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CONTENTS

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EDITORIAL

ARTIFICIAL INTELLIGENCE (AI) IN MEDICAL EDUCATION- A THREAT TO TRADITION OR A CATALYST FOR CURRICULAR TRANSFORMATION

Farooq Ahmed

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Artificial Intelligence (AI) can be used in many ways to improve medical education and curriculum development. This can involve tailoring the content and delivery of educational materials to the individual needs of each student, as well as formative and summative assessments. It can be used to create scenarios as part of the skills and simulation experiences and create virtual patients for learning, hence avoiding the exposure of real patients to medical students. This editorial will emphasize the basic concepts of AI and give examples of AI integration in both undergraduate and postgraduate medical curricula.

Artificial intelligence (AI) fundamentally refers to the ability of machines to perform tasks that typically require human intelligence. This encompasses many capabilities, including learning, reasoning, problem-solving, perception (like vision and speech recognition), and language understanding. [1] Key components of AI include Machine Learning (ML), Deep Learning (DL), and Natural Language Processing (NLP). It's important to note that these components are often intertwined. ML uses artificial neural networks with multiple layers (hence "deep") to analyze complex data like images, audio, and text. These networks mimic the structure and function of the human brain, allowing for extracting high-level features and representations from raw data. DL focuses on enabling computers to understand, interpret, and generate human language. NLP involves tasks such as text analysis, sentiment analysis, machine translation, and chatbot development. [2, 3] The most common AI platforms include Gemini and ChatGPT.

The use of AI in creating and interacting with 3D anatomy models is revolutionizing medical education, research, and clinical practice. AI algorithms, particularly deep learning models, are trained on vast datasets of medical images like CT scans, MRI scans, and histological slides. These algorithms can then automatically segment and reconstruct anatomical structures in 3D with high precision, often surpassing the accuracy of manual segmentation. AI can combine data from multiple sources to create comprehensive 3D models of the human body or specific regions. These "virtual cadavers" offer a non-destructive and repeatable way to explore anatomy, thus overcoming the limitations of traditional cadaver dissection. [4, 5]

The use of AI in creating interactive learning models in Human Physiology, e.g., AI Body-Digital Physiology, allows the simulation the whole body or part of it in terms of biomechanical and biochemical transformation. Some examples include observing the cardiac cycle, valvular functions, and changes in ejection fractions and their effects on the human body. [6]

AI tools are now widespread in the discipline of pathology, especially in Histopathology. These tools help pathologists detect abnormalities, especially in cancer diagnosis. One of the most commonly used is AIFORIA, a tool for the diagnosis and grading of breast cancer. [7]

Many AI platforms have been integrated with high-fidelity simulations in skills laboratories around the world. Similarly, AI tools have made the lives of researchers easy in creating research ideas, developing proposals, and analyzing data.

The benefits of these AI platforms include personalized learning, immediate feedback, streamlining clinical workflows, and preparing students for AI-based patient care. Some of the limitations include over-reliance on AI, biases, and challenges in educating AI software and machines. Despite these, AI is transforming both undergraduate and postgraduate medical education and helping students and educators around the world in scientific knowledge, skills, and even effective domains.

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ORIGINAL ARTICLE

THE FREQUENCY OF GENERALISED SEIZURES IN PATIENTS PRESENTING WITH ACUTE ISCHEMIC STROKE

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ABSTRACT

Objective: To determine the frequency of generalized seizures in patients presenting with acute ischemic stroke.

Material and Methods: The study was descriptive, cross-sectional, and conducted in the Department of Medicine, Khyber Teaching Hospital, Peshawar, from April 10th, 2021, to October 9th, 2021. It included a total of 220 patients, aged 30 to 70 years of either gender, having ischemic stroke. They were registered by using a nonprobability consecutive sampling technique. The study was initiated after agreement from the hospital's ethical committee. Patients signed the informed consent before the collection of their data. Demographic data, including risk factors and frequency of seizures, were noted. Data were entered and analyzed using SPSS 22.

Results: In this study, a total of 220 patients (54.5% males and 45.5% female) were enrolled with a mean age of 51.25 ± 12.1 years. The mean height was 155.1 ± 14cm, the mean weight was 71.9 ± 11.3 kg, and the mean BMI was 29.8 ± 5.9 kg/m2. The mean duration of ischemic stroke was 10.1 ± 2.9 hours. Diabetes was present in 47.3% of patients. Hypertension was present in 70% of patients. Obesity was present in 32.7% of patients. Seizures were present in 13.6% of patients.

Conclusion: Seizures after ischemic stroke are common in our population.

Keywords: Seizures, Ischemic Stroke, Generalized Seizures

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INTRODUCTION

One of the chief causes of morbidity and mortality internationally is stroke. A large number of people are rendered disabled for the rest of their lives following a stroke. Recently, its incidence has been on the rise in Asia.[1] Pakistan contributes to a major percentage of stroke cases in Asia. Stroke and its complications ultimately influence the whole community by reducing health and human resources, thereby leading to a financial burden on society.

The well-known risk factors of stroke in the form of diabetes and hypertension, which were previously seen in abundance in the West, are also more frequent in Asian countries; hence, these risk factors majorly contribute to the increasing stroke burden in Asia and Pakistan in the recent past. Diabetes has already emerged as an epidemic in Pakistan. Hence, we need robust and vigilant national policies to control the surge of diabetes, which is one major etiologic contributor to stroke.[2] There are no effective screening strategies in practice in Pakistan. Hence, most of our patients only get to know about their diagnosis of diabetes or hypertension when they have had an insult in the form of stroke or myocardial infarction. Due to poverty and lack of awareness, most of the individuals fail to get routine medical check-ups. The health system even lacks a protocol for screening endemic diseases in the general population or visitors to local healthcare facilities.[3] Some clinicians fail to keep themselves updated once they reach the climax of their professional careers. Hence, they continue to practice anecdotal and orthodox medicine, which needs to be updated regularly.

Stroke is one of the major etiologies in the causation of acute symptomatic seizures in adult patients. Stroke-related seizures usually occur within 7-14 days of the occurrence of an acute stroke. Seizures occurring after 2 weeks are labeled as late seizures.[4]

The differences between early and late seizures can be due to underlying varying causes regarding the pathophysiology and risk factors of these seizures. In one study, it was seen that 1.8-15% of seizures occur within the first 4 weeks of an acute stroke.[5] In a one-year retrospective study conducted in 2002, it was concluded that the incidence of seizures was 9.1% in patients afflicted with ischemic stroke; this included acute symptomatic sei-

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zures in 1.4% and unprovoked seizures in 7.7%. It was also concluded that cortical distribution of the ischemic infarction contributed to seizures among those patients. [6] In another study, seizures occurred in 5% of patients following ischemic stroke, with almost one-third of the seizures occurring within 24 hours of the stroke. No seizures were observed after lacunar strokes. [7]

In another study of 489 patients with first-time stroke, seizures occurred in 7.2% of the patients. [8] Other studies have also reported similar frequencies of seizures post-stroke. [9] Symptomatic seizures have been reported in a wide range of patients, i.e., 2 to 33% of patients with acute stroke. [10] This wide range of seizure occurrence can be attributed to multiple reasons: scrutiny of retrospective studies, the difference in operational definition of early seizures by different authors (ranging from 1-30 days), and the inclusion/exclusion in research regarding stroke. Some studies took a step ahead and also tried to figure out the etiology of post-stroke seizures. Among them, the severity of stroke, hemorrhagic stroke, and involvement of cortical area in the brain were concluded as risk factors. [4]

The purpose of our present study is to calculate the frequency of generalized seizures in patients with acute ischemic stroke. As no such study has been conducted in our population for the last five years so, this study will provide us with the latest and updated information about patients with acute ischemic stroke and the frequency of seizures in such patients. The results of our study may vary from other studies because of different cultural and socioeconomic conditions and education levels. Moreover, the results of the studies will be shared with other health professionals so that they can take necessary action in the treatment of seizures in all ischemic strokes and future recommendations.

MATERIALS AND METHODS

This study was designed as a descriptive, cross-sectional study, and it was conducted in the Department of Medicine, Khyber Teaching Hospital, Peshawar, from April 10th, 2021 till October 9th, 2021. The study was led after approval from Khyber Teaching Hospital's ethical committee and CPSP Research Committee. The sample size was 220 patients, keeping 6.6% previously reported frequency, [9] 95% confidence interval, and 3.3% absolute precision. Patients of either gender in the age group between 30-70 years presenting with ischemic stroke within 48 hours of stroke onset were included in the study. The 48-hour inclusion criterion helped ensure that our study is focused on the most relevant acute stroke cases and seizure events, allowing for a clearer understanding of the immediate relationship between ischemic stroke and generalized seizures. Patients with prior established conduction defects based on their medical records, patients with other chronic medical conditions like advanced heart failure diagnosed from clinical details and investigations, and patients having established neurologic disorders with diverse neurologic deficits (e.g., history of stroke, damage to the head, and hypoxic encephalopathy), patients already diagnosed with epilepsy, and patients on regular anti-epileptic medications for conditions other than epilepsy (e.g. trigeminal neuralgia and/or neuropathic pains) were omitted from the study.

The aim of the study was clarified to all study participants or their first-degree relatives/caretakers where the patient was unable to comprehend the provided information. Informed written consent was signed by patients or their families/caretakers before recruitment in the study. Confidentiality of all patients was ensured.

A detailed history, clinical examination, and initial assessment, including a computed tomography (CT) scan of the brain, were performed for the diagnosis of acute ischemic stroke. Demographic data, any co-morbid in the form of diabetes, hypertension, obesity, and smoking history were documented. Duration of stroke was also noted. Exclusion criteria were abided by to control bias in study results.

All the data was analyzed in SPSS 22. Mean and standard deviation were calculated for numerical variables like age, weight, height, BMI, and duration of ischemic stroke. Frequency and percentage were computed for categorical variables like gender, diabetes, hypertension, smoking status, obesity, and generalized seizure. Generalized seizure was stratified with age, gender, hypertension, diabetes, obesity, and smoking status to see effect modifiers.

RESULTS

In our study, a total of 220 patients were registered with a mean age of 51.25±12.1 years. (Table 1)

Table No 1: Baseline characteristics

	N	Minimum	Maximum	Mean	Std. Deviation
Age (Years)	220	30	70	51.25	12.194
Height (cm)	220	132	187	155.12	14.031
Weight (kg)	220	47	90	71.92	11.348
BMI (kg/m2)	220	17.30	40.20	29.839 1	5.94156
Duration of Ischemic Stroke (Hours)	220	2	48	10.151	2.914

Table No 2: Frequency of different parameters

		Frequency	Percent
Gender	Male	120	54.5
	Female	100	45.5
	Total	220	100.0
Diabetes	Yes	104	47.3
	No	116	52.7
	Total	220	100.0
Hypertension	Yes	154	70.0
	No	66	30.0
	Total	220	100.0
Smoking	Yes	44	20.0
	No	176	80.0
	Total	220	100.0
Obesity	Yes	72	32.7
	No	148	67.3
	Total	220	100.0
Seizures	Yes	30	13.6
	No	190	86.4
	Total	220	100.0

Table No 3: Data stratifications

			Seizures		Total	P-Value
			Yes	No		
Age groups	30-55 years	Count	20	112	132	<0.897
		% within Age groups	15.1%	84.9%	100.0%	
	56-70 years	Count	10	78	88	
		% within Age groups	12.5%	87.5%	100.0%	
Gender	Male	Count	26	94	120	<0.001
		% within Gender	21.7%	78.3%	100.0%	
	Female	Count	4	96	100	
		% within Gender	4.0%	96.0%	100.0%	
Diabetes	Yes	Count	8	96	104	0.015
		% within Diabetes	7.7%	92.3%	100.0%	
	No	Count	22	94	116	
		% within Diabetes	19.0%	81.0%	100.0%	
Hypertension	Yes	Count	22	132	154	0.668
		% within Hypertension	14.3%	85.7%	100.0 %	
	No	Count	8	58	66	
		% within Hypertension	12.1%	87.9%	100.0 %	
Smoking	Yes	Count	10	34	44	0.049
		% within Smoking	22.7%	77.3%	100.0%	
	No	Count	20	156	176	
		% within Smoking	11.4%	88.6%	100.0%	
Obesity	Yes	Count	4	68	72	0.015
		% within Obesity	5.6%	94.4%	100.0%	
	No	Count	26	122	148	
		% within Obesity	17.6%	82.4%	100.0%	

There were 54.5% male and 45.5% female patients. (Table 2) The mean height was 155.1±14cm, the mean weight was 71.9±11.3kg, and the mean BMI was 29.8±5.9 kg/m2. (Table 1) The mean duration of ischemic stroke was 10.1±2.9 hours. (Table 1) Diabetes was present in 47.3% of ischemic stroke patients.

(Table 2) Hypertension was present in 70% of patients. (Table 2) Smoking was present in 20% of patients. (Table 2) Obesity was present in 32.7% of patients. (Table 2) Seizures were present in 13.6% of patients. (Table 2) Data stratification for the frequency of seizures and age groups was not significant, with a p-value of 0.897. (Table 3) Data stratification for frequency of seizures and gender was significant, p-value <0.001.

(Table 3) Data stratification for the frequency of seizures and diabetes was significant, with a p-value of 0.015. (Table 3) It was found that the stratification of data for the frequency of seizures and hypertension was not significant, with a p-value of 0.66. (Table 3) Data stratification for the frequency of seizures and smoking was significant, with a p-value of 0.049. (Table 3) Stratification of data for frequency of seizures and obesity was significant, with a p-value of 0.015. (Table 3)

DISCUSSION

One of the foremost causes of neurological disability is stroke, and it ranks second as a source of worldwide deaths, with a twelve-monthly mortality rate of about 5.5 million. [11] Stroke is one of the risk factors for seizures in the middle-aged and elderly population. [12]

Ischemic strokes in itself is a major burden on society in the form of morbidity, mortality, and quality of life loss. Seizures in ischemic stroke patients play a synergistic effect by further extrapolating the misery. [13]

They cause redundancy of human resources over driving limitations, more chances of traumatic falls and fractures, and amplified vulnerability to negative effects from consuming anti-epileptic drugs. A large number of studies are available on post-stroke seizures and their associated risk factors. [7, 14]

In our study, a total of 220 patients were registered with a mean age of 51.25 ± 12.1 years. There were 54.5% male and 45.5% female patients. The mean height was 155.1 ± 14cm, the mean weight was 71.9 ± 11.3kg, and the mean BMI was 29.8 ± 5.9 kg/m2. The mean duration of ischemic stroke was 10.1 ± 2.9 hours. 47.3% of ischemic stroke patients were diabetic; 70% were hypertensive; 20% had a positive smoking history; and 32.7% were obese based on body mass index (BMI). Seizures were present in 13.6% of patients, which aligns with several studies but also shows variability when compared with the broader literature. For instance, a community-based prospective cohort study reported a 5.3% incidence of seizures after ischemic stroke, with a significant portion occurring within the first 24 hours and none following lacunar strokes. [7]

In contrast, our higher incidence rate underscores the need for a deeper examination of regional or methodological differences that may contribute to this variability. Data stratification for frequency of seizures and gender was significant, p-value <0.001, diabetes was significant, p-value 0.015, smoking was significant, p-value 0.049; and obesity was significant, p-value 0.015.

Data stratification for frequency of seizures and age groups was not significant, p-value 0.897, hypertension was not significant, p-value 0.66. Other literature demonstrates a large variety in the incidence rates of seizures after a stroke. In a study conducted by Burn et al., 7.7% of patients had one or more episodes of seizures post-stroke; 25 patients experienced recurrent seizures.

The 5-year risk of a post-stroke seizure was 11.5% in a prospective study. [15] This is somewhat consistent with our findings but highlights that the frequency of seizures can vary significantly depending on the study population and duration of follow-up. Our study's higher prevalence of 13.6% could be reflective of different demographic or clinical characteristics in our sample compared to Burn et al.'s cohort. A hospital-based cohort study was conducted in China from 1996-1998, which looked at the incidence of fits and the linked risk factors following a stroke. The first 1000 patients were reviewed for post-stroke seizure activity. 3.4% of these subjects developed seizures within one year after acute stroke.

Among the early seizures, fifty-six percent were concluded to be partial type, while among the late seizures, 72% were generalized tonic-clonic kind of uncertain onset. [16] Another retrospective observational three-year study was conducted in Lebanon on 140 stroke patients.

Out of these 140, early seizures were established in 12 patients (8.6%) with a recorded mean age of 68.42 ± 9.89 years. 8 (67%) among them were fe-

males. Risk factors that were considered independent of early seizure activity were female gender and cortical involvement post-stroke. [17] Our study also identified significant associations with male gender, suggesting that it may be different for different populations. A study conducted in Rochester, Minnesota, used the Rochester Epidemiology Project medical records-linkage system and collected all incident cases of ischemic stroke. New onset seizures occurred in 7.2% of patients. [18]

Another study conducted in Tunisia evaluated stroke patients for seizure occurrence. Seizures were categorized according to the International League against Epilepsy (ILAE) into acute symptomatic seizures (ASS) and unprovoked seizures (US). Seizures were labeled as acute symptomatic seizures if they happened within 7 days of stroke and unprovoked seizures if they occurred after 1 week. 40% had ASS, and 60% had US.

