carefully recorded.

On ROSE the preliminary diagnosis was categorized as follows:

a). Non-diagnostic/inadequate, if the material on smears under examination do not include any diagnostic cells (cancer cells or inflammatory cells).

b). Diagnostic/adequate, when the examined smears contained diagnostic tumor cells or inflammatory cells.

On Cell block following Diagnostic categories were obtained:

a). Non diagnostic, if the material on slides do not reveal diagnostic cells of any specific pathologic process

b). Diagnostic, if the material on slides shows diagnostic neoplastic or inflammatory cells

If the ratio of lymphocytes to all nucleated components was greater than 30%, the case was considered as characteristic of lymph node tissue. Malignant elements, inflammatory smears and non-diagnostic or inconclusive, when no diagnosis could be made, were the criteria for final on-site analysis. Frequencies were calculated for benign and

malignant cases. Statistical data was analyzed using SPSS version 23. Sensitivity and specificity were calculated using ROC Curve analysis in SPSS.

Results

We studied 110 consecutive cases of EBUS-TBNA with Rapid on-site evaluation (ROSE) and cell block preparation retrieved from various nodal stations and corresponding mediastinal masses. Patients ranged in age from 20 - 65 years, with a mean age of 42.5 years. Out of total, 75 patients (69.1%), were male.

ROSE has been carried out in all cases by a skilled cytopathologist. Specimen smears and histopathological examination along with immunohistochemistry (IHC) for malignant and suspicious to be malignant cases, followed in our laboratory and results were interpreted by consultant histopathologist. The results of rapid onsite analysis revealed cancerous cells in 38 (34.5%) cases and for 69(62.7%) the ROSE observation revealed non neoplastic cells. For 107 cases, we were able to diagnose right away and were given a positive designation on analysis, were labeled positive and 03 samples were non diagnostic at ROSE and noted as negative as shown in Table I.

Table I: Summary of ROSE Results (n=110)

ROSE Results	Number of Cases (%)
Neoplastic	38 (34.5%)
Non neoplastic	69 (62.7%)
Non-diagnostic / negative	03 (2.7%)

Final pathological diagnosis made after cell block examination revealed malignancy in 37 (33.6%) cases, non-neoplastic in 68 (61.8%) cases and 5 (4.5%) were non diagnostic as shown in table II. For 105 cases the material obtained from procedure with ROSE was diagnostic and 5 cases were non diagnostic. Hence the sample adequacy of combined procedure was 95.5%.

Table II : Summary of Pathological Records on Cell Block (n=110)

Results of Histopathological Examination	Number of Cases (%)
Neoplastic	37 (33.6%)
Non neoplastic	68 (61.8%)
Non-diagnostic /negative	5 (4.5)

Using histological analysis as the gold standard, we assessed ROSE's ability to diagnose malignant tumors.

Table III provides an overview of the descriptive features of the quick on-site inspection. ROSE had a 95% sensitivity, 60% specificity, 96% negative predictive value and a very high positive predictive value of 98.1%.

Table III: Descriptive Parameters of ROSE

Sensitivity (%)	95%
Specificity (%)	60%
False positive (%)	1.8%
False negative (%)	1.8%
Negative predictive value (%)	96%
Positive predictive value (%)	98.1%
Diagnostic Accuracy value (%)	98 %

Discussion

As EBUS-TBNA is less intrusive and causes less side effects than surgical lymph node sampling, it is becoming increasing popular for diagnosing mediastinal and hilar nodal lesions.[11] It is the best initial step in the diagnosis of pathology in mediastinal and hilar lymph nodes because of its high accuracy.[12]

Among the most frequently asked questions in this field is the ROSE conducted for EBUS-TBNA.[13] A pathologist or cytopathologist present during the aspiration operation reduces the risk of complication while increasing the possibility of getting sufficient diagnostic material through optimal collection and accurate pre-evaluation.[14]

Nakajima et al observed that ROSE had a 5.7% false negative rate owing to findings from a subsequent histological assessment, but no false positive outcomes.[4] In this study we found 1.8 % false positive and 1.8% false negative results on ROSE.

It had been suggested that number of non-diagnostic samples can be reduced if ROSE is done during EBUS TBNA.[5] Oki et al showed diagnostic yields of 94% while Madan NK in 2016 reported it to be 78%.[15,16] In our study number of non-diagnostic samples ware 5 and obtained sample adequacy of 95.5% which is in concurrence with studies of Vasugi et al having sample adequacy of 96.8% while Mallya et al studied the utility of ROSE in EBUS TBNA and reported sample adequacy of 96.3%.[9,17] Variation in hospital case load, operator ability with the size and quantity of lymph nodes sampled can all account for variation in yield across studies.

Vasugi and coworkers also found that EBUS TBNA conducted with ROSE produced a diagnostic yield of

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97.7%, sensitivity 94%, specificity 100%, positive predictive value 100%, and negative predictive value 12%, compared to a reported diagnostic yield of roughly 45% to 55% in traditional TBNA with mediastinoscopy.[9] Few researchers however also reported opposite results such as Murakami et al In 2014 concluded that ROSE has no additional benefits on diagnostic yield.[18]

Mallya V in 2015 according to reports, EBUS-TBNA's overall diagnostic sensitivity and specificity were 85.4% and 89.6%, respectively.[17] Yuan M in 2021 stated sensitivity and specificity for assessing specimen adequacy were 97.5% and 85.7%, respectively.[19] EBUS-TBNA has a sensitivity of 93.75% for detection of chronic granulomatous inflammation while Murthi M, found EBUS TBNA 81.2% accurate for overall pathologies.[20,21]

Dildar B and colleagues discovered that ROSE hag a 96% effectiveness rate in diagnosing small cell cancer when compared to EBUS TBNA.[13] Sentruk A et al showed that in 85.9% cases final diagnosis was compatible with rapid on site evaluation.[22] The sensitivity of ROSE was 77.78%, specificity was 91.23%, the negative predictive value was 72.22% and markedly high positive predictive value 93.33%, according to Simon M. in 2017.[23] Our study concluded ROSE has 100% sensitivity and 60% specificity. According to Rosso et all, sensitivity, specificity, diagnostic accuracy were 95%, 100%, and 96%, whereas the negative and positive predictive values were 90% and 100%, respectively.[7] The sensitivity, specificity, positive predictive value, negative predictive value and accuracy of EBUS-TBNA in differentiating between malignant and benign lesions were determined to be 93.4%, 100%, 100%, 81.0% and 95.1% respectively, in analysis conducted in china.[24] Lin CK et al, tested ROSE and found that it has 96.9% sensitivity, 68.2% specificity, 89.9% positive predictive value (PPV), 88.2% negative predictive value (NPV), and 89.5% diagnostic accuracy.[14] In present study sensitivity, specificity, positive predictive value and negative predictive values are 95%, 60, 98.1% and 96% respectively.

Conclusion

This study concludes that ROSE performed during EBUS TBNA has high sensitivity, moderately effective specificity and high concordance rate with cell block examination. It serves as a valuable adjunct to limit procedure time, enrich sample collection and benefit patient's wellbeing.