The major factors that were established in the occurrence of seizures were the following: 65 years of age or below (71%), infarcts of the middle cerebral artery (83%), and cortical infarcts (87%). 46% of subjects presented with recurrent seizures. [19] All the above studies showed that the frequency of seizures after ischemic stroke is highly variable among different populations.

Our study concluded the fact that seizures are quite common after ischemic stroke, with them occurring in 13.6% of the total 220 patients included in our study. They are an important post-stroke consequence and should not be overlooked.

The patients in this study group might not have been representative of the general population with ischemic stroke. Precisely determining the onset of seizures and their direct relation to stroke onset can be challenging. The study also didn't capture complications or seizure-related issues that emerge after the acute phase, which can be significant in stroke recovery.

CONCLUSION

Seizures after ischemic stroke are very common in our population. Our results suggest that clinicians should consider a comprehensive evaluation for seizures in patients with ischemic stroke, especially those with identified risk factors such as diabetes, smoking history, and obesity. Furthermore, the variability in seizure incidence across studies points to the importance of tailored patient management strategies.

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Following authors have made substantial contributions to the manuscript as under

Authors	Conceived & designed the analysis	Collected the data	Contributed data or analysis tools	Performed the analysis	Wrote the paper	Other contribution
Zaman M	✓	×	✓	×	✓	×
Badshah A	✓	✓	×	✓	✓	×
Atif D	×	✓	×	×	✓	×
Khan Z	✓	✓	✓	×	✓	✓
Shah MA	✓	✓	×	✓	✓	×

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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EFFICACY AND SAFETY OF SUBLINGUAL MISOPROSTOL FOR CERVICAL PRIMING BEFORE MINOR GYNECOLOGICAL PROCEDURES

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ABSTRACT

Objective: To assess the efficacy and safety of 400 micrograms of sublingual misoprostol in comparison to the same dose of vaginal misoprostol for cervical priming before minor gynecological procedures.

Materials And Methods: The Randomized Controlled Trial was conducted in Khyber Teaching Hospital from 1st April 2021 to 31st Oct 2022. The sample size was 212, and a convenient random sampling technique was used. Fifty percent of the patients were given sublingual misoprostol 400 micrograms 2 hours before surgery (group A), while the rest were given 400 micrograms vaginal misoprostol 4 hours before surgery (group B). Efficacy of procedure was defined as the measure of pre-procedural cervical width as measured by the largest number of cervical Hagar's dilators passing easily through the cervix. At the same time, safety was the measure of less or no occurrence of side effects related to misoprostol and procedure, such as fever, chills, vomiting, diarrhea, vaginal bleeding, cervical injury, or uterine perforation. All data was stored and analyzed in SPSS 20.

Results: The mean age of patients in group A was 38.99 ± 7.82, and in group B 37.97 ± 7.30, The Mean parity in group A 2.98 ± 2.32 and in group B was 3.05 ± 1.67, Mean uterine size in group A

10.83 ± 1.80 and in group B 9.93 ± 1.81, and the mean pre-procedural cervical width in mm in group A was 8.57 ± 0.74 and in group B 8.01 ± 0.41(p-value 0.002). Complications included minor side effects like nausea and uterine cramps.

Conclusion: Sublingual misoprostol is an effective and safe agent for cervical ripening and dilatation before minor gynecological procedures. The effect of sublingual misoprostol 2 hours before the minor procedures is more effective compared to the same dose of vaginal misoprostol when given 4 hours prior.

Keywords: Misoprostol, Sublingual, Cervical width, cervical priming, minor gynecological procedures.

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INTRODUCTION

Minor gynecological procedures that need cervical dilatation are associated with a high risk of complications due to transcervical dilatation. Cervical tears, formation of false tracts, bleeding or uterine perforation, and subsequently, cervical stenosis and incompetence have been reported to occur during the cervical dilatation procedure. [1, 2] The minor procedures are endometrial curettage, polypectomy, diagnostic laparoscopy, hysteroscopy, placing intrauterine contraceptive device (IUCD) in scarred uteri with stenosed cervix, manual vacuum aspiration (MVA), suction curettage for early miscarriages and before Hystero- salphingography (HSG). To decrease the risk of complications, medical means of softening or dilating the cervix, known as ripening, has become an integral part of pre-operative care. [3-5] Different cervical ripening agents are used before the procedures. In the past, Luminarias and Prostaglandin E2 (PGE2) have been used effectively for dilating and softening the cervix. However, Luminarias may not be suitable for women with marked cervical stenosis, and prostaglandins such as Dinoprostone are expensive and require special storage conditions. [6] Misoprostol is very effective for cervical priming in transcervical minor procedures. It is cheap, stable at room temperature, and easily available. Oral, vaginal, and sublingual routes have been used by researchers. [7] Oral misoprostol is taken 12 hours before the procedure, via vaginally, it should be administered 2-4 hours before surgery. Sublingually, it is administered 2 hours before the minor procedure. The sublingual route avoids the first-pass effect by the liver and is absorbed in the vascular area of the buccal cavity. [8, 9] This study was conducted to assess the efficacy and safety of sublingual misoprostol in comparison to the same dose of vaginal misoprostol for cervical priming before mi-

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nor gynecological procedures.

MATERIALS AND METHODS

This randomized controlled trial was conducted in the Gynecology unit of Khyber Teaching Hospital from 1st May 2021 to 31st October 2022. After taking approval from the ethical committee of the hospital, half number of the patients were given sublingual misoprostol 400 mg 2 hours before surgery (group A), and half were given 400 mg vaginal misoprostol 4 hours before surgery (group B). Informed consent was taken from each patient before the procedure. The efficacy of the procedure was defined as the measure of pr- procedural cervical width as measured by the largest number of cervical Hagar's dilators passing easily through the cervix. At the same time, safety was the measure of less or no occurrence of side effects related to misoprostol and the procedure, such as fever, chills, vomiting, diarrhea, vaginal bleeding, cervical injury, or uterine perforation.

The sample size was calculated by PS power version 3.0, January 2009. The sampling technique was convenient random sampling. The Independent variables were the sublingual or vaginal use of misoprostol by the patients, and the dependent variables were preprocedural cervical width as measured by the largest number of cervical hegari's dilator passing easily through the cervix and side effects related to the misoprostol during its use and the procedure.

Inclusion criteria included patients who were scheduled for minor gynecological surgery and were enrolled in the study. Exclusion criteria included patients who had a history of allergy to prostaglandins or had vaginal or cervical infections were excluded from the study. Also, those patients were excluded who had a history of cardiac disease and inflammatory bowel disease.

Detailed medical, obstetrical, and gynecological histories were taken from the patients. Participants underwent a detailed physical examination. Preoperative vital signs like blood pressure, pulse rate, and temperature were checked. Side effects like vaginal bleeding, nausea, vomiting, diarrhea, fever more than 38° F, chills and abdominal pain were recorded. All data was stored and analyzed using SPSS 20. Descriptive statistics like mean ± SD were calculated for quantitative variables like Age, parity, mean cervical dilatation, and mean duration of the procedure. Frequency and percentages were calculated for categorical variables like side effects and complications during the procedure. Efficacy and safety of both groups were stratified among age and parity. The Post-stratification chi-square test was used to compare the efficacy and safety of both groups. All the results are presented in tables.

RESULTS

The study included 212 patients who were randomized into two groups by convenient random sampling method into Group A who received 400 micrograms of sublingual misoprostol (n=106) 2 hours before the procedure, and B, who received 400 micrograms vaginal misoprostol 4 hours before the procedure. Out of 212 cases for which misoprostol was given, 44 patients were pregnant and were having failed pregnancies with either miscarriages, blighted ovum, H mole, or retained products of conception.

In early pregnancy failure cases, uterine size was 10-12 weeks, and in molar pregnancy, uterus size was 12-14 weeks.

DISCUSSION

After vaginal application, the peak plasma concentration of misoprostol is reached in 70-80 minutes and then declines slowly by 6 hours. The peak plasma concentration following sublingual administration of misoprostol is higher than the peak to achieve a peak plasma concentration of about 30 minutes. The onset of action of misoprostol is quicker by the sublingual route, but the total duration of action is shorter and is reported to be about 80-120 mts.[13, 14] Therefore, the pharmacokinetic profile of sublingual misoprostol justifies its use preoperatively for minor gynecological procedures.

Bhakti used 400 micrograms of sublingual and vaginal misoprostol for cervical ripening 3 hours before the evacuation procedure. [11] The mean age of patients in the sublingual group was

24.46 years, and in the vaginal group, 25 years. The Mean cervical dilatation achieved with sublingual misoprostol was 7.9 mm (SD 1.32), and in the vaginal

Table No 1: Baseline characteristics of the participants

	Treatment Groups				P-value	Statistics	
	Sublingual Misoprostol (A)		Vaginal Misoprostol (B)			95% C I of the Difference	
	Mean	SD	Mean	SD		Lower	Upper
Age (years)	38.99	7.82	37.97	7.30	0.328	-3.07	1.03
Parity	2.98	2.32	3.05	1.67	0.812	-0.48	0.61
Uterus (weeks)	10.83	1.80	9.95	1.81	0.003	-1.47	-0.30
Pre-procedural cervical width (mm)	8.57	0.74	8.01	0.41	0.001	-0.72	-0.39

Table No 2: Types of Minor Gynecological Procedures

Procedures	Sublingual Misoprostol Group n=106	Vaginal Misoprostol Group n=106
Diagnostic curettage	21 (9.9%)	31 (14.6%)
Suction curettage	26 (12.2%)	22 (10.3%)
Diagnostic laparoscopy	22 (10.3%)	29 (13.6%)
Diagnostic hysteroscopy	6 (2.8%)	7 (3.3%)
Manual vacuum aspiration (MVA)	4 (1.8%)	4 (1.8%)
Endometrial polypectomy	7 (3.3%)	9 (4.2%)
Prior to IUCD insertion	7 (3.3%)	4 (1.8%)
Mirena insertion	4 (1.8%)	-
Hysterosalpingography (HSG)	3 (3.3%)	-
Pipelle Biopsy	6 (2.8%)	-

Table No 3: Effect of Sublingual and Vaginal misoprostol on parity and Early pregnancy failure.

			N	Mean cervical width(mm)	Std. Deviation	Std. Error of Mean
Sublingual Misoprostol	Parity	Nulli para	19	8.34	**0.41**	**0.09**
		Primi Para	13	8.15	0.59	0.16
		Multi Para	74	8.70	0.79	0.09
	Pregnancy	Early pregnancy failure	22	8.64	0.77	0.17
		Non-Pregnant	84	8.55	0.74	0.08
Vaginal Misoprostol	Parity	Primi Para	8	7.88	0.23	0.08
		Multi Para	88	8.07	0.40	0.04
	Pregnancy	Early Pregnancy failure	22	8.02	0.33	0.07
		Non-Pregnant	84	8.01	0.42	0.05

Table No 4: Side Effects and Complications of Both Groups

Side Effects and complications	Sublingual Misoprostol Group A	Vaginal misoprostol Group B
Uterine bleeding	4	3
Uterine cramping	6	3
Nausea	4	1
Vomiting	-	-
Diarrhea	-	-
Shivering	1	-
Cervical tear	-	-
Repaired cervix	-	-
Uterine perforation	-	-
False tract formation	-	-

group, 7.25 mm (SD 2.09) was not statistically significant. In our study, the mean age of the patients in group A was 38. 99±

7.82, and in group B, 37.97±7.30. The mean parity in the sublingual group was 2.98± 2.32, and in the vaginal group was 3.05±1.67. The difference in ages and parity is because we studied the effect of sublingual misoprostol on both pregnant and non-pregnant, reproductive-aged and post-menopausal women.

Young Lee compared the effects of sublingual, vaginal, and oral misoprostol on cervical ripening before hysteroscopy in premenopausal women. [12] Misoprostol was given either orally or vaginally 6-8 hours before surgery and sublingual 2-4 hours before surgery. The three groups were comparable in terms of age, BMI, gravidity, and parity. The pre-operative cervical with (sublingual 7.5

± 2.0mm), oral (7.5 +1.9mm), and vaginal (7.6 + 2.4mm) were statistically

Similar among the three groups. The time to Hegar's number 10, side effects, and complications during hysteroscopy were also comparable among the three groups. In our study, the mean uterine size was 10.83± 1.80 in the sublingual group and 9.95±1.81 in the vaginal group. The mean pre-procedural cervical width in group A is 8.57± 0.74 and in group B, 8.01± 0.41. This study was conducted in premenopausal women, which is why the mean pre-procedural cervical width is less as compared to ours, where most of our patients were in the reproductive age group.

Shagufta et al. studied the effects of sublingual, vaginal, and oral misoprostol before surgical evacuation in 150 patients.[15] 400 micrograms were administered 3-4 hours before surgical evacuation in sublingual and vaginal groups and 12 hours in the oral group. Cervical ripening was significant in the sublingual and vaginal route as compared to the oral route (P< 0.01). Naheed H Mohammad conducted a 3-year study on the use of vaginal and sublingual misoprostol before insertion of an IUCD in women who previously had a cesarean section.[18] In the study use of misoprostol in a dose of 400 micrograms vaginal or sublingual before IUCD insertion was found to be associated with successful insertion on the first attempt in 94% in the vaginally administered group and 97% in the sublingual group (P= 0.498).

There was no statistically significant difference between both groups regarding perforation, heavy bleeding, difficulty of insertion, and vasovagal reaction. Hassan H et al. found that the severity of pain during and 30 minutes after the procedure of hysterosalpingography using a visual analog scale was significantly reduced in patients who received sublingual misoprostol.[19,20] In our study, sublingual misoprostol was given before IUCD insertion and HSG in 7 and 3 cases, respectively, and in the vaginal group, misoprostol was given in 4 cases of IUCD insertion. Misoprostol given for cervical softening is extremely beneficial in these cases, that is, before IUCD, Mirena insertion, and before HSGs, as these can easily be performed as outpatient procedures without the need for anesthesia and by giving minimal discomfort to the patients.

Udhayakumary studied and compared the efficacy of 400 micrograms of misoprostol given vaginaly or sublingually 3-4 hours before minor gynecological procedures in both pre and post-menopausal women. [21]Cervical dilatation in sublingual group was 7.28 ± 2.21 mm and 6.57±

2.24 mm in the vaginal group. Side effects were comparable between the two groups. In our study, the effect of sublingual and vaginal misoprostol on preprocedural cervical width did not show a striking difference in nulliparous and multiparous women and on pregnant and non-pregnant uteri shown in Table no 3.

Shveta et al. found out that the preoperative use of sublingual misoprostol is effective in reducing the need for analgesia and anesthesia for gynecological procedures in a rural hospital. [22] Mean post-intervention cervical dilatation was (9.08 ± 0.888) in the study group of 200 micrograms of sublingual misoprostol 2 hours before the intrauterine procedure, which was more than the control group 2.08± 0.07 in the study group, which was less than in the control group. The mean time required for cervical dilatation was 36± 11.19 (p 0.05), which was less than in the control group, 75.50 ± 4.43. One mg of folic acid was given 2 hours before the procedure in the placebo group. Anesthesia was required in 25% of women in the study group and 100% in the control group. In our study. We gave sublingual misoprostol in 6 cases and vaginal misoprostol in 7 cases of diagnostic Hysteroscopies. Around the world, these procedures are performed as outpatient procedures. [23, 24] We have started it recently and are

Doing it under anesthesia. Sublingual misoprostol reduces procedure-related complications such as the formation of false tracts, cervical tears, and uterine perforations.

Monika Sharma conducted a study on 221 pregnant women for first-trimester pregnancy termination[25]. Sublingual misoprostol was given 3 hours before suction evacuation in the study group, and direct Suction evacuation was done in the control group. In the study group, 10.74% complained of pain hypogastrium, and in the control group (20%) had pain (P 0.04). Bleeding

>75ml occurred in 23.14% in the study group and 34% in the control group. In the study group vs control group incidence of vomiting (4.88 vs. 8%), Diarrhea (8. 26 % vs. 2%), and vaginal bleeding (7.44 vs. 2%) was more in the study group.

Bhakti found that the incidence of nausea and abdominal pain was significantly higher in the sublingual group as compared to the vaginal group (P < 0.05) chills or shivering was a frequent side effect noted in 40% of participants in the sublingual group, whereas only 8% in vaginal group. [11] Other side effects observed were fever and diarrhea, which were found to be similar in both groups. No complications like uterine perforation, cervical injury, or excessive hemorrhage were seen. Mean blood loss during the procedure in the sublingual was 40.32 ml (SD 11.14 ml) and 50.66 ml (SD 12.13) in the vaginal group (p<0.01).

Various studies show that with oral misoprostol use, nausea, vomiting, and diarrhea frequency was much higher as compared to sublingual and vaginal use of misoprostol. [26-28] In two studies, these gastrointestinal complaints were seen in the frequency of 23.3%, in the oral group, with the sublingual group at 8.4%, and in the

vaginal group at 3.3%, P =0.052.[29, 30] In our study complications rate was low both with sublingual and vaginal use of misoprostol.

CONCLUSION

Sublingual misoprostol is an effective and safe agent for cervical ripening and dilatation before minor gynecological procedures. Less pain is perceived by the patient as there is no need for cervical dilatation. The effect of sublingual misoprostol on preprocedural cervical width is more as compared to the same dose of vaginal misoprostol and showed a significant difference, p-value 0.001. The vaginal route of administration is not acceptable to all women, and many, especially in Asian countries, prefer oral medication as compared to vaginal preparation.

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Authors Contribution:

Following authors have made substantial contributions to the manuscript as under

Authors	Conceived & designed the analysis	Collected the data	Contributed data or analysis tools	Performed the analysis	Wrote the paper	Other contribution
Mazhar T	✓	✓	×	×	✓	×
Bukhari N	✓	✓	×	✓	✓	×

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Ethical Approval:

This Manuscript was approved by the Ethical Review Board of Khyber Teaching Hospital. Vide No. 890/DME/KMC. Dated: 24 08 2021

ORIGINAL ARTICLE

ASSOCIATION OF MATERNAL AND NEONATAL RISK FACTORS OF NEONATAL SEPSIS- A DESCRIPTIVE STUDY IN A NEONATOLOGY UNIT

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ABSTRACT

OBJECTIVE: To determine the association of maternal and neonatal risk factors of neonatal sepsis with culture-proven sepsis.

Materials And Methods: It is a cross-sectional study conducted in Lady Reading Hospital Peshawar Neonatology Department Peshawar KPK. The study duration was 6 months, from 1st September 2022 to 28th February 2023. A sample size of 208 was taken. All the neonates admitted to the NICU with clinical signs and symptoms of sepsis were included in the study and later confirmed by positive blood cultures. The signs and symptoms include neonates with fever, lethargy, reluctance to feed, hypothermia, convulsions, grunting, jaundice, and abdominal distention. All neonates were enrolled in the study after approval of the Institutional Ethical Board. Informed consent was taken from parents.

Results: The highest frequency of presenting complaints was reluctance to feed and lethargy 19.7% of newborns had died because of sepsis. 79.3% of sepsis was seen in preterm. The mean age at admission was(N=208) 4.1 days ±5.1 SD, and the mean weight was 2.96 kg±0.68 SD. The clinical characteristics of neonates with neonatal sepsis 75% were reluctant to feed, 15.9% had convulsions, 26% had severe jaundice, and 73.6% were sedentary. 20.7% had a preterm birth, while 35.6% weighed less than 1.5kg with an APGAR score of less than 7 in 77.4% of neonates. The mean days of treatment in the NICU were 9.0 days ±8.44 SD. Males were predominantly affected, with a frequency of 71.2%, and females 28.8%. Among the different risk factors like crowded family, place of delivery, gestational age at birth, and birth asphyxia, birth asphyxia had a significant relationship with neonatal sepsis.

Conclusion: Neonatal sepsis remains the leading cause of neonatal mortality. Our study established that both neonatal and maternal risk factors play a pivotal role in the diagnosis of neonatal sepsis, with a strong impact on maternal antenatal care as well.

Keywords: Neonatal Sepsis, Culture-Proven Sepsis, Neonatology

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INTRODUCTION

Neonatal sepsis is defined as systemic inflammatory response syndrome secondary to any infection. [1] Neonatal sepsis is the leading cause of mortality in neonates, with an estimated incidence of 3 million cases occurring worldwide. [2] Sepsis is responsible for 30-50% of all neonatal deaths occurring each year in developing countries.[3] Neonatal sepsis manifests itself in the form of poor feeding, lethargy, vomiting, hypothermia, cyanosis, distress, and tachypnea. [4] The source of the causative pathogen may be acquired from the intrauterine origin but also maternal flora, hospital, or community. [5] Prematurity is a compounding factor and prolonged hospital stay. [6, 8] of these neonates add to the misery. [7] Premature rupture of membranes for more than 18 hours and maternal fever are two other important risk factors. The diagnosis of neonatal sepsis is based on different markers, the gold standard being blood culture. [8] The causative organisms, most of the time, are gram-negative bacteria. [9, 10] Acinetobacter, Escherichia coli, coagulase genitive Staphylococcus aureus, and Klebsiella pneumoniae are the commonly isolated organisms causing neonatal sepsis, with gram-negative sepsis causing the highest mortality. [11,12]

Our study aims to look for any preventable causes of neonatal sepsis based on these risk factors and to establish the etiology of neonatal sepsis based on the causative organisms isolated, which are causing mortality in our tertiary care hospitals.

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MATERIALS & METHODS

It is a cross-sectional study conducted in tertiary care hospitals, i.e., Lady Reading Hospital Peshawar Neonatology Department Peshawar KPK. The study duration was 6 months, from 1st September 2022 to 28th February 2023. The sample size was determined by using a single population proportion formula from Open Epi version 3.01 and from the previous literature in South Asia, which showed a prevalence of 15.8%[13]. The sample size of 208 was calculated using. Taking a 95% confidence interval, 5% margin of error, and prevalence of 15.8%. [13] All the neonates admitted to NICU with clinical signs and symptoms of sepsis were included in the study and later on confirmed by positive blood cultures. The signs and symptoms include neonates with fever, lethargy, reluctance to feed, hypothermia, convulsions, grunting, jaundice, and abdominal distention. Neonates with negative culture results were excluded from the study. All neonates were enrolled in the study after approval of the Institutional Ethical Board. Informed consent was taken from parents.

About 1 to 3 ml of blood was collected from neonates after cleaning the prick site with povidone-iodine solution, put in Bactec Plus culture bottles, and transported to the laboratory at 2-24c. The samples were analyzed for growth for 72 hours, and if no growth was obtained within this time, a second reading was taken after 10 days maximum.

Data was collected prospectively from the HMIS system regarding blood culture results. Separate questionnaires were used to document all the risk factors and outcomes of neonates with clinical signs and symptoms of sepsis. In culture-negative patients who were still hospitalized and sick, repeat blood cultures were taken. All the babies were followed up till the outcome, which was discharge or death. If the death of the neonate occurred before culture, the culture result will be followed in the HMIS system to see if the death was due to sepsis. Data was analyzed using SPSS-22.

RESULTS

The Prevalence of sepsis in this study was 20%. The frequency of different admitting complaints in newborns with sepsis in the NICU is shown in Table 1. The highest frequency of presenting complaints was reluctant to feed and lethargy. 19.7% of newborns had died because of sepsis. 79.3% of sepsis was seen in preterm. The mean age at admission was(N=208) 4.1 days ±5.1 SD, and the mean weight was 2.96 kg±0.68 SD. The clinical characteristics of neonates with neonatal sepsis 75% were reluctant to feed, 15.9% had convulsions, 26% had severe jaundice, and 73.6% were sedentary. 20.7% had a preterm birth, while 35.6% weighed less than 1.5kg with an APGAR score of less than 7 in 77.4% of neonates. The mean days of treatment in the NICU were 9.0 days ±8.44 SD. Males were predominantly affected, with a frequency of 71.2%, and females 28.8%. Among the different risk factors like crowded family, place of delivery, gestational age at birth, and birth asphyxia, birth asphyxia had a significant relationship with neonatal sepsis. Table. 2

DISCUSSION

In developing countries, the identification of both neonatal and maternal risk factors guides towards early diagnosis of neonatal sepsis.[14, 15] We conducted our study was conducted over six months on 208 neonates with culture-positive sepsis; about 180 cases reported as negative were excluded from the study. The disease prevalence from our study was 20%, as compared to 13.58% from Kabul[16] 82% from Ghana[17] 15% from Nepal[18],69.36% Bangladesh.[19]

After treatment, 80.3% of neonates recovered from illness and were sent home with a mean hospital stay of 9.0 days, and 19 % unfortunately died. The results were comparable to Arifzai et al.[16], with 86.66% alive and 13.33% dead. Throughout the world, preterm deliveries contribute to 28% cause of neonatal deaths, While Sah R et al. reported a death rate of 7.6%, alive being 92.4%.[20]

Male babies with sepsis were 70.2 % compared to 49% from Shahzad et al. [21] and 44% from Arifzai et al. [16] The odds ratio for the male gender was 1.3 by Murthy et al.[14,] and it was also reported as significant by Agnche Z et al. [1]

Prematurity and birth weight had some association with neonatal sepsis. Low birth weight babies were 13%, while very low birth weight (VLBW)babies were 35.6% in our study. Low birth weight association with sepsis was also significant in studies done by Yadav et al.[22], Nyma Z et al.[19,] and Amin SE et al.[23] and showed an association with neonatal sepsis. The 40% of neonates were premature, and the odds ratio for prematurity was 0.43 as compared to the odds ratio of 2 by Murthy et al. [14]. The frequency was comparable to Yadav et al. [22] but was less as compared to Amin SE et al. [23] and Shahzad et al. [21]. Very low birth neonates although not the highest incidence of infection in this study it has the highest morbidity and mortality. The increasing survival of extremely immature infants has resulted in a cohort of infants at prolonged risk for acquired infection.

PROM was present in 7.2% of cases in our study with a P value of 0.4, while it was highly significant in studies by Adatara et al.[24], Murthy et al. [14]and Salamer B et al.[25]

CPR at birth has a p-value of 0.004, as reported by Adatara et al. [24,] while in our study, it was 1.

Maternal fever was present in 14 % of cases while 64.9%for another study done in Pakistan[21] and 22.66% for Kabul[16] and reported as highly significant by Nyma Z et al.[19] In this study, home delivery and maternal fever history

Table No 1: The frequency of different admitting complaints in newborns with sepsis in the NICU

Variable	Categories	Frequency	Percentage
Gender	Male	148	71.2
	Female	60	28.8
Place of Delivery	Home	86	41.3
	Hospital	122	58.7
Premature Rupture of membrane	Yes	16	7.7
	No	192	92.3
Chorioamnionitis	Yes	2	1
	No	206	99
Birth Asphyxia	Yes	47	22.6
	No	161	77.4
Gestation	<30	8	3.8
	30-35	38	18.3
	>35	162	77.9
Weight of baby	<3 kg	135	64.9
	>3 kg	73	35.1
CPR	Yes	10	4.8
	No	198	95.2
Maternal Fever	Yes	32	15.4
	No	176	84.6
Crowded Family	Yes	51	24.5
	No	157	75.5
Vomiting	Yes	98	47.1
	No	110	52.9
Jaundice	Yes	54	26
	No	154	74
Lethargy	Yes	153	73.6
	No	55	26.4
Hypothermia	Yes	123	59.1
	No	85	40.9
Convulsions	Yes	53	15.9
	No	175	84.1
Reluctant To Feed	Yes	156	75
	No	52	25
Culture proven sepsis	Yes	181	87
	No	27	13
Blood Culture	No Growth	27	13
	Klebsiella	71	34.1
	pseudomonas	7	3.4
	E coli	63	30.3
	Acenobacter	8	3.8
	Citrobacter	29	13.9
	Streptococcus	2	1
	Staph aureus (MRSA)	1	0.5
Outcome	Alive	169	81.3
		39	18.8

Table No 2: The relationship of risk factors with neonatal sepsis

Variable	Categories	Culture proven sepsis		P value
		No	Yes	
Gender	Male	77.8	70.2	0.5
	Female	22.2	29.8	
Place of Delivery	Home	37	42	0.68
	Hospital	63	58	
Premature Rupture of membrane	Yes	11.1	7.2	0.4
	No	88.9	92.8	
Chorioamnionitis	Yes	0	1	1
	No	100	98.9	
Birth Asphyxia	Yes	1.4	21.2	0.15
	No	88.9	75.7	
Gestation	<30	3.7	3.9	0.8
	35-30	22.2	17.7	
	>35	74.1	78.5	
Weight of baby	<3 kg	66.7	64.6	1
	>3 kg	33.3	35.4	
CPR	Yes	3.7	5	1
	No	96.3	95	
Maternal Fever	Yes	1.4	13.9	0.77
	No	88.9	84	
Crowded Family	Yes	18.5	25.4	0.6
	No	81.5	74.6	
Vomiting	Yes	55.6	45.9	0.4
	No	44.4	54.1	
Juandice	Yes	14.8	27.6	0.2
	No	85.2	72.4	
Lethargy	Yes	10.1	63.5	0.8
	No	22.2	27.1	
Hypothermia	Yes	66.7	58	0.5
	No	33.3	42	
Convulsions	Yes	18.5	15.5	0.77
	No	81.5	84.5	
Reluctant To Feed	Yes	66.7	76.2	0.3
	No	33.3	23.8	

at the time of birth and home delivery did not contribute to neonatal sepsis. A low APGAR score has a P value of 0.15, while for Yismaw AE[26,] it was 2.69, and for Nyma Z et al.[19] 3.37% and also reported as a significant factor associated with sepsis by Rafi MA et al.[11]

Sepsis was common in hospital-born neonates in our study, as against Murthy et al. [14], where out-born neonates had an OR of 5.5. Late-onset neonatal sepsis (LOS) in preterm infants is an important cause of morbidity and mortality in preterm infants. Since presenting symptoms may be non-specific and subtle, early and correct diagnosis is challenging.

Klebsiella pneumonia, pseudomonas aeruginosa, E. coli, Acinobacter, Citrobacter, streptococcus, and Staph aureus were among the bacterial growths obtained with respective frequencies of Klebsiella obtained in 34.1% of babies, E. coli 30.3 %, Citrobacter 13.9 %, and Acinobacter in 3.8 % of babies. Similar growths were obtained in other developing countries like Nepal,[18,20,27,28], India[29], and Bangladesh. [11]

CONCLUSION

Neonatal sepsis remains the leading cause of neonatal mortality. Our study established that both neonatal

and maternal risk factors play a pivotal role in the diagnosis of neonatal sepsis, with a strong impact on maternal antenatal care as well.

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Authors Contribution:

Following authors have made substantial contributions to the manuscript as under

Authors	Conceived & designed the analysis	Collected the data	Contributed data or analysis tools	Performed the analysis	Wrote the paper	Other contribution
Zahoor F	✓	×	✓	×	✓	×
Parvaiz H	✓	✓	×	✓	✓	×
Shoaib M	×	✓	×	×	✓	×

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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ORIGINAL ARTICLE

RISK FACTORS FOR SURGICAL SITE INFECTIONS IN PEDIATRIC PATIENTS: A CROSS-SECTIONAL STUDY

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ABSTRACT

Objective: To find out the prevalence of surgical site infections (SSI) after laparotomies in the pediatric population and associated factors at Children's Hospital Lahore, Pakistan.

Materials and methods: This cross-sectional study was conducted in the Department of Pediatric Surgery, University of Child Health Sciences Lahore, from February 2021 to January 2022, in which 156 children were admitted to the hospital. Fifty-two participants were separated into three subgroups based on the duration of the operation. SPSS 25 was used to investigate the associations between different variables using Chi-square tests. Data were recorded into a prepared proforma.

Results: Out of 156 patients, 105 (67.3%) were male and 51 (32.7%) were female, with a mean age of 44.85 ±41.3 months. Both elective and emergency abdominal laparotomy patients were included in the study. Among them, 62.2% (97 cases) of surgical procedures were elective, while 37.8 % (59 cases) were emergency procedures. According to the type of the wound, 32.1 % of all surgeries were classified as clean, while 67.9 % were classified as clean-contaminated. Surgical site infection was diagnosed in 16 children, giving an incidence rate of 10.3%.

Conclusion: This study revealed that by reducing the average operating time to less than two hours, shortening hospital stays, providing more focused post-operative care for wounds, using drains more selectively, and correcting hemoglobin levels, we can reduce the SSI rate to a more acceptable level.