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Authors declared no conflicts of Interest.

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DATA SHARING STATMENT

The data that support the findings of this study are available from the corresponding author upon request.

ORIGINAL ARTICLE

Smile Stories: Investigating Pediatric Dental Anomalies a Cross-Sectional Study

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ABSTRACT

Objective: Determination of the frequency and distribution of dental anomalies across different age groups and gender within the pediatric population.

Study Design: Cross-sectional observational study.

Place and Duration of Study: Tertiary care hospitals of Karachi from 1st February 2023 to 15th December 2023.

Materials and Methods: After obtaining informed verbal consent via the individual, his or her parent, or legal guardian, demographics and medical records were entered onto a predesigned proforma that contained all dental anomalies details of the pediatric population which were diagnosed by clinical interpretations. Outcomes were analyzed using SPSS version 21.00.

Results: Among 278 participants 16.5%(n=46) of the population suffered from dental anomalies. Total males were 57.5%(n=160) and females were 42% (n=118) among which 56.5% (n=26) males and 5.2 %(n=20) females had dental anomalies. Most dental anomalies were observed at ages 6,7, and 9. The most prevalent dental abnormality in males was peg lateral incisor, followed by fusion and macrodontia, but in females, it was peg lateral incisor, fusion, and hypodontia. Anomalies with a significant association with gender were hypodontia, macrodontia, fusion/gemination, and peg lateral having p-values of 0.03, 0.04, 0.02, and 0.05 respectively. Most common abnormalities detected at ages of 12 years, and 11 years, were peg laterals, fusion/germination, and hypodntia, with p-values of 0.04 and 0.03, respectively.

Conclusion: Peg lateral incisor was the most common dental abnormality among the local pediatric population of Karachi, Pakistan. Dental abnormalities were more common in men, and they most often occurred during the mixed dentition phase.

Key Words: *Dental Anomalies, Hypodontia, Dentition, Mixed, Oral Health, Pediatric Dentistry.*

Introduction

Teeth are an intricate component of the body of an individual which has complex and difficult growth patterns. The complete growth of the teeth depends upon a complicated reciprocal relationship between dental epithelium and the essential ectomesenchyme.[1] Relationship is mediated by a complicated network of chemicals, receptors, and transcript regulatory mechanisms.[2]

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An anomaly is any abnormality that differs from the normal. A developmental anomaly is a defect that develops when a tooth structure is being formed and developed.[3] Oral anomalies are caused by variances in tissues of dental hard and soft tissues, which can be caused by enamel, dentin, or cementum. Anomalies might be significant abnormalities or minor aberrations. They can be induced by a variety of factors or by a single tiny change in the environment.[4] Some anomalies are caused by internal factors such as inheritance, metabolic malfunction, or mutations, while others are caused by external factors such as corporal or biological damage, biological mediators, dietary deficiencies, stress, habits, or environmental circumstances. These abnormalities are caused by both intrinsic and external variables. [5] These anomalies may be heredity, congenital, and acquired. Hereditary refers to a disorder that arises as a result of an individual's hereditary makeup. Congenital refers to a condition that develops at or before birth. A congenital disease is occasionally caused by inheritance, while a

hereditary ailment may not become apparent until many years after birth. [6] A family inclination is sometimes used to describe a disease that has some indication of a hereditary tendency but is inconclusive. During the dental examination of a child, complete oral hygiene along with examination of bones, mucosa, and other abnormalities was performed.[7]

The dental anomalies' aberrations might be a single defect or part of a larger grouping of disorders. Detection of dental anomalies is very important. Dental anomalies are less common than other common oral diseases and disorders, such as dental caries and periodontal disease, but the management and therapy are sometimes challenging and complicated. Such diseases may lead to malocclusion, and cosmetic problems, and render root canal or tooth extraction difficult.[8] As the presence of the abnormalities has an impact on the aesthetics of the tooth, in addition, they make different dental treatments difficult. For example, the presence of peg laterals involves management involving multiple specialties orthodontics, restorative dentistry, etc. Dental malformations can have a big influence on how pediatric kids get dental care, including how complicated it is. Supernumerary teeth, hypodontia (missing teeth), and enamel abnormalities are examples of anomalies that frequently need unique treatment regimens distinct from those used in routine dentistry. If left untreated, these disorders can make orthodontic procedures more difficult, complicate restorative procedures, and increase the risk of tooth cavities or periodontal problems. In addition, irregularities such as malocclusions or misaligned teeth may need lengthy orthodontic treatment, sometimes including the cooperation of several dental professionals to guarantee the best possible results for the patient.[9]

Similarly, Structural anomalies such as dilacerations, taurodontism, fusion, germination, and dens invagination can influence the root canal system as well as the person's appearance.[10] As a result, efficient endodontic treatment requires careful and specific consideration of their unique structure. Abnormalities in the quantity and position of teeth in the jaws are linked to cosmetic and occlusion problems. The prevalence of peg-shaped lateral incisors varies greatly between racial/ethnic groups, providing support to the hypothesis that genetics play an important part in the condition's development. In a Minnesota study, the incidence of peg-shaped lateral incisors was shown to be 1.6% among other races and 7.5% among Asians.[11]

Data on dental anomalies is useful when dealing with therapeutic and ethnographic patient care. The frequency and degree of manifestation of abnormalities may provide valuable information for phylogenic and genetic investigations, as well as aid in comprehending variances within and across populations.[12] There have been scant studies available to determine the prevalence of dental abnormalities among pediatric patients coming to tertiary care facilities in Pakistan and Karachi.

Dental abnormalities that damage the enamel and dentin of teeth can have a serious negative effect on children's oral health and quality of life. The frequency and distribution of congenital abnormalities among pediatric patients in Karachi have not been thoroughly investigated, especially about age and gender. Comprehending these variables is essential for formulating focused preventative and therapeutic approaches that address the unique requirements of various populations. Healthcare practitioners in Karachi can enhance pediatric oral health outcomes by implementing tailored therapies based on the incidence of dental abnormalities observed in children of different ages and genders.

Therefore, the purpose of our study was to determine the frequency and distribution of dental anomalies across different age groups and genders within the pediatric population.

Materials and Methods

The cross-sectional observational study was an investigation conducted in Karachi spanning 1st February 2023 to 15th December 2023. Permission was granted from the institutional review board of the institution (KMDC/COD/ ESRC/0640/21). Children of both genders between 2-12 years of age, having deciduous or mixed dentition were included in the study. The exclusion criteria were patient or the patients. guardian not given consent. and noncooperative patients. Non-probability: Convenience sampling was used for the data collection. The sample size of 278 participants was

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computed using Open Epi software with a population size of 1000 [13], a 95% confidence level, a 5% margin of error, and a 50% response distribution.

After receiving informed verbal consent from the patient, his or her parents, or legal guardian, demographics and a detailed medical history were documented on a proforma. The proforma includes questions related to basic demographics and findings related to dental anomalies. Two trained dentists performed the dental examination. The clinical examination was conducted under adequate light to determine the presence of abnormalities or dental defects. All teeth were assessed in terms of abnormality of size, shape, number, and structure. For intra-observer reliability, the same observer reassessed a subset of patients at different times to check for consistency in diagnosis. For inter-observer reliability, a trained senior dentist assessed the same patients independently, and their results were compared.

Data was entered and evaluated through SPSS 22:00. Descriptive and inferential statistics were performed Qualitative variables like gender were calculated as frequencies, and percentages. The quantitative variables like age and presence of dental hard tissue anomalies were calculated as mean + standard deviation. The mean scores for the detection of dental hard tissue abnormalities were compared across gender and age. Inferential statistics were judged significant with a p-value < 0.05 by using chi-square statistics.

Results

It is evident from the results that in a sample of 278 participants 16.5%(n=46) of the population suffered from dental anomalies. Total males were 57.5%(n=160) and females were 42% (n=118) among which 56.5% (n=26) males and 5.2 %(n=20) females had dental anomalies. (Figure - I)

The dental anomaly most seen in males was peg lateral incisor followed by fusion and macrodontia while in females it was peg lateral incisor, fusion, and hypodontia respectively. Table I. The table also shows significant p-values for dental anomalies and gender. The anomalies that showed a significant relationship with gender were hypodontia, macrodontia, fusion/gemination, and peg lateral having p-values of 0.03, 0.04, 0.02, and 0.05 respectively.

Concerning age, the most frequent anomalies were found at the age of 12 years, 11 years, and 02 years, and these were peg laterals, fusion/ germination, and hypodontia respectively. (table- II) significant association of age with dental anomaly was observed at the age of 11 and 12 years with peg lateral and Supernumerary teeth (paramolar) was 0.04 and 0.03 respectively.

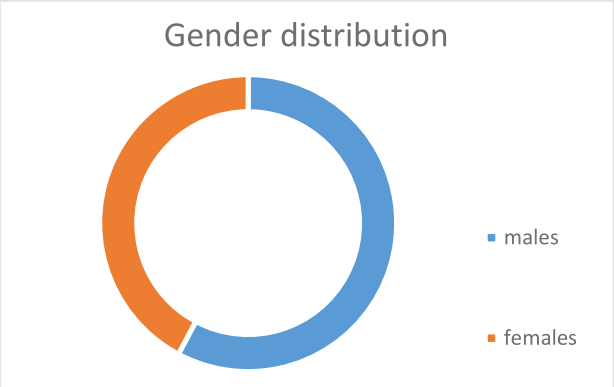

Figure 1: Percentage Distribution of Gender Suffering from Dental Anomalies

Table I: Gender Association with Incidence of Dental Anomalies

Anomalies	Male(%)	Female (%)	P- value
Hypodontia	11.5 (3)	15 (3)	0.03*
Microdontia	11.5(3)	0	0.67
Macrodontia	15.3 (4)	0	0.04*
Amelogenesis Imperfecta	0.4(1)	0	0.09
Fusion/Gemination	23 (6)	35 (7)	0.02*
Peg Lateral	26.9 (7)	45 (9)	0.05*
Talon Cusp	0	0	0.89
Supernumerary teeth(mesiodens)	3.8 (1)	5 (1)	0.65
Supernumerary teeth(paramolar)	3.8 (1)	0	0.07

*p- value <0.05

Table II: Age Association with Incidence of Dental Anomalies

Anomalies	Age(years)	Percentage(%)	P value
Hypodontia	2	8.7	0.06
Microdontia	8	2.8	0.68
Macrodontia	6	2.3	0.91
Amelogenesis Imperfecta	9	2.1	0.09
Fusion/Gemination	11	13.1	0.45
Peg Lateral	12	15.8	0.03*
Supernumerary teeth (mesiodens)	8	2.6	0.67
Supernumerary teeth (paramolar)	11	5.6	0.04*

*p- value <0.05

Discussion

Children in the pediatric population of Pakistan, particularly those attending tertiary care dental clinics or hospitals. Comparison between children with dental anomalies and those without, or comparison of prevalence rates across different regions or demographic groups. Screening and diagnosis of dental anomalies, including early detection programs helps to improve early detection and treatment of dental anomalies, leading to better oral health outcomes and prevention of long-term complications. The time frame for assessing the effectiveness of interventions or screening programs typically ranges from initial diagnosis to follow-up over months or years. Dental anomalies are abnormalities in tooth development that can impact the quantity, size, form, and structure of teeth. These abnormalities are becoming more and more concerning for the pediatric population in Pakistan since they may affect dental health and general well-being. To minimize long-term consequences and enhance quality of life, early identification and management are critical, and this requires an understanding of the incidence and kinds of dental abnormalities in children.

Males were more likely to suffer from dental anomalies than females. This is in contrast with research published in 2021, which found that the frequency of various dental abnormalities was equal in males (36.5%) and girls (35.5%).[11] Although the dental anomalies in males were less as compared to females in a study conducted in Serbian Orthodontic patients.[14]

The highest number of diseases were found at the age of seven. This might be because children are more likely to attend the hospital for systemic illnesses or dental issues caused by mixed dentition. In 2020, a survey of the Greek orthodontic population found that the average age of reporting tooth anomalies was 11.76 years. [13] This might be attributed to greater children's understanding of puberty at the rising age and prominence of facial characteristics, as well as higher awareness of patients and their parents' aesthetics.

The most common anomaly found in both males and females was peg lateral incisor. However, a study conducted in Saudi Patients reported that peg lateral incisors report about 8.4% and only hypodontia shows statistically significant differences among genders.[15]

However, in a study published in 2020 by Alhabib S, the Saudi Arabian area has the highest frequency of peg laterals, followed by Egypt. Except for the groups in Pakistan and the Philippines, males were more likely than females to have peg laterals across all geographic areas. When comparing the frequency of peg laterals in the Saudi population, it was shown that the right lateral incisor had more cases than the left.[16]

Fusion has been encountered as the second most common anomaly reported by the participants. Two different morphological dental abnormalities are referred to as fusion and gemination. The number of teeth in the mouth can be used to clinically determine the difference between fusion and gemination. However, fusion can also happen between two normal teeth or between a normal tooth and a supernumerary tooth. Gemination often provides a single root and a root canal with two crowns that are either totally or partially divided. [17]

A systematic review conducted by Akay G in 2020 revealed that the prevalence of fusion and germination in permanent dentition is high and dentists should know the difference between the two dental anomalies.[18]

Macrodontia and hypodontia were reported as the third most common anomalies found in males and females respectively. This is in consistent with the studies published in a retrospective study in Turkey, in 2020. They identified hypodontia and hyperdontia, together with taurodontism, microdontia, and macrodontia in their study population.[19]

The study's weaknesses include limited sample size, the fact that all of the participants were recruited from the same teaching hospital and the use of a single clinical examination for analysis. The study did not examine the relationship between the various anomalies, and their association with syndromic patients[20] which is considered a drawback. The current study neglected to look at the distribution and relationship of dental malformations to their successors, which may be considered a study drawback.