Keywords: Surgical site infections, Wound infection, Prophylactic antibiotic, Emergency laparotomies, Operative time

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INTRODUCTION

Surgical site infection (SSI) is defined as an infection that occurs after surgery in the part of the body where the surgery took place. [1] SSI can be superficial, deep, or in the organ space. [2]may result in more severe clinical disease and may have different risk factors when compared to superficial SSIs. Machine learning (ML SSIs are the most common healthcare-associated infection in surgical patients and a major cause of postoperative morbidity. Among laparotomy patients, the SSI rate is 25-40% higher compared to other surgeries. SSIs lead to longer hospital stays, increased costs, and a greater risk of mortality. [3]

Despite improvements in infection control, SSIs following laparotomies remain problematic. SSI risk is influenced by multiple procedure-related and patient-related factors. Longer operative duration is an established independent risk factor for SSI, with prior studies showing infection risk doubles for each hour of surgery. [4] However, the specific relationship between operative time and SSI remains unclear. [5]

While risk factors for surgical site infection are established in adults, data is lacking for pediatric populations. [6] Co-morbid conditions like diabetes, hypertension, ischemic heart diseases, etc, result in increased incidence of SSIs in adults. [7] These comorbidities are absent in children, and the influence of operative time and age is not well studied. More research on pediatric-specific risk factors is needed to guide prevention strategies. [8]

This study is designed to determine the prevalence of SSIs in pediatric patients undergoing laparotomies. This study also aims to identify risk factors for surgical site infection in pediatric laparotomy patients. Recognizing modifiable risks could inform prevention strategies to reduce infection rates, improve outcomes, and lessen the clinical, economic, and psychological burden of surgical site infections on patients, families, and the healthcare system.

MATERIAL AND METHODS

It is a cross-sectional study conducted at the

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Department of Pediatric Surgery, Children's Hospital, Lahore, from February 2021 to January 2022. Patients aged 1 month to 14 years, either gender, who presented in the outdoor department or emergency department for surgical conditions requiring laparotomy with clean or clean contaminated wounds were included in the study. Approval from the Institutional Review Board was taken before conducting the study. Informed written consent was obtained from each patient for inclusion in the study. A total of 156 patients were selected by purposive nonprobability sampling technique and were divided into three groups based on the duration of surgery.

Group A if operative time < 1 hour

Group B if operative time between (1-2) hours

Group C if operative time > 2 hours

All patients who had undergone surgery outside our hospital, patients with tumors, and those whose parents did not give consent were excluded from the study. The institute's standard approach for infection prevention was followed during all elective and urgent surgical procedures. All patients were given an antiseptic bath and antiseptic skin preparation before elective surgery. Prophylactic antibiotics were given to all patients. Typical sterilization and disinfection procedures were carried out. Patients were discharged from the hospital as early as possible after surgery to prevent SSI. All demographic and study-specific information was recorded in a preformatted form. Data were analyzed from admission to hospital discharge and up to 30 days of follow-up visits for each patient. The data was entered into SPSS version 25.0. First, the mean and standard deviation for quantitative characteristics like age were calculated. We calculated the frequency and proportion of qualitative variables, including gender, SSI, and risk factors. Data was presented using tables for both quantitative and qualitative variables. Finally, the correlation between risk factors and SSI was examined using the Chi-square test. P-values of 0.05 were regarded as significant at a 95% confidence interval.

RESULTS

The mean age of patients was 44.85±41.3 months. The rate of surgical site infection (SSI) was 12% in infants, 5.1% in toddlers, 16.7% in preschoolers, and 9.3% in school-age children. There was no significant difference in SSI rate between the age groups (p=0.459).

Males accounted for 67.3% of the study population, while females accounted for 32.7%. The SSI rate was 12.4% in males and 5.9% in females, which was not significantly different (p=0.206). This indicates gender was not associated with SSI risk.

Among the 156 cases, 62.2% were elective surgeries, while 37.8% were emergency procedures. The SSI rate was 12.4% with elective surgeries and 6.8% with emergency surgeries, showing no significant difference (p=0.264).

Longer operative times resulted in more SSIs, as shown in Table 1. Group C had a significantly higher SSI incidence with p=0.001 (Table 1) Furthermore, most SSI cases were superficial rather than deep (p=0.031). See Table 2 for details.

Of all surgeries, 32.1% were classified as clean and 67.9% as clean-contaminated. The surgical site infection (SSI) rate was 4% in clean cases and 13.2% in clean-contaminated cases. However, this difference was not statistically significant (p=0.077).

The mean hospital stay was longer in patients who developed SSI (8.125 ± 3.222 days) compared to those without SSI (5.336 ± 2.673 days). This difference was statistically significant (p=0.004), indicating prolonged hospitalization is a risk factor for SSI.

Drains were utilized in 45 procedures, while 111 operations did not use drains. The surgical site infection (SSI) rate was higher when drains were used (15.6%) compared to when drains were not used (8.1%). This suggests drain usage may increase SSI risk. When analyzed by surgical groups, the SSI rate in group C was 23.3% with drains versus 18.2% without drains. All groups showed numerically higher SSI rates with drain use compared to no drains. This difference was statistically significant, with p=0.042. The use of peritoneal drains appears to be associated with an increased rate of surgical site infections compared to not using drains across all surgical groups.

In terms of the hemoglobin level and surgical site infection, it was revealed that when the hemoglobin level was less than 10mg/dl, the rate of surgical site infection was highest (22.2%). The infection rate fell to 7.9% when the hemoglobin level was between 10 and 12 mg/dl. The rate of SSI further declined (7.5%) when the hemoglobin level was above 12 mg/dl. The level of hemoglobin appears to affect surgical site infection regardless of the group. The hemoglobin level had a significant impact on surgical site infection in all groups, with a P-value of 0.006, as shown in (Table 4). Other risk factors for SSIs included delayed presentation of more than 48 hours and colorectal surgeries.

DISCUSSION

Surgical site infections are the most common hospital-acquired infection globally, causing increased morbidity, mortality, costs, and length of stay. [9] SSI rates vary widely between countries and specialties based on patient factors, infection control practices, and institutional environments. [10] This study's 10.3% SSI rate in clean and clean-contaminated surgeries is comparatively lower than other reports. [11, 12] Because we only included clean and clean-contaminated cases in our research, the SSI was lower; however, it may have been higher if we included contaminated and dirty cases as well.

The most common type of SSI was superficial (9.6%), followed by deep SSI (0.6%). These findings are also consistent with those found in the literature, which indicates that superficial SSI is the most common kind of SSI to be encountered. [13]

Table No 1: Stratification of Operative time with SSIs

Group	Surgical site infection		Total	P-value
	YES	NO		
A	2	50	52	**0.001**
	3.8%	96.2%	100.0%	
B	3	49	52	
	5.8%	94.2%	100.0%	
C	11	41	52	
	21.2%	78.8%	100.0%	
TOTAL	16	140	156	
	%10.3	89.7%	100.0%	

Table No 2: Stratification of operative time with type of SSIs

	SSI CLASSIFICATION			TOTAL	P value
	SUPERFICIAL	DEEP	**No SSIs**		
A	2 (3.8%)	0 (0.0%)	50 (96.2%)	**52 (100.0%)**	**0.031**
B	3 (5.8%)	0 (0.0%)	49 (94.2%)	**52 (100.0%)**	
C	10 (19.2%)	1 (1.9%)	41 (78.8%)	**52 (100.0%)**	
Total	15 (9.6%)	1 (0.6%)	140 (89.7%)	**156 (100.0%)**	

Table No 3: SSIs and Length of stay in hospital

Surgical site infection	N	Mean	Std. Deviation	Std. Error Mean	P value
Yes	16	8.1250	3.22232	.80558	0.004
No	140	5.3357	2.67310	.22592	

Table No 4: Stratification of SSIs with the level of hemoglobin.

Hemoglobin level	Overall SSIs	Group A SSIs	Group B SSIs	Group C SSIs	P-Value
<10 mg/dl	%22.2	%12.5		%40	0.004
12-10 mg/dl	%7.9				
>12 mg/dl	%7.5	%0		%18.8	

The type of surgical wound has a direct relationship with the risk of wound infection. It is based on the amount of bacterial load and the possibility of bacterial contamination of the tissues at the time of operation. [14] Our research also found a link between the kind of operation and the SSI, which was also reported by other workers. [3] In our study, the rate of SSI in clean wounds was 4%, whereas the rate of SSI in clean-contaminated cases was 13.2%. The greatest incidence of surgical site infections (SSIs) is reported in gastrointestinal surgery, particularly colorectal surgery. [15] In our study, laparotomies performed on patients with colorectal abnormalities, such as Duhamel pull-through for Hirschsprung's disease and stoma reversal for anorectal malformation, resulted in 75 % of infections.

Emergency surgeries often have higher SSI rates compared to elective procedures due to inadequate preparation, potential sterility breaches, existing infections, and compromised immunity.[16] However, this study found no significant SSI difference between emergency and elective operations, possibly because elective cases had longer durations and more colorectal procedures leading to wound contamination. Also, efforts were made to optimize patients and adhere to sterilization protocols regardless of urgency. [17]

Prolonged operative duration is an established risk factor for surgical site infection (SSI). [18] This study found surgeries over 2 hours had significantly higher SSI rates ($p=0.001$), aligning with prior research showing doubled infection risk with operations over 2 hours.

Extended preoperative hospitalization is also associated with a higher infection rate.[19] In our research, patients who acquired SSIs had a significantly longer mean hospital stay than those who did not develop SSIs. ($p<0.004$). In our research, surgical site infection rates tended to rise with the hospital stay, as no surgical site infection was found in children with a two-day hospital stay. But in the 5-day hospital stay, patients' surgical site infection rate was 2.7%. The SSI prevalence rose to 22.2% among children with 10-day hospitalization. These findings are backed by several previous studies. [20,21] The length of stay of patients in hospitals is a significant ele-

ment in driving up the expenditures and strain on medical institutions in developing countries. The medical and financial burden imposed by SSIs necessitates the implementation of effective infection control methods in undeveloped countries. [22]

In this study, a presentation delay over 48 hours was associated with a 30% increase in SSI. Other studies also show increased SSI with late presentation. The SSI increase is likely due to bowel complications like gangrene and peritonitis, causing contamination and converted wound class. Besides increasing SSI risk, delayed presentation necessitates more complex surgery. Efforts to improve access to care could help reduce late presentation and subsequent SSI rates in developing settings. [23]

In terms of hemoglobin levels and surgical site infection, it was observed that the incidence of surgical site infection was highest when the hemoglobin level was less than 10mg/dl (p-value- 0.079). Many studies from various parts of the world have clearly described the relationship between anemia and surgical site infection in surgical patients. [24] A study by Liu et al. conducted on patients undergoing elective colorectal surgery showed similar findings, indicating that patients with anemia experienced a greater risk of incisional SSI than non-anemic patients. (12% versus 6%, P = 0.04). [25]

To prevent the development of abscesses or hematomas following surgery, surgical drains are frequently used. Patients with drains placed in the peritoneal cavity had a greater rate of SSI in our study, which is consistent with earlier research on this topic conducted globally. [26] Surgical site infections occurred in 15.6 % of patients who had a drain placed in the peritoneal cavity, compared to 8.1 % of patients who did not have a drain. Although the wound infection incidence was greater when the drain was used after laparotomy, across the spectrum of surgical fields, research evaluating the risk of SSI after post-operative drain placement has produced inconsistent findings. A few studies do reveal an increased incidence of SSI when drains are placed. However, these are typically associated with open drains and not with the use of closed suction drains. So far, no research has linked the use of drains to a lower risk of SSI. [26]

CONCLUSION

This study reveals that by reducing the average operating time to less than two hours, shortening hospital stays, providing more focused post-operative care for wounds, using drains more selectively, and correcting hemoglobin levels, we can reduce the SSI rate in developing countries to a more acceptable level.

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Authors Contribution:

Following authors have made substantial contributions to the manuscript as under

Authors	Conceived & designed the analysis	Collected the data	Contributed data or analysis tools	Performed the analysis	Wrote the paper	Other contribution
Rehan M	✓	×	✓	×	✓	×
Talat N	✓	✓	×	✓	✓	×
Abdullah F	×	✓	×	×	✓	×
Mirza B	✓	✓	✓	×	✓	✓
Ameer A	✓	✓	×	✓	✓	×

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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ORIGINAL ARTICLE

FREQUENCY OF DIABETES MELLITUS IN PATIENTS WITH LICHEN PLANUS-DATA FROM A TERTIARY CARE HOSPITAL

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ABSTRACT

Objectives: To determine the frequency of diabetes mellitus among patients diagnosed with lichen planus.

Material and methods: A six-month descriptive cross-sectional study was conducted at the Khyber Teaching Hospital after ethical approval. In this study, all patients diagnosed With Lichen Planus (LP) in the outpatient department who met the inclusion criteria were assessed. After a thorough examination, a phlebotomist collected 2 ml of venous blood from each patient for blood glucose level measurement at the hospital laboratory.

Results: Among the 139 enrolled patients, 59.6% were male and 42.4% were female. The mean age was 44.66 years, ± 11.81 SD. The frequency of diabetes mellitus was 17.3% in the patient cohort. The mean random blood sugar (RBS) level was 242.17 mg/dl ± 26.29 SD in Lichen Planus patients with diabetes mellitus (DM) and 109.21 mg/dl ± 20.25 SD in LP patients without DM (P<0.001). 36.5% of patients with a history of steroid use had DM, compared to only 27.8% of those without (p <0.001).

Conclusion: The study found the prevalence of diabetes mellitus in LP to be 17.3%, with a higher prevalence in patients who had a previous history of systemic steroid use.

Keywords: Blood Glucose, Diabetes Mellitus, Lichen Planus, Steroids

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INTRODUCTION

Lichen Planus (LP) is a chronic immune-mediated inflammatory disorder that affects various anatomical sites, including the skin, genital mucosa, hair, nails, and oral mucosa. [1] A quarter of LP patients may manifest without cutaneous symptoms. At the same time, nail involvement is observed in approximately 1-10% of the affected population. [2] The classic presentation of LP lesions includes pruritus, a firm texture, polygonal shape, violaceous color, planar papules/plaques, a shiny surface, and the presence of Wickham striae characterized by white lines. [3] Painful mucosal erosions contribute significantly to the morbidity associated with LP and entail an incidence of malignancy ranging between 0.5 to 2%. [4]

On histopathology, LP is characterized by hyperkeratosis without parakeratosis, hypergranulosis, sawtooth rete ridges, lymphocytic infiltrate along the dermo-epidermal junction, degeneration of the stratum basale, and the presence of apoptotic keratinocytes near the basal layer - irrespective of the subtype of distribution of LP. [5, 6] The disease predominantly affects middle-aged adults aged 30-60 and is rare among children, with females having a relatively higher incidence of LP compared to males. [1, 7, 8] Although no specific ethnic predilection has been recognized, recent studies have reported a higher incidence of LP in individuals of South Asian origin and African Americans, suggesting a genetic predisposition. [9, 10] Familial LP cases further support this idea, with a reported prevalence rate of 10.7% among individuals with a positive family history of LP. [11] Although the exact relationship between LP and diabetes remains unclear, evidence suggests a possible connection. Understanding LP's prevalence in diabetic patients is crucial for several reasons. Identifying its frequency may shed light on shared pathophysiological mechanisms or common risk factors, aiding diagnosis and management strategies. Diabetic patients with LP may face additional challenges, necessitating a multidisciplinary approach to care. LP could also indicate disease severity or complications in diabetics. Thus, studying LP prevalence in diabetes holds clinical and scientific value for advancing care and outcomes.

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MATERIAL AND METHODS

A descriptive cross-sectional study was conducted

at Khyber Teaching Hospital from November 8, 2021, to May 8, 2022. A total of 139 patients diagnosed with Lichen Planus were included, among whom a 10% prevalence of concurrent diabetes mellitus was observed. Participants were selected using a non-probability sampling approach. The sample size was determined using the WHO calculator, with a 95% confidence interval and a 5% margin of error. [16] To be eligible for participation, patients had to meet specific inclusion criteria: 1) Age between 30 and 75 years, 2) diagnosed cases of Lichen Planus based on clinical or histopathological findings, 3) both male and female sex, and 4) both out-patients and in-patients. Exclusion criteria consisted of 1) patients who were pregnant or had gestational diabetes, 2) patients with prior endocrinological conditions and hence at risk for development of DM,

After approval of the study proposal by the hospital's research and ethical committee (reference number: DME/1055/ KMC), all patients diagnosed with LP attending the outpatient department (OPD) who met the inclusion criteria were recruited for assessment after obtaining a written informed consent form. A general physical, systemic, and dermatological examination was conducted on each participant. A certified phlebotomist collected 2 ml of venous blood from each participant, which was tested for Random blood sugars and HbA1C levels. All data was recorded on a pre-designed proforma. Data was analyzed using the Statistical Package for Social Sciences (SPSS) version 22. The mean and standard deviation were calculated for numerical variables such as age, duration of LP, and blood sugar level. Categorical variables, including gender, systemic steroids, and diabetes mellitus, were analyzed in frequency and percentages. To assess potential effect modification, the proportions of patients with DM and concomitant LP were stratified based on age, gender, duration of diagnosis, and usage of systemic steroids. The statistical significance of associations was determined using a post-stratification chi-square test, with a significance level set at $p < 0.05$.