Knowledge about dental anomalies is essential as it requires a far more comprehensive treatment

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approach. To establish the optimal treatment choice, it is recommended that each case should be studied using an interdisciplinary approach. This assists in long-term and successful treatment planning according to a child's particular needs. Furthermore, research into the prevalence, causes, and treatment of dental anomalies in Pakistan is imperative for developing tailored interventions and improving oral healthcare infrastructure. Dental anomalies are common among syndromic patients, [21] therefore collaboration between healthcare professionals, policymakers, and communities is essential in fostering a proactive approach to mitigate the burden of dental anomalies, especially among syndromic patients, and promote oral health equity across the nation.

Recommendations include enhancing dental education programs, implementing community-based oral health initiatives, and investing in infrastructure to expand access to affordable and quality dental services, particularly in underserved areas. Recommendations also entail bolstering public education on oral hygiene, expanding dental infrastructure, and implementing policies to ensure equitable access to affordable dental services nationwide. Addressing these anomalies requires comprehensive strategies encompassing education, prevention, and accessible dental healthcare services to ensure optimal oral health outcomes for the population.

Conclusion

Peg lateral incisor was the most common dental abnormality among the local pediatric population of Karachi, Pakistan. Dental abnormalities were more common in men, and they most often occurred during the mixed dentition phase.

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CONFLICT OF INTEREST

Authors declared no conflicts of Interest.

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DATA SHARING STATMENT

The data that support the findings of this study are available from the corresponding author upon request.

ORIGINAL ARTICLE

Improving Early Initiation and Exclusive Breastfeeding through Maternal Counselling and Healthcare Worker Training at Alkhidmat Raazi Hospital, Rawalpindi

Naveed Butt, Usman Zafar, Ashir Iqbal, Bilal Ahmad, Sharmeen Malik

ABSTRACT

Objective: To evaluate the impact of enhanced healthcare provider counseling and practical demonstrations of correct breastfeeding techniques on improving exclusive breastfeeding practices.

Study Design: Prospective follow-up study.

Place and Duration: This study was conducted at Alkhidmat-Raazi Hospital, Rawalpindi, Pakistan, from 17th September 2022 to 7th April 2023.

Materials and Methods: A total of 309 mothers were enrolled in the study based on specific inclusion and exclusion criteria. A structured counseling intervention was implemented for postnatal care, incorporating bedside guidance during hospital stays and follow-up sessions conducted monthly over six months. Breastfeeding compliance was assessed through in-person and telephonic interviews documented in standardized data sheets. Data were analyzed using SPSS version 24. Descriptive statistics summarized the demographic characteristics and breastfeeding practices of participants. Chi-square tests were applied for categorical variables to assess the impact of the intervention. A p value ≤ 0.05 was considered statistically significant.

Results: The response rate for follow-up visits was 76%. Early breastfeeding initiation (within one hour of birth) was observed in 52.8% of mothers, and exclusive breastfeeding at six months increased to 65.4%.

Conclusion: Systematic postnatal counseling and hands-on guidance significantly improved breastfeeding practices. Continued support over six months facilitated better adherence to the exclusive breastfeeding code, emphasizing the importance of healthcare provider engagement in promoting optimal breastfeeding practices.

Key Words: *Breastfeeding, Early Initiation, Exclusive Breastfeeding, Health Promotion*

Introduction

Breastfeeding is widely recognized as an optimal nutritional strategy for infants, conferring substantial health benefits to newborns and mothers across socioeconomic backgrounds.[1,2] Recent research highlights breastfeeding's role in reducing the risk of infections such as diarrhea, pneumonia, and meningitis, as well as lowering the long-term risk of chronic conditions like obesity and diabetes.[3-9] Furthermore, breastfeeding is associated with improved cognitive outcomes, as measured by higher intelligence quotients.[10] Globally, it is estimated that increasing breastfeeding to universal levels could prevent approximately 823,000 deaths among children under five each year.[10]

For mothers, breastfeeding also provides significant health benefits, including a reduced risk of breast and ovarian cancers, type 2 diabetes, and cardiovascular diseases.[10,11] These advantages underscore breastfeeding as a modifiable health behavior with powerful impacts on public health, prompting the World Health Organization (WHO) and United Nations International Children's Emergency Fund (UNICEF) to recommend that all newborns initiate breastfeeding within the first hour of life and remain exclusively breastfed for the first six months. Complementary feeding should begin at six months, with continued breastfeeding encouraged for up to two years or beyond.

Achieving these breastfeeding goals is also pivotal to several sustainable development goals (SDGs), particularly those aimed at reducing child mortality, improving maternal health, and supporting cognitive development.[11-13] In response to these goals, the World Bank's investment framework for nutrition

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promotes policies and programs to optimize breastfeeding practices as part of an integrated approach to maternal and child health, particularly in low- and middle-income countries (LMICs).[14] Nevertheless, despite strong evidence and advocacy from international and national organizations, breastfeeding rates remain suboptimal globally and have even shown signs of decline, with LMICs facing additional challenges due to societal, cultural, and structural barriers.

In Pakistan, recent surveys report that exclusive breastfeeding rates remain below global targets, with early initiation practices often hampered by limited resources and counseling opportunities. Given the potential for health counseling to enhance compliance with breastfeeding recommendations, there is a clear need to test practical, locally adapted strategies to empower mothers to overcome barriers to optimal breastfeeding.[22]

The aim of this study was to evaluate the impact of enhanced healthcare provider (HCPs) counseling by empowering them through targeted training after sustained exclusive breastfeeding for six months. Furthermore, we aimed to determine if the practical demonstrations of correct breastfeeding techniques could improve exclusive breastfeeding practices by early initiation of breastfeeding.

Materials and Methods

This was a prospective follow-up study conducted at Alkhidmat Raazi Hospital, Rawalpindi, from 17th September 2022 to 7th April 2023. Ethical approval for the study was granted by the Ethical Review Committee (ERC) under approval number A-01-22, and written informed consent was obtained from all participants.

The sample size was calculated using a 95% confidence interval and a 5% margin of error, resulting in a total of 309 mothers. A purposive sampling technique was used. Lactating mothers who provided consent to participate for six months were included, while those with newborns requiring neonatal intensive care unit admission, congenital anomalies, or health issues affecting breastfeeding were excluded.

Data were collected by trained medical officers using a self-designed standardized form that documented participants' demographic details, obstetric history, mode of delivery, and breastfeeding practices. During hospital stays, mothers received structured postnatal counseling sessions, including bedside guidance on correct latching and positioning techniques. Follow-up assessments were conducted over six months through in-person visits and telephonic interviews. If a participant missed a scheduled visit, she was contacted within 24 hours to assess breastfeeding practices and address any concerns. All data was anonymized, and confidentiality was strictly maintained.

The intervention included targeted training for obstetric and newborn care staff, following the WHO Baby-Friendly Hospital Initiative (BFHI). Healthcare providers, including obstetricians, pediatricians, nurses, and midwives, were trained on the "Ten Steps to Successful Breastfeeding" and the benefits of breastfeeding. Educational flyers in Urdu highlighting breastfeeding advantages, common myths, and dietary guidance were distributed to mothers and their families. Additionally, the hospital implemented policies discouraging formula milk use and communicated effectively to staff.

Data analysis was conducted using SPSS version 24. Descriptive statistics, including means, standard deviations, and percentages, summarized participant demographics and breastfeeding practices. Chi-square tests were applied to compare categorical variables, and exact p values along with 95% confidence intervals were reported for all statistical tests. A p value ≤ 0.05 was considered statistically significant. Results were presented in tables to highlight participant demographics, intervention impact, and breastfeeding outcomes.

Results

A total of 309 mothers participated in the study, with a mean age of 27.6 years (SD ± 4.9). Most participants (69.3%, 214/309) were between 21 and 30 years of age. The majority (70.6%, 218/309) were multigravida (MG), while 29.4% (91/309) were primigravida (PG). The mean gestational age at delivery was 37.7 weeks (SD ± 1.4), and the mean newborn birth weight was 2.9 kg (SD ± 0.4). Regarding mode of delivery, cesarean sections accounted for 74.4% (230/309) of births, while spontaneous vaginal deliveries (SVD) accounted for 25.6% (79/309). The male-to-female newborn ratio was approximately 1:1. (Table I)

At six months, exclusive breastfeeding was practiced

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by 65.4% (155/237) of responders. Partial breastfeeding was reported by 18.8% (43/237), while 16.4% (39/237) had ceased breastfeeding altogether. (Table II) Among mothers who initiated breastfeeding within the first hour of delivery, exclusive breastfeeding rates at six months were slightly higher (82/162, 50.6%) than those who did not initiate breastfeeding early (72/141, 49.1%). However, the difference was not statistically significant (p=0.77).

There was no statistically significant difference in exclusive breastfeeding rates at six months based on the mode of delivery. Mothers delivering via cesarean section had an exclusive breastfeeding rate of 49.1% compared to 50.6% for those delivering vaginally (p = 0.68). (Table III) Similarly, exclusive breastfeeding rates did not differ significantly between MG (67.5%, 110/218) and PG mothers (63.5%, 47/91; p=0.53). (Table IV) Baseline characteristics of the study population by gravida status are presented in Table V.

Table I: Demographics of Study Participants

Parameter	n (%)
Maternal Age Category (yrs.)	
<20	18 (5.8%)
21–30	214 (69.3%)
31–40	74 (23.9%)
>40	3 (1%)
Gravidity	
Primigravida	91 (29.4%)
Multigravida	218 (70.6%)
Gestational Age (weeks)	
33 to <35	17 (5.5%)
35–40	288 (93.2%)
>40	4 (1.3%)
Mode of Delivery	
SVD	79 (25.6%)
C-section	230 (74.4%)
Sex of Newborn	
Male	158 (51.1%)
Female	151 (48.9%)
Weight of Newborn (kg)	2.92 ± 0.4
Residence	
Rawalpindi/Islamabad	287 (92.9%)
Others	22 (7.1%)

Table II: Breastfeeding Practices at Six Months

Category		
Responders (n=237)	Exclusive Breastfeeding	155 (65.4%)
	Partial Breastfeeding	43 (18.8%)
	Not Breastfeeding	39 (16.4%)
Non-Responders (n=72)		

Table III: Breastfeeding Practices by Mode of Delivery at Six Months

Mode of Delivery	Exclusive Breastfeeding	Percentage (%)	p-value
Cesarean Section	113	49.1	0.68
Vaginal Delivery (SVD)	42	50.6	

Table IV: Breastfeeding Practices by Gravida Status at Six Months

Breastfeeding Practices	Multigravida (MG) (n=218)	Primigravida (PG) (n=91)	p-value
Exclusive Breastfeeding	110 (67.5%)	47 (63.5%)	0.53
Partial Breastfeeding	42 (25.8%)	21 (28.4%)	
Not Breastfeeding	11 (6.8%)	5 (7.0%)	

Table V: Baseline Characteristics by Gravida Status

Characteristic	Multigravida (MG)	Primigravida (PG)
Mean Age (in years)	29	25
Mode of Delivery		
Cesarean Section	168	62
SVD	50	29
Newborn Gender		
Female	105	46
Male	113	45
Newborn Birth Weight (kg)	3.0	2.8
Time to First Feed		
<1 hour	113	50
>1 hour	105	41
Gestational Age (weeks)	37.48	38.16

Trends in breastfeeding adherence varied over the study period. High adherence was noted in the early months, with a decline mid-study before recovering slightly toward the end. Exclusive breastfeeding followed a similar trend, with fluctuations reflecting response rates across follow-up visits.

The intervention effectively improved exclusive breastfeeding practices, with a cumulative adherence rate of 65.4% in six months. However, continuous support throughout the postnatal period was essential for sustaining these practices.

Discussion

This study demonstrated the effectiveness of structured healthcare worker training and postnatal counseling in promoting early initiation and

exclusive breastfeeding practices. At six months, 65.4% of mothers adhered to exclusive breastfeeding, surpassing the WHO target of 50% and showing significant improvement compared to the national average of 46%. The high adherence rate highlights the impact of targeted interventions in addressing barriers to optimal breastfeeding practices.

Early initiation of breastfeeding within the first hour was observed in 52.7% of participants, a rate comparable to Ethiopia (52%) and Tanzania (49%) and slightly higher than Pakistan's national average (46%) and Saudi Arabia (43.6%). This result reflected the success of the intervention in improving early breastfeeding practices. Similar studies have identified healthcare worker support as a critical factor in overcoming cultural and logistical barriers to early initiation.[15-21]

The exclusive breastfeeding rate of 65.4% at six months is one of the highest reported in recent studies. It exceeds the UNICEF-reported rates for South Asia (40%) and the global average (40%). The adherence to exclusive breastfeeding can be attributed to the sustained counseling efforts and postnatal support provided throughout the study.[22,23]

Our study found no significant difference in exclusive breastfeeding rates between mothers delivering via cesarean section (49.1%) and vaginal delivery (50.6%; p=0.68). This parity could be attributed to the focused breastfeeding support provided to all participants, irrespective of their mode of delivery. These findings underscore the importance of systematic interventions in mitigating the challenges associated with cesarean births.

Conclusion

This study demonstrates that structured and sustained healthcare worker interventions, from maternity wards to postnatal visits, significantly improve exclusive breastfeeding practices during the first six months. The findings emphasize the critical role of targeted counseling and hands-on support in overcoming barriers to breastfeeding and achieving optimal adherence to WHO's early initiation and exclusive breastfeeding guidelines.

Limitations of the Study

The study's prospective follow-up design without randomization limits causal inferences. The shift from in-person to telephonic follow-ups may have affected data consistency. Additionally, the focus on a single geographical area restricts the generalizability of findings. Future studies with randomized designs, extended follow-ups, and broader population coverage are recommended to better understand factors influencing exclusive breastfeeding.

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Disclaimer

The views expressed in this study are solely those of the authors and do not necessarily represent the official policies or positions of Alkhidmat Raazi Hospital or any affiliated organization.

Conflict of Interest

The authors declare no conflict of interest regarding this study.

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ORIGINAL ARTICLE

Workplace Incivility –Resident's Perspective

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ABSTRACT

Objective: To explore postgraduate residents' perceptions of workplace incivility and its impact on their emotional status and job performance.