RESULTS

The study included 139 patients diagnosed with lichen planus, with a mean age of 44.66 years (±11.81), and the mean duration of LP in years was 5.16± 2.56. as shown in Table 1. The study further revealed that 17.3% (n=24) of the patients had DM, while 82.3% (n=115) did not have LP, as shown in Table 2. The mean random blood sugar (RBS) was 131.97mg/dl, with a standard deviation of 54.77 mg/dl. RBS level was 242.17 mg/dl with a standard deviation of 26.29 mg/dl in Lichen Planus (LP) patients with diabetes mellitus. In comparison, the mean RBS was 109.21 mg/dl, with a standard deviation of 20.25 in LP patients without diabetes mellitus. The difference in RBS level in these two groups was statistically significant ($p<0.001$). The results were further stratified based on gender, duration of lichen planus, and history of use of systemic steroids to ascertain further associations and a significant difference was noted in the prevalence of DM based on the history of steroid use with a P value of 0.001 as shown in Table 3.

The 139 patients selected for analysis were additionally stratified based on the systemic use of steroids. A total of 37 patients (26.6%) had a positive history of use of systemic steroids, whereas 102 (73.4%) denied the use of systemic steroids.

The table shows that 17.3% (24 out of 139) of the patients with Lichen Planus had diabetes mellitus, whereas the remaining 82.7% (115 patients) did not have diabetes. Table 3 shows that diabetes prevalence in Lichen Planus patients did not differ significantly based on gender (P = 0.32) or disease duration (P = 0.59). However, a significant association was found between systemic steroid use and diabetes (P = 0.001); 45.95% of patients with steroid use had diabetes, compared to only 6.86% without steroid use, suggesting that steroid use may increase the risk of diabetes in these patients.

Table No 1: Baseline characteristics of patients

Parameters	Mean or Frequency	Standard Deviation or Percentage
Age	**44.66 years**	11.81
Duration of Lichen Planus	5.16 years	2.50

Table No 2: Frequency of diabetes mellitus in patients with lichen planus.

Gender	Diabetes Mellitus		Total	P value
	Yes	No		
Males	16 (20%)	64 (80%)	80 (100%)	0.32
Females	8 (13.5%)	51 (86.5%)	59 (100%)	
Total	24 (17.3%)	115 (82.7%)	139 (100%)	

Table No 3: Stratification of diabetes mellitus in patients with Lichen Planus based on gender, duration of lichen planus, and steroid usage.

Gender	Diabetes Mellitus		Total	P value
	Yes	No		
<3 years	6 (14.6%)	35 (85.4%)	41 (100%)	0.59
>3 years	18 (18.4%)	80 (81.6%)	98 (100%)	
Total	24 (17.3%)	115 (82.7%)	139 (100%)	
History of Use of Systemic Steroids	Diabetes Mellitus		Total	P value
	Yes	No		
Yes	17 (45.95%)	20 (54.05%)	37 (100%)	.001
No	7 (6.86%)	95 (93.14%)	102 (100%)	
Total	24 (17.26%)	115 (82.73%)	139 (100%)	

DISCUSSION

Numerous epidemiological studies have described the correlation between diabetes mellitus and diseases such as Lichen Planus and hepatitis C. [12, 13] In our investigation, the observed frequency of diabetes mellitus among LP patients was 17.3%. This finding aligns with the systematic review and meta-analysis conducted by Otero Rey EM et al., which reported a prevalence range of 1.6% to 37.7% for diabetes mellitus in LP. [14] Atefi Net al. reported a prevalence of 20% diabetes in patients with LP in their study, further corroborating our results. [12] Conversely, Xue JL et al. purport in their study that the prevalence of DM in patients with LP was 11.6%, while Seyhan M et al. reported a higher percentage at 26.7%. [5, 13] Lastly, Varma K et al. concluded that the prevalence of DM in LP was 33%. [13] While certain studies confirmed our prevalence rates findings, others reported disparate percentages of diabetes mellitus prevalence in LP patients.

The difference in the frequency of DM was statistically significant amongst the analyzed groups, namely in patients with and without a history of steroid use (36.6% VS 27.8%, $p<0.001$). This finding suggests that steroid use may be a potential risk factor for the development of diabetes mellitus in LP patients. There also existed a numerically significant difference in the frequency of diabetes mellitus based on the length of LP diagnosis (18.4% in patients with LP duration >3 years VS 14.6% in patients with LP duration <3 years, $p=0.59$). However, this difference did not reach statistical significance, and further investigation is required to draw definitive conclusions on this association.

Age has been shown to display a correlation between Lichen Planus and diabetes. In our study, the mean age was 44.66 years ± 11.81 SD. Atefi N et al. conducted a study on the prevalence of diabetes mellitus in Lichen Planus and reported a mean age of 52.04 years. [12] Similar other studies reflecting the prevalence of diabetes mellitus in Lichen Planus were conducted across the globe as well. Xue JL et al. reported a mean age of 50.4 years, and Seyhan M et al. reported a mean age of 42.9 years, consistent with the results of our study. [19, 20] The age similarities between Lichen Planus occurrence in our sample and the global population suggest no significant factors accelerating or preventing this clinical occurrence in the studied area. Thus, these geographically based factors of the studied area may not significantly alter the age of incidence compared to the global population.

CONCLUSION

Our study found the frequency of diabetes mellitus at 17.3% in patients with lichen planus. Patients with Lichen Planus and a history of using steroids in the past have a higher prevalence of diabetes mellitus compared to those who did not use steroids. There appears to be a potential correlation between the duration of Lichen Planus and the likelihood of developing diabetes, but this relationship needs to be further explored.

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Authors Contribution:

Following authors have made substantial contributions to the manuscript as under

Authors	Conceived & designed the analysis	Collected the data	Contributed data or analysis tools	Performed the analysis	Wrote the paper	Other contribution
Ullah I	✓	×	✓	×	✓	×
Rashid F	✓	✓	×	✓	✓	×
Tareen A	×	✓	×	×	✓	×
Khan HA	✓	✓	✓	×	✓	✓

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Ethical Approval:

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ORIGINAL ARTICLE

LIPID ABNORMALITIES IN PATIENTS WITH TYPE 2 DIABETES MELLITUS AND THEIR CORRELATION WITH HBA1C LEVELS

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ABSTRACT

Objective: To determine the lipid abnormalities in patients with type 2 diabetes mellitus and correlate these to HbA1c levels.

Materials & Methods: This cross-sectional study was conducted at the Department of Medicine, Khyber Teaching Hospital Peshawar, for six months (from 1 January 2021 to 30 June 2021). The sample size calculated was 174 using the WHO software for sample size. A non-probability consecutive sampling technique was used for sample collection. All patients of both genders with established diagnoses of type 2 diabetes mellitus or newly diagnosed diabetic population who were over the age of 20 years were included in the study. Patients on lipid-lowering agents with chronic kidney disease, chronic liver disease, or congestive heart failure, pregnant women, and hypothyroid patients were excluded from the study. Data was analyzed using SPSS version 20.

Results: The mean age of the study sample was 50 ± 10.9 SD years. Eight-five (42.6%) were male and 115 (57.4%) were female. The mean age of males was 51.7 ± 9.8SD years and females was 48.6 ± 11.5SD years. The mean serum total cholesterol (TC) level was 183.7±51.6, the mean triglycerides (TG) level was 236.5±119SD, the mean low-density lipoprotein (LDL) level was 116±44.6SD, and the mean high-density lipoprotein (HDL) level was 38.5±9.2SD. The mean HbA1c level was 8.8±2.1SD. Mean HbA1c in both male and female populations was the same. HbA1c has a non-significant correlation with the gender of the population (P value >0.05)

Conclusion: Gender-based differences in lipid levels were not statistically significant. Poorly controlled diabetes was associated with elevated lipid levels, but the differences were not important. Notably, HbA1c was more closely linked to low BMI. The study found no significant correlations between HbA1c and BMI with lipid levels, while age was weakly correlated with serum cholesterol and LDL-C.

Keywords: Hyperglycemia, Diabetes mellitus, Dyslipidemia, HbA1c level, lipid Profile, Body mass index

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INTRODUCTION

Diabetes mellitus is a complex syndrome with disordered metabolism and hyperglycemia due to deficient insulin secretion or resistance to insulin accompanied by inadequate insulin secretion, affecting almost every system. According to the international diabetes federation, nearly 463 million (half a billion) individuals are suffering from diabetes mellitus, a significant worldwide health issue. One of the main causes of morbidity and death is diabetes, among communicable and non-communicable diseases, and nearly 5 million deaths occurred due to diabetes and diabetes-related complications in 2019. [1, 2] The International Diabetes Federation estimates that 26.7% of Pakistani adults were affected by diabetes in 2022, with over 33,000,000 cases in total. [3]

Lipids play a much more important, diverse, and widespread biological role in the body. Triglycerides (TG), low-density lipoproteins (LDL), high-density lipoproteins (HDL), and total cholesterol (TC) are among the significant lipids and lipoproteins.[4] Dyslipidemia is very common in diabetes mellitus and increases the likelihood of coronary artery disease and its sequelae. The management of serum lipid levels in the diabetic population is considered standard diabetic care. [5]

Abnormal patterns of lipoproteins can be either single or combination may be involved. [6] Dyslipidemia increases the influx of free fatty acid due to insulin resistance, which in turn is aggravated by raised levels of inflammatory adipokine. [7] The prevalence of dyslipidemia is continuously on the rise in developing countries due to the usage of a more refined diet, westernization of diet, sedentary and stressful lifestyle, obesity, stressful life, smoking, and more alcohol use. [8] In Pakistan, the prevalence

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of metabolic syndrome in the diabetic population was recorded as 46-75% in two studies. [9]

The rationale of this study was to identify lipid abnormalities in the diabetic population of Pakistan because early detection and treatment of dyslipidemia slow the progression of many complications of diabetes mellitus. We also wanted to assess whether there was any correlation between HbA1c levels and lipid levels of the diabetic population.

MATERIAL & METHODS

The study was conducted in the Department of Medicine, Khyber Teaching Hospital, Peshawar, over six months (01/01/2021 to 30/06/2021) using a cross-sectional study design. The sample size calculated was 174 as per WHO software for sample size determination. [10] Moreover, a non-probability consecutive sampling technique was used for sample collection. Ethical approval was granted by the institutional ethical committee.

The study included all patients, regardless of gender, who were over 20 years old and had either a newly diagnosed diabetes population or an established diagnosis of type 2 diabetes mellitus. Patients on lipid-lowering agents, patients with chronic kidney disease (CKD), chronic liver disease (CLD) or congestive heart failure (CHF), pregnant women, and hypothyroid patients were excluded from the study.

Fasting blood samples of all patients under study were collected in special kits and sent to the hospital laboratory for total cholesterol, triglycerides, LDL, and HDL. All other relevant investigations like renal function tests, liver function tests, fasting and random blood sugar, HbA1c, thyroid function tests, and total urine protein analysis were done. Demographic data like name, age, sex, and address of all patients was recorded. Underweight less than 18.5, normal weight equal to 18.5-22.9, overweight = 23-24.9, and obesity equal to and above 25 were the BMI categories as per Asian-specific BMI cutoff. [11] In our study, we have classified diabetic control as fair control (HbA1c $\leq$ 7) and poor control (> 7%).

Hypercholesterolemia was defined by the National Cholesterol Education Program Adult Treatment Panel (NCEP ATP III) as total cholesterol greater than 200 mg/dl, LDL when value >100 mg/dl, high TG when value >150 mg/dl and HDL when value was <40mg/dl.

One or more abnormal serum lipid concentrations from the aforementioned reference values were considered dyslipidemia. [12]

All data obtained from patients were recorded on a pre-formed questionnaire. Mean ± standard evaluation of the mean of all values was expressed. For correlation, the Pearson Chi-Square test was used, and a p-value of greater than 0.05 was considered significant. The analysis of the data was done with SPSS 20.

RESULTS

The mean age of all the participants was 50 ± 10.9 SD years. Eight-five (42.6%) were male and 115 (57.4%) were female. The mean age of males was 51.7 ± 9.8SD years and females was 48.6 ± 11.5SD years. The mean serum total cholesterol (TC) level was 183.7±51.6, the mean triglycerides (TG) level was 236.5±119SD, the mean LDL level was 116±44.6SD, and the mean HDL level was 38.5±9.2SD. The mean HbA1c level was 8.8±2.1SD. In comparison to their male counterparts, our female patients had insignificantly higher levels of triglycerides, total cholesterol, LDL, and HDL ($P > 0.05$). Mean HbA1c in both male and female populations was the same (Table 1).

The comparison of various variables reveals that, with a mean HbA1c of 8.8 ± 2.1, uncontrolled diabetes is linked with insignificantly elevated levels of total cholesterol, LDL-C, triglycerides, and HDL-C ($P > 0.05$). The mean BMI was lower in patients with poor diabetic control as shown in table 2 ($p=0.012$).

HbA1c and BMI did not significantly correlate with triglycerides, total cholesterol, LDL, and HDL, whereas age was weakly correlated negatively with serum Cholesterol and serum LDL-C ($r= - 0.254$ and -0.315, $p < 0.05$) (Table 3).

DISCUSSION

This study involved participants with a mean age of 50 ± 10.9 years, with a slightly higher representation of females. Gender-based differences in lipid levels were

Table No 1: Characteristics and lipid profiles of patients presented with type 2 diabetes

	Male	Female	Total
Age (years)	51.7 ± 9.8	48.6 ± 11.6	50 ± 10.9
HbA1c (%)	8.8 ± 2.2	8.8 ± 2.1	8.8 ± 2.1
Body Mass Index (kg/m^2)	26.9 ± 4.9	28.6 ± 6.1	27.9 ± 5.6
Triglycerides	231.8 ± 138.7	240.1 ± 104.3	236.5 ± 119.1
Total cholesterol	173.2 ± 38.8	191.5 ± 58.6	183.7 ± 51.6
LDL cholesterol	109.6 ± 26.6	120.8 ± 54.2	116.1 ± 44.6
HDL cholesterol	37.9 ± 8.6	39.0 ± 9.8	38.5 ± 9.2

Table No 2: Patients' lipid profiles when divided into two groups: HbA1c >7% (poor control) and ≤ 7% (fair control).

	HbA1c ≤ 7.0 %		HbA1c > 7.0 %		p-value
	Mean	SD	Mean	SD	
Age	48.6	11.4	50.3	10.8	0.617
BMI	31.2	6.4	26.9	5.0	0.012
Triglycerides	213.3	55.4	243.5	132.0	0.410
Total cholesterol	179.9	26.6	184.8	57.1	0.758
LDL cholesterol	103.2	25.8	119.9	48.4	0.222
HDL cholesterol	38.3	6.6	38.6	9.9	0.939

Table No 3: Correlation (r) of lipid profile with diabetic parameters

Lipid profile	HbA1c		BMI		Age	
	r	p	r	P	r	p
Serum Triglyceride	0.161	0.215	0.079	0.546	-0.215	0.96
Serum Cholesterol	-0.158	0.225	0.034	0.797	-0.254	0.048
Serum LDL-C	-0.079	0.544	-0.088	0.50	-0.315	0.013
Serum HDL-C	-0.110	0.397	-0.089	0.97	-0.089	0.494

insignificant ($p > 0.05$). Notably, high HbA1c was more closely linked to low BMI. The study found no significant correlations between HbA1c and BMI with lipid levels, while age was weakly correlated with serum cholesterol and LDL-C ($r= -0.254$, $p= 0.048$ and $r= -0.315$, $p= 0.013$, respectively). These findings emphasize the complex interplay between diabetes control, lipid profiles, and body weight in our population.

Obesity, as determined by the Body Mass Index (BMI), is a recognized risk factor for cardiovascular disease (CVD). The average BMI of the participants in our study was significantly lower than the mean BMI of the participants in Rauf et al., which were 28.7 kg/m^2 and 35.23 ± 4.42 kg/m^{2,} respectively. The subjects in a different study by Sonmez et al. had a mean BMI of 30.07 ± 4.04 kg/m^2, whereas, in our study, the subjects' mean BMI was low as it could be due to the study participants being diabetes patients. [13, 14]

The study by Rauf et al.[13] reported a mean total cholesterol of 214.38 ± 37.86 mg/dl, which is slightly higher than our data of 183.7 ± 51.6 mg/dl. Similarly, Ahmed et al. [15] found a mean of 211.91 ± 40.19 mg/dl, which is also higher than our study's mean total cholesterol of 183.7 ± 51.6 mg/dl. In term of the mean serum triglycerides by Rauf et al.[13], the mean serum triglycerides of the subjects were 160.80 ± 22.78 mg/dl, lower than our mean triglycerides of 236.5 ± 119.1mg/dl. The mean low-density lipoprotein (LDL) in our study was 116.1 ± 44.6 mg/dl, compared to the study by Ahmed et al. [15] and Rauf et al. [13], which was 131.82 ± 32.13 gm/dl and 134.06 ± 26.04 mg/dl respectively. The mean HDL in our study was 38.5 ± 9.2 mg/dl, which aligns with Ahmed et al. [15], where the subjects' mean HDL was 38.36 ± 8.10 mg/dl.