Study Design: Qualitative phenomenon study

Place and Duration of Study: Sharif Medical & Dental College, Lahore from 1st February 2023 to 1st September 2023.

Materials and Methods: Fourteen postgraduate residents were selected through purposive, qualitative sampling. In-depth interviews were audiotaped, and simultaneous field notes were taken. After the identification of any new theme after 14 participants, three more participants were interviewed till the data saturation point was achieved. Data verification was done through an audit by the researchers. The responses from these interviews were evaluated and themes were identified which were further explained in subthemes. The qualitative data was from audiotaped narratives, transcriptions, and field notes capturing participants' perceptions and experiences. Otter.ai was employed for the transcription of the recorded interviews, streamlining the process of converting audio data into text. Microsoft Word was used for further editing and organizing transcriptions. A word cloud generator, WordArt, was utilized for the graphical representation of themes and subthemes.

Results: Five themes and nine subthemes were identified. The themes derived were types of workplace incivility, emotional impact of workplace incivility, impact on professional development, coping mechanisms and addressing & preventing workplace incivility. The subthemes were subtle microaggressions, verbal disrespect, emotional distress, undermined confidence, stifled growth, compromised patient care, seeking support, finding allies and reflecting & self-care.

Conclusion: Our study determined that the most common types of workplace incivility among postgraduate trainees are subtle microaggressions and verbal disrespect. Workplace incivility has a negative impact on residents concerning their emotional status and job performance. Role play and mentoring by seniors, leadership qualities by setting examples, effective communication and reflection on your own action are the best coping strategies.

Key Words: *Coping Strategies, Emotional Impact, Perspective, Residents, Workplace Incivility.*

Introduction

Workplace incivility (WPI) is an important issue for healthcare workers. It is described as a violation of rules and standards, disrespectful and rude behavior and a vague purpose to harm a person at the workplace. Ignoring and not listening to a person, temperamental issues, eye-rolling, lip sounds, gossip, avoiding greetings, social boycotts repeatedly showing up late on calls and duties, treating colleagues rudely, workplace bullying are few examples of WPI.[1,2] It is a prevalent issue among doctors. Various factors contribute to WPI among doctors including high-stress level, hierarchical power dynamics in wards, favoritism, lack of merit policy, heavy workload, and organizational culture promoting favoritism and bullying at the workplace.[3] Healthcare workers who are either the target or witness of incivility experience several negative somatic, psychological, and behavioral effects. It

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negatively affects doctors' job satisfaction, resulting in burnout, reduced engagement and finally brain drain. Chronic exposure to WPI affects doctors' physical and mental health, putting the safety of the patients at stake, and potentially jeopardizing patient care. This phenomenon primarily disrupts teamwork, cooperation, and trust among medical professionals. Patient violence and aggressive behavior toward hospital physicians and nurses are often classified as workplace violence.[3,4,5]

Workplace incivility is mostly considered as an issue at the individual level. But in reality, it affects not only individuals but the whole organization. Working in a friendly environment is associated with the satisfaction and good performance of the employees.[6] It needs to be addressed as a phenomenon that affects learning and performance. The prevalence of WPI is increasing with every passing year. In 2005, an incivility researcher reported that WPI is on a rise and almost half of the healthcare workers experience WPI once in a month worldwide.[7] The frequency of WPI was 55% in 2011 and it increased to 62% in 2016 and 76% in 2022.[7]

Workplace incivility in hospitals among doctors is worrisome as it not only hampers the mental and social well-being of doctors but also jeopardizes patient care.[8] The majority of literature on this phenomenon explores the incidence of WPI among nursing staff and medical students.

A study reported workplace incivility among adult workers in China and Vietnam.[9] A study done in Pakistan recruited faculty from various higher education institutions. According to this study, WPI negatively affects the innovative work behavior of the employees.[10] A study from Canada determined the type of workplace incivility and its impact on doctors. The study reported that doctors experienced furtive behaviors such as gossip, over talking, yelling, public ridicule, rude emails, degrading posts on various platforms, etc. Such behaviors not only affected the mental health of the doctors but also had a negative impact on the workplace environment and patient care.[11]

A lot of research work has been done on workplace incivility but there are a limited number of studies that have addressed the issue of WPI among doctors, particularly among postgraduate residents. The postgraduate residents make up a major proportion of most of the hospitals. So our study determined their perception of WPI, its impact on their health & job performance and strategies to tackle WPI. To the best of our knowledge, no such study has been done in Pakistan before. The study would give us a deep insight into the problem and the impact it creates on quality of care and performance of postgraduate residents. Moreover, it is crucial to know the negative impact of WPI and how to prevent these attitudes in healthcare settings.

Materials and Methods

A qualitative phenomenon study was carried out in Sharif Medical and Dental College, Lahore from 1st February 2023 to 1st September 2023. A total of 14 postgraduate residents of different specialties, in Sharif Medical City Hospital were included using purposive qualitative sampling. Ethical concerns were considered in accordance with the framework given by Eikelboom.[12] The study was approved by the ethical committee of the institute (Ethical approval number: No SMDC/SMRC/275-22). The participation of residents was on a voluntary basis and informed written consent was taken from them. Confidentiality of the participants was maintained.

All the selected participants were briefed regarding the interview and re-interviews. The questions without probes and prompts were handed over to participants 24 hours prior to the interview. Participants were interviewed by two researchers' multiple times, in areas with no distraction and according to their availability to explore their perceptions, taking the article by Ibno *et al.,* [13] as reference. The interviews were audiotaped, and simultaneous field notes were taken. The participants filled their personal details on a proforma. Provisionally, the duration of the interview was 30 minutes. Open-ended questions were asked according to the interview guide. At the end of the semi-structured interview, participants were thanked for his/her time and were asked to add anything they wanted. After the identification of any new theme after 14 participants, three more participants were interviewed till the data saturation point was achieved.[14] Interrater variability was assessed manually using the percentage agreement method, yielding a high level of agreement between coders. Data verification was done through an audit by the supervisor. The responses from these

interviews were evaluated and themes were identified which were further explained in subthemes.

The responses were color-coded into categories i.e. themes and sub-themes. These themes, sub-themes and the transcribed interviews were critically reviewed again to look for plausibility and triangulation. Several measures were taken to ensure the validity of the study. A participatory approach with member checking was used for interpretative validity and all the interviewees confirmed the correctness of the interviews by going through the transcripts. The comments verbatim under each theme to further confirm descriptive validity.

In-depth semi-structured interviews collected the qualitative data. The data was from audiotaped narratives, transcriptions, and field notes capturing participants' perceptions and experiences. Otter.ai was employed for the transcription of the recorded interviews, streamlining the process of converting audio data into text. Microsoft Word was used for further editing and organizing transcriptions. A word cloud generator, WordArt, was utilized for the graphical representation of themes and subthemes.

Results

The results showed five themes and nine subthemes drawn after thematic analysis as shown in table I.

A word cloud of themes and subthemes was generated which is shown in figure 1.

Theme	Subtheme	Verbatim
Types of Workplace Incivility*	**Subtle Microaggressions**	Workplace incivility could include interrupting others during meetings, spreading rumors or gossip, making sarcastic remarks, ignoring or requests for assistance, or failing to acknowledge coworkers' contributions. Favoritism during marking of list for surgical procedures.
	Verbal Disrespect	Yes, I have experienced workplace incivility in the past. There have been instances where colleagues have made derogatory comments about my work, making fun of me during ward rounds.
Emotional Impact of Workplace Incivility	**Emotional Distress**	Certainly, there was a time when a senior registrar consistently interrupted me during ward rounds and morning meetings, making it difficult for me to contribute effectively to discussions. This behavior not only undermined my confidence but also disrupted the flow of my learning, I was unable to clear my queries.
	Undermined Confidence	
Impact on Professional Development	**Stifled Growth**	The changes I associate with the experience include feeling more guarded and hesitant.
	Compromised Patient Care	Compromised well-being and shaky confidence due to incivility and continuous bullying by peers and seniors resulting in errors and mistakes, I was criticized for everything rather than constructive feedback, and I was reprimanded.
Coping Mechanisms	**Seeking Support**	I tried to address the issue directly with the person who was bullying me by politely talking to him. When this approach didn't yield the desired results, I sought support from my supervisor and Head of department to address the behavior and find a resolution.
	Finding Allies	Additionally, I talked to trusted colleagues or friends to discuss the problem and gain some ideas to confront this issue.
	Reflecting and Self-Care	I focused on maintaining a positive attitude, seeking support from trusted colleagues, and prioritizing self-care activities outside of work to reduce stress and maintain a healthy work-life balance.
Addressing and Preventing Workplace Incivility		Hospital administration and HOD can foster a culture of respect and civility among doctors by leading by examples.

Discussion

Microaggressions are short, common verbal, environmental or behavioral insults at workplace that have adverse impact on the personnel. Normally, those personnel who are different from others in any aspect are the target of microaggression. It causes stress, emotional distress, sleep disturbances, weight gain, nicotine and alcohol addiction. Literature has revealed that the detrimental effects of microaggressions are of the

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Figure 1: Word Cloud of Themes and Subthemes

same magnitude as that of overt incivility.[15,16] Verbal disrespect is one of the elements of WPI. Harsh rude words, lack of respect and aggressive behavior are on the rise leading to significant decrease in morale and commitment of personnel at the workplace.[17]

The current study revealed the negative impact of incivility on the performance and learning of postgraduate residents in the ward. The same findings were described in other studies. Workplace incivility badly affects the job performance by decreasing the work capacity.[8] According to this study, WPI has a negative effect on learning engagement.[18]

Residents and doctors who suffer from this attitude may have to face a lot of range of variations in behavior and emotions. These negative emotions can lead to a vicious cycle of more negative emotions that not only affect doctors but also put the safety of patients at stake. The residents in our study understood the potential complications of WPI on patient safety. A study conducted on nursing students reported that bullying affected the patient outcomes and safety.[19]

Our participants responded to WPI by adopting different coping mechanisms. They seek help and support from their peers, seniors, mentors and allies. Finally, they respond to these negative emotional impacts by reflection, critical analysis and self-care. In a study done on WPI in Paramedicine, participants dealt with incivility by adopting the path of least resistance and taking decisions best for the patients.[20]

The residents in our study suggested some strategies to prevent WPI. They suggested role play by seniors, mentoring by seniors, and leadership qualities by setting examples to prevent and discourage workplace bullying in the hospitals. Not only the leadership but the residents also tried to improve their communication skills, with colleagues and patients. Reflection on your action is the best action to prevent WPI. In a study by Abdollahzadeh *et al.,*[21] it was suggested that finishing the assigned task on time, mastering the knowledge and skill, and communicating effectively are the ways to prevent WPI. In another study, according to medical students, reporting incivility to the seniors and taking support of peers are the ways to deal with it.[22] Hashemi *et al.,*[23] reported stress management, proactive coping strategies and appropriate training to reduce WPI among employees.

Conclusion

Our study determined that the most common types of workplace incivility among postgraduate trainees are subtle microaggressions and verbal disrespect. Workplace incivility has a negative impact on residents concerning their emotional status and job performance including emotional distress, decreased confidence and compromised patient care. Role play and mentoring by seniors, leadership qualities by setting examples, effective communication and reflection on your own action are not only the best coping strategies but can also prevent and discourage incivility in the hospitals.

Limitations of the Study

The study is limited by the fact that it is based only in one center, future research shall be done to know the different triggering factors and the effect of type of personality in triggering WPI. As doctors are not only the ones working in health care settings so perspectives of nurses, paramedical and more importantly patients shall be considered.

Recommendations of the Study

This study would draw attention to identify the behaviors that can be improved in future through incivility training interventions. Necessary actions should be taken in hospitals to prevent and manage WPI among postgraduate residents to avoid its negative impact on their learning, performance, and mental health.

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CLINICAL CASE REPORT should be of academic value and provide relevance of the disease being reported as rare or unusual. The word count of the case report should not be more than 800 words with 3- 5 key words. The abstract should be non-structured of about 150 words (case specific) with a maximum of 5 references. It should not include more than 2 figures and one table.

REVIEW ARTICLE should consist of structured overview of relatively narrow topic providing background and recent development with reference of original literature. An author can write a review article only if he/she has written a minimum of three original research articles and some case reports on the same topic. Review articles should be of 2500 to 3000 words with a non-structured abstract of 150 words and minimum 3 key words.

LETTERS TO THE EDITOR should normally not exceed 400 words, have no more than 05 references and be signed by all the authors-maximum 3 are allowed. Preference is given to those that take up points made in contributions published recently in a journal. Letters may be published with a response from the author of the article being discussed. Discussions beyond the initial letter and response will not be entertained for publication.

OBITUARIES should be of about 250 words.

EDITORIALS are written by invitation.

DISSERTATION/THESIS BASED ARTICLE An article based on dissertation/thesis submitted as part of the requirement for a postgraduate degree (M. Phil, FCPS, MS) can be sent for publication after it has been approved by the institution's ethical review board/committee and the college/university evaluation committee/board. The data should not be more than five years old. Thesis/dissertation-based articles will be assessed by proper review process. Once accepted for publication, disclosure will be made that 'it is a Dissertation based article.'

RANDOMIZED CONTROLLED TRIALS

- When reporting the results of a randomized trial, JIIMC requires a completed CONSORT 2010 checklist and flow diagram as a condition of submission.
  - CONSORT 2010 checklist
  - CONSORT 2010 flow diagram
- Templates for these can be readily accessible here or on the CONSORT website, which also describes several CONSORT checklist extensions for different designs and types of data beyond two group parallel trials
- Authors should ensure that your article, at minimum, reports content addressed by each item of the checklist. Meeting these basic reporting requirements will greatly improve the value of your trial report and may enhance its chances for eventual publication.
- As per recommendation of ICMJE, Journal of Islamic International Medical College requires registration of clinical trials in a public trials registry as a prerequisite for publication of all clinical trials.
- **Clinical Trials:** Clinical Trials submitted for publication must be registered in public registry, e.g., http://clinicaltrial.gov/ , must provide registration proof & all RCTs must be based on CONSORT statement. Unregistered trials will not be published.