Glycated hemoglobin, or HbA1c, is a frequently used indicator for long-term glucose control due to its ease of use. Furthermore, it is an invariant test with negligible biological variability that remains unaffected by variables that could otherwise significantly influence glucose measurement. [16] The level of HbA1c anticipates complications from diabetes because it indicates more harmful glycation sequelae, such as nephropathy and retinopathy, due to toxic advanced glycation end products. [17]

Elevated HbA1c is now thought to be a distinct risk factor for CVD in people with or without diabetes, in addition to dyslipidemia. It has been demonstrated that in the diabetic population, the absolute HbA1c value increases the estimated risk of CVD by 18% for every 1% increase. Even in non-diabetic cases, a positive correlation between HbA1c and CVD has been shown, even when HbA1c is within the normal range. [18]

In our study, the mean HbA1c levels for both genders are roughly the same. However, the lipid profile is more abnormal in the female population. This finding is intriguing when compared to the theory that, in some way, HbA1c causes dyslipidemia. This is supported by a study by Christ et al. that shows a negative correlation between estrogen exposure and cardiovascular events, as well as LDL and non-HDL cholesterol. [19]

In our study, HbA1c was not significantly correlated with triglyceride, serum cholesterol, and LDL-C, which is supported by findings from Senthilkumar et al. [20], and Sultania et al.[21] A comparable study conducted by Naqvi et al. [22], produced some intriguing findings, suggesting that the risk of hypertriglyceridemia can be increased by 2.69% or 2.69 (OR=1.71-4.23, $p <0.001$) by either inadequate glycemic control or a high HbA1c. Compared to our study Singh et al. [23], in the Indian population, it could

be due to differences in our population, and in our study, all diabetes patients were taken compared to newly diagnosed patients in Singh et al.[23] study as patients with diabetes for a long duration could lead on down trends of lipid profile.

The pathophysiology of diabetic dyslipidemia is largely influenced by insulin resistance, as evidenced by the elevated free fatty acid release from fat cells resistant to insulin. Free fatty acids that enter the liver when there is glycogen present cause fatty liver because they increase the breakdown of apolipoprotein B and VLDL cholesterol as well as the production of triglycerides. In a similar vein, low HDL levels are linked to higher circulating insulin levels.[24]

The serum triglycerides, LDL-C, and cholesterol levels were found to be higher in females, whereas male patients had lower levels than female patients, as per our study. This result is in line with the findings of other studies. [25] This investigation's results supported those of other studies that showed female patients had significantly higher levels of serum triglycerides and cholesterol and considerably decreased levels of HDL-C when compared to male patients.[26]

CONCLUSION

Gender-based differences in lipid levels were not statistically significant. Poorly controlled diabetes was associated with elevated lipid levels, but the differences were not significant. Notably, HbA1c was more closely linked to low BMI. The study found no significant correlations between HbA1c and BMI with lipid levels, while age weakly correlated negatively with serum cholesterol and LDL-C. These findings emphasize the complex interplay between diabetes control, lipid profiles, and body weight in the studied population.

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Authors Contribution:

Following authors have made substantial contributions to the manuscript as under

Authors	Conceived & designed the analysis	Collected the data	Contributed data or analysis tools	Performed the analysis	Wrote the paper	Other contribution
Khan Z	✓	×	✓	×	✓	×
Khan I	✓	✓	×	✓	✓	×
Haroon M	×	✓	×	×	✓	×
Badshah A	✓	✓	✓	×	✓	✓
Wazir MZ	✓	✓	×	✓	✓	×
Ullah I	×	✓	×	×	✓	×

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Ethical Approval:

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ORIGINAL ARTICLE

THE EFFECTIVENESS OF AN OPERATIVE DECOMPRESSION TECHNIQUE FOR THE MANAGEMENT OF CALCIFIED LUMBER DISC HERNIATION

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ABSTRACT

Objective: To determine the effectiveness of a new decompression surgical intervention for the management of calcified lumber disc herniation (CLDH).

Patients and methods: This prospective cohort study was conducted in the orthopedic center at Adiwaniyah Teaching Hospital, Adiwaniyah Province in Iraq. The study enrolled 72 patients, 37 females and 35 males, with an age range of 65 to 75. Inclusion features were subjects with calcified lumber disc herniation who presented with a low backache with radiation to the leg, which remained the same for at least six months despite conservative measures such as pharmacological agents and physiotherapy. The pain affected the patients' daily activities.

Results: The mean visual analog score was reduced after three months from a baseline reading of 7.03 ±1.02 to 3.29 ±1.05 ($p< 0.05$), and it was further reduced one year later to 2.07 ±0.93 ($p<0.01$). The Oswestry Disability Index (ODI) score was reduced after three months from a baseline reading of 53.27 ±8.37 % to 12.38 ±4.29 % ($p< 0.01$), and it was further reduced one year later to 8.91 ±1.93 % ($p<0.01$).

Conclusion: The surgical procedure used in the present study relieved pain and significantly improved functional outcomes compared with the baseline pre-surgical status.

Keywords: Calcified lumber disc herniation, surgical decompression, children calcification, intervertebral disc (IVD) degeneration

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INTRODUCTION

Pain in the lower back is one of the primary causes of morbidity worldwide. Although intervertebral disc (IVD) degeneration might occasionally go unnoticed, it is frequently accompanied by lower back pain. In older people or those with degenerative or scoliotic spinal conditions, the calcification of IVD is not a rare problem. Even though the calcification has a clinical impact, it may have gone unnoticed. It may lead to IVD stiffness and change the biomechanics of the involved segment. The IVD calcification may not be confined to the disc, but it is noticed to involve other cartilages like the joint cartilages, the vertebral endplate may also be involved. [1] Herniation of the lumbar disc is the most common type of herniation of intervertebral discs, and it mainly affects people in the 4th to 6th decades, with male predominance. [2, 3] With advanced age, the intervertebral disc undergoes natural degeneration that is associated with herniation of the lumbar disc. [4-7] Moreover, the herniated discs may result in mechanical deformity of neighboring nerve roots and local inflammation, leading to radiculopathy that indicates intervention with either operative or non-surgical methods. [8]

The indications for surgical intervention in cases of LDH are determined. When the subject's condition fails to respond to conservative treatment like physical therapy and pharmacotherapy and the radiculopathy symptoms are marked and permanent, accompanied by confirmed radiological imaging, the choice for surgical intervention is a good answer to relieve pain and improve the patient's quality of life with great satisfaction. [9] Many techniques are utilized to treat herniation of lumbar disc, including microdiscectomy, microdiscectomy, and percutaneous endoscopic lumbar discectomy. [10, 11]

CLDH is marked by the occupancy of the vertebral canal, which is a calcified part of the herniated disc. [12, 13] The incidence of CLDH out of all LDH ranges between 4.7 % - 15.9%. With the increment in the incidence among the younger age group, the development of the condition in grown-up persons often takes a longer time and is difficult to cure spontaneously. [6, 14] Previous research on disc herniation, which is calcified, is principally light on the vertebrae in the thoracic region, meanwhile, the lumbar calcified disc is not common and not easy to manage (15,16). The conventional open-operative approach

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is commonly employed in such conditions (16). Although it demonstrates favorable effectiveness, it was associated with various complications, including severe lower back pain, and it affected the adjacent segments. [15, 16]

CLDH is not sufficiently described. [17] The manifestations vary from low backache with radiation to the lower limbs, which limits the daily activity of the patient and affects the life quality. The underlying pathogenesis of CLDH is not completely understood. Microtrauma, metabolic diseases, infection, and diminished flow of blood were attributed to the development of calcified intervertebral discs. Surgical treatment of disc herniation may be complicated by calcification, as indicated by some researchers. [18] Resection of lumbar discs that are calcified and herniated in grown-up persons has been rarely reported to date. The calcified disc removal is challenging because the disc becomes hard, and there is a high rate of complications post-operatively, which is accompanied by injury to the nerve root at the time of operation. [19]

The purpose of this study was to illustrate the impact of a decompression operative procedure on the management of CLDH. This approach implies the removal of all structures around the root of the nerve, leaving the calcified disc.

MATERIALS AND METHODS

This prospective cohort study was carried out in the orthopedic center at Adiwaniyah Teaching Hospital, Adiwaniyah Province in Iraq. The study enrolled 72 patients with an age range of 61 to 75 years, 37 females and 35 males. Inclusion criteria included subjects with calcified lumber disc herniation (CLDH) with a presentation of low backache radiation to the leg, which remains the same for at least six months despite conservative measures such as pharmacological agents and physiotherapy, the pain affected the daily activity of the patients. The diagnosis was based on clinical evaluation and documentation by imaging techniques such as magnetic resonance imaging, computed tomography, or both. Demographic information, including gender, age, and body mass index, were obtained.

OPERATIVE PROCEDURE

The technique used was Open fenestration discectomy. Foraminal decompression microsurgical procedure was performed aiming at removing structures causing nerve compression but with preservation of the herniated discs. The procedure was as follows: general anesthesia was given while patients were in the prone position. Fluoroscopy was used to locate the affected region. We made a vertical incision, starting from about one cm superior to the spinous process of the involved upper lumbar vertebra, ending at the spinous process of the vertebra below. The aponeurosis was cut, and the multifidus was retracted to make obvious the medial border of the superior facet, ligamentum flavum, lamina, and the spinous process. Following that, we excised the ligamentum flavum. Then, hemi-laminectomy of both the superior edge of the inferior lamina and the inferior edge of the superior lamina was done. Resection of the superior facet partial medial border was carried out. The nearby structures were then removed, followed by the separation and release of the Dural sac and the nerve root from the adherent tissues using a hook. The absorbable suture was used to close skin, subcutaneous fascia, and aponeurosis. Applying of corsets was done, and discharge of patients was done on the second day post-surgically.

OUTCOME ASSESSMENT

Outcome assessment included evaluation of pain using the visual analog score (VAS) (20), and "Simplified Chinese Version of the Oswestry Disability Index (ODI), version 2.1a" was used to assess functional disability. [21] Patients were evaluated 3 months and then after one year by reporting both VAS and ODI.

The Committee of Ethical Considerations of the University of Al-Qadisiyah, College of Medicine, approved the research. All enrolled individuals gave written consent. Data were analyzed using a statistical package for social sciences (SPSS, Chicago, USA, IBM, version 16.0). Qualitative variables were outlined as numbers and percentages, and quantitative ones were shown as range, standard deviation, and mean. Paired t-test was used to compare mean scores before and after the operation. The level of significance was suggested at $p \leq 0.05$.

RESULTS

The demographic characteristic of enrolled subjects is shown in Table 1. A total of seventy-two patients were enrolled: 37 (51.4 %) females and 35 (48.6 %) males. The age ranged from 61 to 75 years, and the mean was 62.31 ±8.09 years. The mean body mass index (BMI) was 28.03 ±7.82 kg/m^{2,} and it ranged from 23.97 to 35.02 kg/m^2. The clinical characteristics of enrolled subjects are shown in Table 2. Left-side leg pain was seen in 27 (37.5 %), whereas right-side involvement was seen in 23 (31.9 %), and in 22 (30.6 %) cases, both sides were involved. A comparison of the mean visual analog score (VAS) of pain in the leg before and after the operation is shown in Figure 1. The score was reduced after three months from a baseline reading of 7.03 ±1.02 to 3.29 ±1.05 ($p< 0.05$), and it was further reduced later to 2.07 ±0.93 ($p<0.01$). A comparison of the mean "Oswestry Disability Index (ODI) of functional disability" before and after the operation is shown in Figure 2. The score was reduced after three months from a baseline reading of 53.27 ±8.37 % to 12.38 ±4.29 % ($p< 0.01$), and it was further reduced one later to 8.91 ±1.93 % ($p<0.01$). Table 3 showed operative characteristics, which were as follows: the mean operative time was 20.23 ±10.07 minutes, the mean blood loss was 75.04 ±50.92 ml, and the mean hospital stay duration was

2.43 ±1.92 days.

DISCUSSION

The present study aimed to explore the outcome of a surgical procedure performed on patients with calcified herniated lumbar discs when conservative measures failed to control pain or improve functional disability. Our results showed significant improvements in pain scores and functional outcomes at 3 months and one year after the surgery. We did not observe any significant adverse outcomes, and the procedure was not associated with notable blood loss.

In line with our observation, Wang et al. reported similar findings following the same surgical procedure on patients with calcified herniated lumbar discs. Wang et al. claimed that leaving the calcified herniated disc and removing the surrounding compressing structures will produce better results in elderly individuals than routine discectomy procedures. [22] Indeed, we found similar results

Table No 1: Demographic characteristics of enrolled subjects

Characteristic	Result
Number of cases	72
Gender	
Male, n (%)	35 (48.6 %)
Female, n (%)	37 (51.4 %)
Age (years)	
Mean ±SD	62.31 ±8.09
Range	61 -75
BMI (kg/m2)	
Mean ±SD	28.03 ±7.82
Range	23.97-35.02

n: number of cases; SD: standard deviation; BMI: body mass index

Table No 2: Clinical characteristics of the participants

Characteristic	Result
Leg pain	
Left side, n (%)	27 (37.5 %)
Right side, n (%)	23 (31.9 %)
Both, n (%)	22 (30.6 %)
Disc involved	
One disc, n (%)	24 (33.3 %)
More than one, n (%)	48 (66.7 %)

n: number of cases

Table 3: Operative characteristics of the participants

Characteristic	Result
Operative time	10.07± 20.23 minutes
Blood loss	50.92± 75.04 ml
Hospital stays	1.92± 2.43 days

Data were shown as mean ±standard deviation

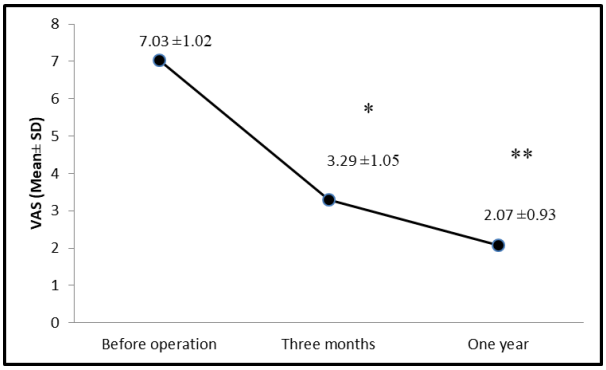

Fig 1: Comparison of the mean visual analog score (VAS) of pain in the leg before and after the operation. Data were presented as mean± standard deviation. *: significant at p≤ 0.05 in comparison with before operation level; **: significant at p ≤ 0.01 in comparison with before operation level.

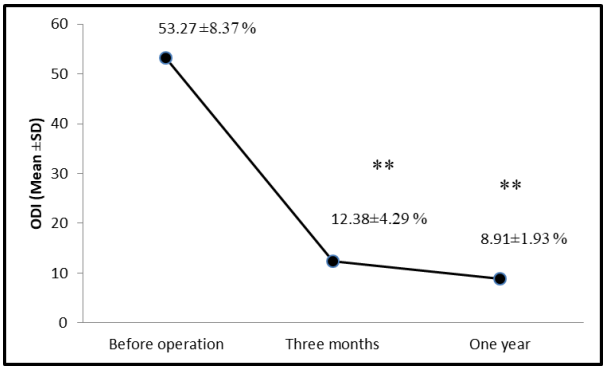

Fig 2: Comparison of mean "Oswestry Disability Index (ODI) of functional disability" before and after the operation. Data were presented as mean± standard deviation. **: significant at p ≤ 0.01 in comparison with before operation level.

in our sample of patients and agree with them regarding presurgical pain reduction and improvement of quality of life. Indeed, older people with disc herniation at the lumbar spine often experience more post-operative adverse outcomes, slower improvement, and worse life quality following discectomy in comparison to young subjects. [23]

In the study of Kim et al., thirty-one patients were treated using two different approaches, inter-laminar and trans-foraminal types, and they reported relatively higher rates of complications in comparison with the present study; however, they followed patients for a duration longer than that in the present study. In another study, Dabo et al. reported that interlaminar discectomy is associated with long-term complications in the form of lower limb dysesthesia despite early symptomatic relief. [12, 15] Lee and Lee reported that percutaneous endoscopic lumbar discectomy needs well-trained orthopedic surgeons to get a shorter mean time of operation and that less well-trained surgeons may face the need to convert into open procedures. In addition, it should be stated that discectomy is

frequently associated with lumbar instability postoperatively. [24, 25]

Zhang et al. performed percutaneous endoscopic surgeries on 11 patients with single-segmental calcified discs, and they found that this approach is safe and associated with satisfactory results; however, the sample was relatively low, and a greater sample size is needed to validate these results. [26]

Yuan et al. compared the outcome of a percutaneous endoscopic lumbar discectomy approach in a group of patients with calcified discs and a group of patients with no calcified discs and claimed that some complications happened in patients with calcified discs (spinal hypertension syndrome), whereas the second group of patients (no calcified disc) were free of such complications indicating the need for some different approach in patients with calcified disc. [27]

Although the nerve root is anteriorly compressed by the herniated disc, other nearby structures also cause nerve compression. Wang et al. [22] used a surgical decompression method to address the problem in light of this. Resection of the calcified disc is not necessary with this technique, which can be exceedingly difficult. Instead, to release the compression on the root of the nerve, they conducted hemilaminectomy on both the lower border of the superior lamina and the border of the inferior lamina, as well as the ligamentum flavum and a portion of the medial edge of the upper facet.