  A clinical trial is any research study that prospectively assigns human participants or groups to one or more health-related interventions to assess their effects on health outcomes. These interventions can include drugs, surgical procedures, devices, behavioral treatments, dietary changes, and modifications in care processes. Health outcomes encompass any biomedical or health-related measures collected from patients or participants, including pharmacokinetic data and adverse events. Purely observational studies (those in which the assignment of the medical intervention is not at the discretion of the investigator) do not require registration.

GENERAL ARCHIVAL INSTRUCTIONS

The manuscript should be typed in MS Word. Each manuscript should include a title page (containing email address, cell numbers, institution, and postal address of the corresponding author), abstract, key words, text, acknowledgements (if any), references, tables (each table, complete with title and footnotes) and legends for illustrations and photographs. Each component should begin on a new page. Sub-

headings should not be used in any section of the script except in the abstract.

TEXT ORGANIZATION

All manuscripts except Short Communication and Letter to the Editor should be divided into the following sections.

ABSTRACT

Abstracts of original article should be in structured with following sub-headings:

- Objective
- Study Design
- Place & Duration of Study
- Materials & Methods
- Results
- Conclusion

Four elements should be addressed: "why did you start?", "what did you do?", "what did you find?" and "what does it mean? ".” Why did you start?" is addressed in the objective. "What did you do?" constitutes the methodology and could include design, setting, patients or other participants, interventions, and outcome measures. "What did you find?" is the 'results', and "what does it mean?" would constitute the conclusions. Please label each section clearly with the appropriate sub-headings. Structured abstract for an original article, should not be more than 250 words. At least 3 key words should be written at the end of the abstract. Review articles, case reports and others require a short, unstructured abstract. Commentaries do not require an abstract.

INTRODUCTION

Write this section with references as per following instructions:

1. Give background information about the subject matter and the issues your study intends to address. Only strictly pertinent references should be cited, and the subject should not be extensively reviewed.
2. Describe what is known (in the literature) and what is not clear about the subject with reference to relevant literature thus identifying the literature gap.
3. You write the rationale (justification) of your study.
4. Finally, you mention the objective of your study

MATERIALS AND METHODS

Methodology is written in past tense.

Follow this sequence **without headings:**

- Study design
- Place and Duration of Study
- Sample size
- Sampling technique
- Mention about permission of the ethical review board and other ethical issues addressed.
- Inclusion and Exclusion Criteria
- Data collection procedure-
- Type of data: parametric or nonparametric
- Data analysis: including Statistical Software used, and statistical test applied for the calculation of p value and to determine the statistical significance. Exact p-values and 95% confidence interval (CI) limits must be mentioned instead of only stating greater or less than level of significance. All percentages must be accompanied with actual numbers.

RESULTS

These should be presented in logical sequence in the text, tables, and illustrations. All the data in the tables or illustrations should not be repeated in the text; only important observations should be emphasized or summarized. No opinion should be given in this portion of the text.

DISCUSSION

This section should include the author's comments on the results. Write in present tense, active voice except for results, which are written in past tense. It should be written in following sequence:

- First, very briefly summarize, Interpret and discuss main results and don't merely repeat the results.
- Discuss key studies relevant to your study.
- Compare your work with other's work.
- Describe limitations of your study.
- Suggest future work if necessary.

CONCLUSION

Conclusion should be provided under a separate heading. It should be in congruence with the objective. No recommendations are needed under this heading.

REFERENCES

References must be written in Roman Number and in the Vancouver Style only. References should be numbered in the order in which they are superscripted in the text. At the end of the article, the full list of references should give the names and initials of all authors (unless there are more than six

when only the first six should be given followed by et al). The author's names are followed by the title of the article; title of the journal abbreviated according to the style of the Index Medicus (see "List of Journals Indexed", printed yearly in the January issue of Index Medicus); year, volume, and page number, e.g., Hall, RR. The healing of tissues by C02 laser. Br J. Surg: 1970; 58:222-225. References to books should give the names of editors, place of publication, publisher, and year. The author must verify the references against the original documents before the article. References to papers accepted but not yet published should be designated as "in press" or "forthcoming"; authors should obtain written permission to cite such papers as well as verification that they have been accepted for publication.

TABLES AND ILLUSTRATIONS

Tables and illustrations should be merged within the text of the paper, maximum number of tables and illustrations should not exceed four, and legends to illustrations should be typed on the same sheet. Tables should be simple and should supplement rather than duplicate information in the text; tables repeating information will be omitted. Each table should have a title and be typed in double space without horizontal and vertical lines on an 8 ½" x 11' paper. Tables should be numbered consecutively with Roman numerals in the order they are mentioned in the text. Page number should be in the upper right corner. If abbreviations are used, they should be explained in footnotes and when they first appear in text. When graphs, scattergrams, or histograms are submitted, the numerical data on which they are based should be supplied. All graphs should be made with MS Excel and be sent as a separate Excel file even if merged in the manuscript. For scanned photographs the highest resolution should be used.

S.I.UNITS

System International (SI) Unit measurements should be used. All drugs must be mentioned in their generic form. The commercial name may however be mentioned within brackets, if necessary.

PHOTOGRAPHS AND FIGURES

Figures and Photographs should only be included when data cannot be expressed in any other form. Figures and photographs must be cited in the text in consecutive order. Legends must be typed on the same paper. Legends for photomicrographs should indicate the magnifications, internal scale, and method of staining. Figures should be numbered in Arabic numbers.

OBLIGATORY FILES

Obligatory supporting documents for all types of Manuscripts except the letter to editor, without which JIIMC will not accept the manuscript for initial processing.

- Cover Letter
- JIIMC Checklist
- JIIMC Conflict of Interest Performa
- JIIMC CopyRight and Undertaking Agreement
- IRC Certificate
- Bank draft as initial processing fee (Original bank draft send in JIIMC office)

Template of these files is available in the download section.

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Any funding source for the research work must be informed at the time of submitting the manuscript for publication in JIIMC. Any associations that might be construed as a conflict of interest (stock ownership, consultancies, etc.) shall be disclosed accordingly. Examples of financial conflicts include employment, consultancies, stock ownership, honoraria, paid expert testimony, patents or patent applications, and travel grants, all within 3 years of beginning the work submitted. If there are no conflicts of interest, authors should state that. All authors are required to provide a signed statement of their conflicts of interest as part of the author's declaration.

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- Author will describe the role of the study sponsor (s), if any, in study design; in the collection, analysis, and interpretation of data; in the writing of the report; and in the decision to submit the paper for publication.
- If there is no Methodology section, the role of the funding source should be stated as an acknowledgment.
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3. Have given final approval of the version to be published; and
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- After initial scrutiny the manuscript is assessed by an editor for its originality, significance, and suitability as per scope and format of the journal.
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- The editor may reject manuscripts without outside review, for example if the subject matter is outside the purview of the journal, a manuscript on the same topic is just about to be published, the quality of the manuscript is poor, or criteria for the submission of manuscripts are not met.

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