They discovered that 1) this intervention can be finished in less than 60 minutes per afflicted disc, 2) the pain in the leg significantly decreased the day after the operation, as evidenced by noticeably lower scores of VAS, 3) the disability state significantly improved after operation, as indicated by a decrease in ODI, 4) the operative outcomes were evaluated using "modified Macnab criteria," and 5) the afflicted subjects had experienced few adverse outcomes.

Older adults with LDH generally experience more postoperative issues, slower recovery, and lower quality of life after discectomy compared to younger adults. The decompression method without disc removal has been shown to result in fewer complications and a significantly lower ODI after surgery, indicating improved quality of life for patients. This foraminal decompression technique may be suitable for elderly patients with cLDH. [22] The minimal blood loss, short hospital stays, brief operative times, and absence of significant complications noted in this study enhance the safety of this surgical approach.

CONCLUSION

The surgical procedure used in the present study relieved pain and improved functional outcomes significantly in comparison with baseline pre-surgical status.

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Authors Contribution:

Following authors have made substantial contributions to the manuscript as under

Authors	Conceived & designed the analysis	Collected the data	Contributed data or analysis tools	Performed the analysis	Wrote the paper	Other contribution
Kadhim AA	✓	×	✓	×	✓	×
Aljanabi AS	✓	✓	×	✓	✓	×
Hakim WS	×	✓	×	×	✓	×

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Ethical Approval:

This Manuscript was approved by the Ethical Review Board of College of Medicine, University of Al-Qadisiyah. Vide No. 29/298. Dated: 13 06 2022

ORIGINAL ARTICLE

EFFECT OF TYPE AND AGE OF INTRODUCTION OF WEANING ON NUTRITIONAL STATUS OF CHILDREN UNDER 5 YEARS: A CASE-CONTROL STUDY

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ABSTRACT

Objective: To determine the impact of weaning type (complementary feeding) and age on the nutritional status of children under five.

Material and Methods: This is a case-control study was conducted at the Nutritional Rehabilitation Unit (NRU) of the Pediatric Department of Khyber Teaching Hospital over six months from January 2023 to June 2023, and included children aged 6–59 months, excluding those with congenital abnormalities, mental impairment, and chronic disorders. A questionnaire was provided to parents, gathering data on weaning procedures and anthropometric measures (weight and height for age and Z score). Data were examined using SPSS version 25.0, investigating the odds ratio between weaning practices and nutritional status.

Results: The study included 420 children, 140 cases (malnourished children), and 280 controls (healthy children). The participants' average age was 12.4 months for cases and 13.2 months for controls. The majority of participants (49.76%) were male. Weaning before 6 months was shown to be substantially linked with underweight (OR=1.87, 95% CI=1.12-3.12) and stunting (OR=2.45, 95% CI=1.31-4.58).

Conclusion: This study highlights the association between stopping breastfeeding inappropriately and poor nutrition. It also emphasizes the need to promote appropriate weaning practices and improve the nutritional value and diversity of weaning meals to improve child nutrition.

Keywords: Early weaning, complementary feeding practices, stunting, underweight.

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INTRODUCTION

Adequate and appropriate nutrition is significant for the growth and development of children, particularly in the first 1000 days. [1] This relevance is further amplified by the substantial increase in weight that occurs throughout the first year of life, weight at birth is around 3 kg and reaches 10 kg by the first birthday. [2] Weaning is the introduction of semi-solid and solid meals to a growing infant who is being fed with breast milk or formula. This is an important phase in an infant's feeding, requiring great care as delaying it leads to slow growth, problems in feeding, malnutrition, and anemia. [3] Breastfeeding for six months and introducing complementary meals have been recommended for quite some time now, as opposed to the previously suggested time of four months. [4] This transitional phase, from 6 months to the end of the second or third year, during which an infant's diet progressively transitions from exclusive milk consumption to the introduction of semi-solid foods and eventually to regular adult family meals, is often referred to as the process of weaning. [5]

Protein and calorie deficiency in infants and children is characterized by micronutrient deficiency, wasting, and stunting and is a direct contributor to impaired cognitive skills. [6, 7] Insufficient caloric intake during the weaning phase is a predominant factor contributing to malnutrition. [8] Appropriate selections of the quantity and type of dietary products ensure optimal growth and development of a child. [9] Irregular feeding practices, use of costly commercially-produced food products administered in diluted proportions, and improper food handling and preparation techniques are factors leading to malnutrition. [10, 11] The association between weaning and childhood malnutrition has been highlighted in previous research conducted in

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Pakistan. These studies have recognized the important time of growth delay to occur between 6-23 months. [8, 10] Regrettably, early malnutrition persists till school age.

MATERIALS AND METHODS

This was a case-control study conducted at the nutritional rehabilitation unit in the Department of Child Health Khyber Teaching Hospital, Pakistan. The study took over 6 months from January 2023 till June 2023 and was approved by the Institutional Ethical Research Board of Khyber Teaching Hospital, all malnourished or healthy children of either gender aged 6–59 months were included, and those with congenital abnormalities, mental impairment, and chronic disorders were excluded from the study.

The sample size was determined using Epi info version 3.3.2, a statistical software program. An assumption was made that the proportion of control exposed for the age range of 6-59 months was 60% (p2 ¼ = 0.60). This assumption was based on an odds ratio (OR) of 2.20, which was derived from a case-control study conducted in Pakistan. [8] Therefore, we calculated that a minimum sample size of 140 cases and an equivalent number of controls would be necessary to achieve a power of 80% at a significance level of 5%, who were compared with 280 controls in the ratio 1:2. Therefore total sample of 420 children's, divided into two groups with 140 cases group and 280 controls group.

A questionnaire was prepared, and a pilot test was conducted. The training medical officer, along with the nutritionist, conducted interviews with the parents to complete the questionnaire. In addition, they got training in the collection and documentation of anthropometric measures. Weight measurements were recorded with a precision of 0.1 kg using a standardized newborn weighing scale with a capacity of 20 kg. The accuracy of the weighing scales was routinely verified. The recumbent length (height) was measured with precision to the closest 0.1 cm using an adjustable child height measuring board. Using WHO growth charts, the Z-score approach (WHO standard) was used to calculate the nutritional status of the children included in the research. Following the categorization of malnutrition suggested by the World Health Organization (WHO), the children were categorized as underweight if their weight was two standard deviations (SD) or more below the median of the reference population for weight-for-age and gender. Stunting and wasting were operationally defined as demographic indicators, namely height-for-age and weight-for-height measurements, falling below two standard deviations (SD) from the mean.

Data was analyzed using SPSS version 25. Frequencies and percentages were derived for categorical data, mean± S.D for normally distributed continuous data, and median (IQR) for non-normal continuous data. Cases and controls were compared for the odds ratio.

RESULTS

This study had 420 children divided into two groups, with 140 cases group and 280 control group. The children's average age was 12.4 months for cases and 13.2 months for controls. Male children were 49.76%, while 50.24% were female. This study showed that 34.76% of infants were classified as underweight,42.62% as stunted, and 22.62% as wasted. The average age of weaning was 6.8 months, while it was 6.5 months for controls. 18.57% of cases were weaned before 6 months as compared to controls (7.14%). The most predominant kind of weaning diet for both cases and controls were traditional foods (48.33%), followed by mixed foods (25%) and commercial foods (26.67%). These data indicate that traditional weaning practices are still used in this group (Table 1).

This study looked at the relationship between weaning age and nutritional status. Weaning before 6 months was shown to be substantially linked with underweight. 34.76% of infants were classified as underweight, 42.62% as stunted, and 22.62% as wasted (OR=1.87, 95% CI=1.12-3.12) and stunting (OR=2.45, 95% CI=1.31-4.58). Weaning between the ages of 6 and 8 months was similarly linked to stunting (OR=1.68, 95% CI=1.22-3.12). However, no significant relationship was found between weaning after 8 months and any of the nutritional markers. These data imply that weaning children before the age of six months may increase their chance of being underweight or stunted. This emphasizes the significance of good weaning practices, as well as the necessity for interventions to promote optimal weaning practices in this group (Table 2).

This study also looked at the relationship between the type of weaning meals and nutritional status. Underweight (OR=1.63, 95% CI=1.02-2.61 and OR=1.55, 95% CI=1.12-2.45, respectively) and stunting (OR=1.78, 95% CI=1.06-2.98 and OR=1.88, 95% CI=1.09-2.78, respectively) were substantially linked with both commercial and traditional weaning diets. However, there was no significant relationship between weaning meal type and wasting. These data imply that both commercial and traditional weaning meals may contribute to children's poor nutritional outcomes (Table 3).

DISCUSSIONS

This study revealed that 34.76% of infants were classified as underweight, 42.62% as stunted, and 22.62% as wasted. The results of this study align with prior research done in Pakistan by Ajmal et. Al.[8] In a study done in Bangladesh, it was shown that 24.67%, 9.75%, and 20.57% of children under the age of five in 2019 suffered from stunting, wasting, and being underweight, respectively. [13] In this study, they further reported that stunting

Table No 1: Demographic and Weaning Practices of Study Participants

Characteristic	Cases (n=140)	Controls (n=280)	Total (n=420)
Age (months)	12.4 ± 3.1	13.2 ± 2.8	
Gender			
Male (%)	73(52.14%)	136(48.57%)	209(49.76%)
Female (%)	67(47.86%)	144(51.43%)	211(50.24%)
Age of Weaning (months)	6.8 ± 1.2	6.5 ± 1.1	
< 6 months (%)	26(18.57%)	20(7.14%)	46(10.95%)
6-8 months (%)	76(54.28%)	193(68.93%)	269(64.05%)
> 8 months (%)	38(27.14%)	67(23.92%)	105(25%)
Type of Weaning Foods			
Commercial (%)	50(35.71%)	62(22.14%)	112(26.67%)
Traditional (%)	59(42.14%)	144(51.43%)	203(48.33%)
Mixed (%)	31(22.14%)	74(26.42%)	105(25%)

Table No 2: Association between Age of Weaning and Nutritional Status

Age of Weaning (months)	Underweight (OR, 95% CI)	Stunting (OR, 95% CI)	Wasting (OR, 95% CI)
< 6 months	1.87 (1.12 - 3.12)	2.45 (1.31 - 4.58)	1.98 (1.05 - 3.73)
6-8 months	1.00 (0.78 – 2.36)	1.68 (1.22 – 3.12)	1.09 (0.89 – 2.57)
> 8 months	0.94 (0.57 - 1.56)	1.12 (0.63 - 1.99)	1.05 (0.59 - 1.88)
P-value	< 0.05	< 0.01	< 0.05

Table No 3: Association between Type of Weaning Foods and Nutritional Status

Type of Weaning Foods	Underweight (OR, 95% CI)	Stunting (OR, 95% CI)	Wasting (OR, 95% CI)
Commercial	1.63 (1.02 - 2.61)	1.78 (1.06 - 2.98)	1.42 (0.84 - 2.39)
Traditional	1.55 (1.12 – 2.45)	1.88 (1.09 – 2.78)	1.32 (0.91 – 2.17)
Mixed	1.25 (0.75 - 2.08)	1.09 (0.61 - 1.94)	1.18 (0.67 - 2.07)
P-value	< 0.05	< 0.01	< 0.05

and underweight being lower in < 6months of age and higher in 36-47 months and 24-35 months respectively. The prevalence of wasting was higher at 12-23 months and 36-47 months of age, respectively. [13] Similarly, Sahiledengle et al. documented in a study that Ethiopia has a prevalence rate of 16.88% underweight, 27.21% stunting and 16.44% wasting among children aged below 0-23 months. [14]

Our study found a strong link between weaning before 6 months and underweight and stunting. This emphasizes the necessity of fostering proper weaning practices, such as exclusive breastfeeding for 6 months, to increase infant nutrition. A recent study in Pakistan conducted on infants under 6 months of age reported the continuation of exclusive breastfeeding protected infants in Pakistan from various types of malnutrition during the first six months of life. [15]

In a study conducted in Karachi, late weaning, i.e., more than 6 months of life, was associated with acute malnutrition and stunting. Mehmood R et al. stated in this article that the risks of infections are increased when food and bottle feeding is introduced early however, the consequences of delayed weaning are underweight and stunting. A wise selection of weaning time is necessary to ensure the appropriate nutritional and health status of infants. [16]

Our study found a strong association between weaning before 6 months and underweight and stunting. This emphasizes the necessity of fostering proper weaning practices, such as exclusive breastfeeding for 6 months, to increase infant nutrition. Similar results were found in other studies associating early weaning with malnutrition. Early weaning (before 6 months) was linked to underweight and stunting in rural India. Dhanalakshmi S et al. reported in this study that the odds of developing acute malnutrition were 14 times higher with the initiation of complementary feeding. [17] A research from Ethiopia found that weaning before 6 months increased the risk of stunting. The possible justification given was the incorrect timing of weaning foods to a not-yet-mature digestive and immune system. [18] Gati Ara et al., in a case-control study from Karachi, reported that shortening the duration of exclusive breastfeeding and inappropriate age of weaning, especially delayed, associated with 3.58 times risk of malnutrition. [19]

Our study did not reveal a very strong association between commercial and traditional weaning diets and underweight and stunting. Ivaca Petrikova, in her research on feeding practices in Indian children, reported that offering semisolid food of adequate dietary diversity to children older than 6 months was strongly associated with better nutrition outcomes. [20] Other studies, though, have found an association between the kind of weaning meals and nutritional status. A study conducted in Saudi Arabia found a significant association between weaning practices, patterns, and food items with iron deficiency, musculoskeletal problems, and allergies. [21] A study from Bangladesh using WHO infant feeding indicators reported that poor complementary food practices resulted in malnutri-

tion in about one-third of the children aged 6–23 months. The consistency, frequency, and diversity of the diet were quoted as a major contributing factor to malnutrition in children. [22] Similarly, a study in Sub-Saharan Africa reported a substantial association between dietary diversity and malnutrition among 6–to 23-month-old children. [23]

Similarly, research done in rural India found that children fed commercial weaning meals had a greater risk of stunting than those provided traditional weaning foods. The key conclusion in this study was semisolid food of sufficient dietary diversity was strongly associated with better nutrition outcomes in infants older than 6 months. [24] This underscores the importance of interventions to increase the quality and diversity of weaning meals, as well as to encourage good feeding practices to improve children's nutritional outcomes. Self-reporting by parents on weaning practices may have recall bias. This may alter data accuracy and research outcomes. Participants were selected from one health institution, which may not reflect the whole population. This may cause selection bias and reduce generalizability.

CONCLUSION

Weaning before 6 months was shown to be substantially linked with underweight. Children fed on both commercial and traditional weaning meals can have poor nutritional outcomes. The present study emphasizes the significance of exclusive breastfeeding until 6 months. To enhance nutritional outcomes among children, infants should be weaned at 6 months of age with homemade weaning meals. Nutritional education programs for expecting mothers to improve knowledge and awareness about infants are recommended.

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Authors Contribution:

Following authors have made substantial contributions to the manuscript as under

Authors	Conceived & designed the analysis	Collected the data	Contributed data or analysis tools	Performed the analysis	Wrote the paper	Other contribution
Munir A	✓	×	✓	×	✓	×
Amir S	✓	✓	×	✓	✓	×
Aqeel M	×	✓	×	×	✓	×
Bahar S	✓	✓	✓	×	✓	✓
Rehman KU	✓	✓	×	✓	✓	×
Muhammad J	×	✓	×	×	✓	×

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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ORIGINAL ARTICLE

CLINICAL OUTCOMES OF ENUCLEATION VERSUS MARSUPIALIZATION FOLLOWED BY ENUCLEATION IN THE MANAGEMENT OF UNICYSTIC AMELOBLASTOMA

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ABSTRACT

Objectives: To compare the clinical outcome of enucleation versus marsupialization followed by enucleation in managing unicystic ameloblastoma.

Material and Methods: A retrospective chart review of 40 patients equally divided into marsupialization and enucleation groups was carried out. Pre and Post-operative clinical features and radiographic bone resorption volume were evaluated using SPSS version 22. The independent sample T-test was used to compare the mean ages of the two groups. Categorical variables were subjected to the Chi-square test or Fisher's exact test. A logistic regression model included the variables with $p < 0.05$ to determine the odd ratios.

Results: Data analysis showed male dominancy in the enucleation group (12, 60%) and marsupialization groups (11, 55%). The mean age was 31.35±SD7.0507 and 29.80 ±SD9.1450, respectively, for group 1 and group 2. Post-operative pain, paresthesia, and swelling predominated in the enucleation group. A good percentage of reduction in bone resorption was noted in the marsupialization group. A significant difference was observed between the groups in terms of Postoperative paresthesia, Postoperative Swelling, and % reduction in Bone resorption (0.050, 0.004, and 0.001, respectively).

Conclusion: Conservative approach in the form of marsupialization showed less post-operative pain, paresthesia, and swelling as compared to the enucleation group. A good percentage of bone remodeling and less recurrence or progression of the disease was documented in the marsupialization group, resulting in a positive patient response to this strategy.

Keywords: Ameloblastoma, Enucleation, Marsupialization

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INTRODUCTION

Ameloblastoma is the second-most common odontogenic tumor, representing about 1% of all jaw tumors. The site predilection is such that they are much more common in the lower jaw than in the upper jaw and more common in the posterior mandible as compared to the anterior. Ameloblastomas are benign tumors with aggressive behavior and morbidity. Multicystic ameloblastoma is the most common type of these tumors, accounting for 86% of cases, causing considerably large swellings, disfigurement, teeth displacement, and even pathological fractures. [1, 2] UC ameloblastoma presents clinically and radiologically as a dentigerous cyst. Although their histological characteristic represents a typical epithelial lining composed of ameloblastoma epithelium. [3, 4]

Treatment of Unicystic ameloblastoma is debatable and surgeon-specific. The treatment modalities range from simple enucleation, enucleation, curettage, and Marsupialization to block resection with or without sacrificing the continuity of jaw bone. [5] Decompression or marsupialization was first described by Lean Scultet in 1671 as a means of changing the internal pressure of cystic lesions. With this type of treatment, the constant stimulus that causes peripheral bone reabsorption is reduced and nullified, favoring a decrease in the size of the lesion with subsequent bone healing. [6, 7]

In the management of unicystic ameloblastomas, sometimes, unnecessary aggressive treatment is offered to the patient, resulting in morbidity and loss of function in the jaw. Thus emphasizing the importance of providing a conservative treatment to the patient with this type of tumor to prevent the functional and esthetic sequelae entailed by the excision of the tumor through a conventional treatment. The present study is carried out to compare the clinical outcome of enucleation versus marsupialization followed by enucleation in the management of unicystic

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ameloblastoma.

MATERIAL AND METHODS

A retrospective chart review of patients treated for unicystic Ameloblastoma with Enucealtion and/ Or marsupialization was carried out from the departmental and individual records from January 2019 to December 2022 in the Department of Oral & Maxillofacial Surgery, Khyber College of Dentistry Peshawar after the ethical approval was obtained from the Research Review Board at Khyber College of Dentistry (06/ADR/KCD, dated: 17/01/2023). All patients fulfilling the inclusion criteria were divided into two groups (The enucleation group and the Marsupialization group). Demographic data such as age, gender, primary site, Pre and Post-operative clinical features such as Pain, swelling, paresthesia, and radiographic bone resorption volume (maximum anteroposterior length in cm multiplied by the maximum vertical distance in cm). [8] A reduction in the target resorbed area by 50% was considered a good result. When there was a reduction of less than 50% but more than 10%, it was denoted as a moderate result. Ineffective regression of the tumor was considered only when the reduction in the volume of the resorbed area was less than 10%. An increase in the size of the tumor at any stage was considered as Tumor progression.

Data were analyzed using the latest Statistical Package of Social Sciences (V-21). Continuous variables such as age were expressed as mean and SD. Frequency and percentages were determined for categorical variables such as gender, Pre and Post-operative pain, swelling, paresthesia, and percent reduction in bone resorption. To compare the mean ages of the enucleation and marsupialization group, an independent sample T-test was applied. Categorical variables were subjected to the Chi-square test or Fisher's exact test. The variables with $p < 0.05$ were included in a logistic regression model to determine the odd ratios.

RESULTS

Data analysis showed male dominancy in both enucleation group (12, 60%) and marsupialization groups (11, 55%). The mean age of all the patients of both groups was 31.35±SD7.0507 and 29.80 ±SD9.1450 respectively, for group 1 and group 2 with a mean age difference of 1.55, 95% CI -4.05 to 6.77, p-value= 0.552 (Table-2).

Analysis of other variables showed that pre-operative pain, paresthesia, and swelling most commonly occurred in the Marsupialization group and compared to the Enucleation group. While post-operative pain, paresthesia, and swelling predominated in the enucleation group. A good percentage of reduction in bone resorption was noted in the marsupialization group. Progression of the disease process was noted frequently in the enucleation group (10%) as compared to the Marsupialization group. A detail of these findings is given in Table 1.

Stratification of different variables with Enucleation

Table No 1: Descriptive statistics (n=20 each)

Variables		Enucleation Group		Marsupialization Group	
		(n)	(%)	(n)	(%)
Gender	Male	12	60%	11	55%
	Female	8	40%	9	45%
Mean Age		31.35±SD7.0507		29.80 ±SD9.1450	
Pre op Pain	No	12	60%	11	55%
	Yes	8	40%	9	45%
Post op Pain	No	6	30%	13	65%
	Yes	14	70%	7	35%
Pre Op Paresthesia	No	17	85%	12	60%
	Yes	3	15%	8	40%
Post Op Paresthesia	No	9	45%	15	75%
	Yes	11	55%	5	25%
Pre Op Swelling	No	9	45%	8	40%
	Yes	11	55%	12	60%
Post Op Swelling	No	5	25%	14	70%
	Yes	15	75%	6	30%
% Reduction in Bone resorption	Good	5	25%	12	60%
	Moderate	7	35%	5	25%
	Ineffective	6	30%	2	10%
	Progression	2	10%	1	5%

Table No 2: Mean age difference between the Enucleation Group and Marsupialization Group

Groups		Number of patients (n)	Mean age + S.D	Mean Difference	%95 Confidence Interval	P value
Age	Enucleation	20	31.35±SD7.0507	1.55	4.05- to 6.77	0.552*
	Marsupialization	20	29.80 ±SD9.1450			

*Significant at 0.05

Table No 3: Stratification of different variables with Enucleation and Marsupialization

Variables		Enucleation Group		Marsupialization Group		P-value
		(n)	(%)	(n)	(%)	
Gender	Male	12	(60%)	11	(55%)	0.749*
	Female	8	(40%)	9	(45%)	
Pre op Pain	No	12	(60%)	11	(55%)	0.749*
	Yes	8	(40%)	9	(45%)	
Post op Pain	No	6	(30%)	13	(65%)	0.27*
	Yes	14	(70%)	7	(35%)	
Pre Op Paresthesia	No	17	(85%)	12	(60%)	0.077*
	Yes	3	(15%)	8	(40%)	
Post Op Paresthesia	No	9	(45%)	15	(75%)	0.050*
	Yes	11	(55%)	5	(25%)	
Pre Op Swelling	No	9	(45%)	8	(40%)	0.749*
	Yes	11	(55%)	12	(60%)	
Post Op Swelling	No	5	(25%)	14	(70%)	0.004*
	Yes	15	(75%)	6	(30%)	
% Reduction in Bone resorption	Good	5	(25%)	12	(60%)	0.001**
	Moderate	7	(35%)	5	(25%)	
	Ineffective	6	(30%)	2	(10%)	
	Progression	2	(10%)	1	(5%)	

*Chi-square **Fisher Exact

Table No 4: Regression Analysis

Variables in the Equation		Odds Ratio	P- value	95% Confidence interval
Post op Swelling	No	Reference		
	Yes	.793	.805	.126 - 5.003
Postop Paresthesia	No	Reference		
	Yes	.186	.078	.029 - 1.209
% Reduction in Bone resorption	Good	Reference		
	Moderate	.050	.049	.003 - .985
	Ineffective	.148	.204	.008 - 2.811
	Progression	2.230	.590	.121 - 41.217

*Chi-square **Fisher Exact

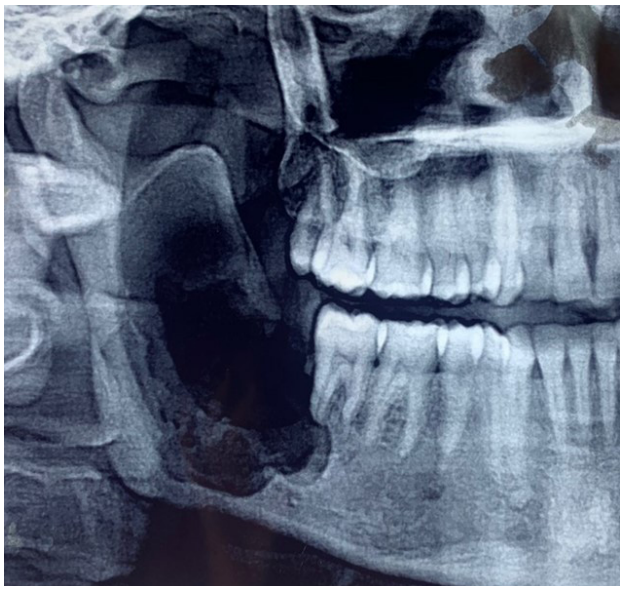

Fig-1 Pre-operative

Fig-1 Post-operative

Fig-2 Pre-operative

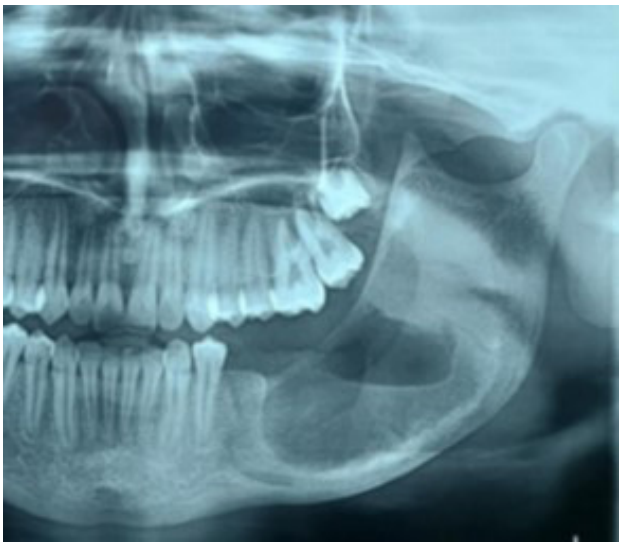

Fig-2 Post-operative

and Marsupialization was performed and showed that a statistically significant difference was observed between enucleation and marsupialization groups in terms of Post-operative paresthesia, Postoperative Swelling, and % reduction in Bone resorption (0.050, 0.004 and 0.001 respectively). See Table 3 for details.

Logistic regression analysis showed that the odds ratio (OR) for Post-operative swelling was 0.793 (95 % CI .126 - 5.003) and post-operative Paresthesia was 0.186, 95% CI .029 -1.209. Similarly, the OR for Moderate reduction in % bone resorption was 0.050 (95 % CI .003 - .985), ineffective reduction in % bone resorption 0.148 (95 % CI .008 - 2.811) and Progressive resorption 2.230 (95 % CI. 0.121 – 41.217). In other words, greater odds of Post-operative swelling, Post-operative paresthesia, moderate % reduction in bone resorption, ineffective bone formation, and progression of resorption were associated with patients who received enucleation as the treatment modality as compared to the marsupialization Group. Detail is given in Table 4

DISCUSSION

In the present study, the majority of the cases were reported in males (57.5%) as opposed to their female counterparts, with a female-to-male ratio of 1: 1.29. Figueiredo et al. [9], Reichart et al. [11,] and Cosola et al.[12,] during analysis of their results, have given the same results. Age

analysis revealed that ameloblastomas typically occur in the late second and early third decades of life. Most patients with ameloblastoma present at 3rd to 5th decade with an average age at the time of diagnosis that varies from continent to continent, estimated to be approximately 42.3 and 30.4 years in Europe and Africa. [13, 14] The pediatric population accounts for a very small percentage of instances of ameloblastoma, which varies by geographic location. [15]

When compared to the Enucleation group in our study, the Marsupialization group had pre-operative pain, paresthesia, and edema more frequently. In contrast, edema, paresthesia, and post-operative discomfort were frequent in the enucleation group. A good percentage of reduction in bone resorption was noted in the marsupialization group. Progression of the disease process was noted frequently in the enucleation group (10%) as compared to the Marsupialization group. Pre-operative pain was present in 40% of cases of the enucleation group and 45% in the marsupialization group. In contrast, Al-Khateeb et al.[16], White, and Pharoah [10] found a majority of their cases as painless swelling and showed that pain is rarely a presenting complaint in ameloblastoma. Juliansyah et al. [17] showed that 39.1% patient of ameloblastoma presented with Swelling at the initial presentation, while 21.7% had pain. The variations in the previous results could be attributed to variations in geography, sample size, and investigative methodology. The current study's findings are consistent with those of the Juliansyah et al. investigation. In a retrospective study by Dandriyal et al., [18] of 20 patients reasoned that 10 (half) patients went through enucleation with bone curettage. They assessed the general impact of enucleation with bone curettage as good in 10% of cases, moderately effective in 30% of cases, and insufficient in 20% of cases. In our review, 60% of the cases had good quality bone formation when treated with marsupialization, while 30-35% of cases presented ineffective bone remodeling after enucleation. The difference may be attributed to the fact that the majority of their cases were treated with enucleation and curettage, while in our study, we compared the difference between the two surgical modalities and analyzed their outcomes. Another reason for this difference in findings may be because we included only unicystic ameloblastomas while they investigated different histopathological types.

Wu et al. [8]. studied 233 subjects with ameloblastomas of the jaw treated with marsupialization or enucleation to evaluate clinical outcomes, recurrences, and post-operative sequelae. Forty-three cases of unicystic ameloblastomas received marsupialization modality, with a 50% success rate. With curettage, the cystic cavity of 24 patients was reduced by more than 50%. Their statistics revealed that the decreased pace of the cystic cavity in the decompression bunch was higher than that in the curettage group ($P<0.001$). Conversely, the results of the present investigation show that the percent reduction of bone in the cystic cavity in the marsupialization group is better than the enucleation group ($P<0.001$). Genetic variation and differences in sample size may be the reason for this gross difference between the results of these two studies. [19]

Tumor recurrence is the most common complication of any odontogenic and non-odontogenic tumors of the jaws, depending upon multiple factors, including histopathological type, surgical modality employed, and the extent of involvement of bone and soft tissues. Investigators from different countries showed that the conservative approach in the treatment of ameloblastomas has a greater chance of recurrence or progression of the tumor. [20]

The results of our study showed an overall low progression or recurrence rate in both groups. However, the marsupialization group proved itself to be superior in that the recurrence or progression rate was higher in the enucleation group (10%).

The only limitation here was that only a short follow-up of 12 months was carried out for each case, and this might have affected the overall recurrence rate as compared to other large-scale cross-sectional studies. As per the methodical survey of Lau SL et al. [21], different recurrence percentages were demonstrated by different modalities, with a lowest of 3.6% for resection and as high as 30.5 for enucleation. Nakamura N et al.[22,] while working on unicystic ameloblastomas, have the highest recurrence rates for marsupialization and conservative enucleations. In their study, almost no recurrence rate was demonstrated by radical excision and marsupialization.

The current study contains several shortcomings. This research was restricted to one public sector hospital. To examine the actual occurrence and behavior of the uncommon histological subtypes, a comparatively limited number of patients were chosen from the oral and maxillofacial surgical facility. Additionally, because there are so few of these tumors, we did not examine the impact of the

unicystic ameloblastoma histological pattern on treatment outcomes. An information bias about both clinical and morphological data may be present in the study. The minimum follow-up period was 12 months, and recurrences might emerge and show up at a later time. Nonetheless, the study's data is extremely thorough and comparable to other research reports. Additionally, it offers fresh data that may help improve our knowledge of tumor epidemiology and guide the creation of effective treatment plans in this region of the globe.

CONCLUSION

It can be concluded that the Conservative approach in the form of marsupialization followed later on by enucleation showed less post-operative pain, paresthesia, and swelling as compared to the enucleation group. A good percentage of bone remodeling and less recurrence or progression of the disease was documented in the marsupialization group, resulting in a positive patient response to this strategy.

The retrospective results of our study confirm the importance of developing less invasive approaches to ameloblastoma elimination while maintaining patients' quality of life.

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Authors Contribution:

Following authors have made substantial contributions to the manuscript as under

Authors	Conceived & designed the analysis	Collected the data	Contributed data or analysis tools	Performed the analysis	Wrote the paper	Other contribution
Rehman B	✓	×	✓	×	✓	×
Khan M	✓	✓	×	✓	✓	×
Murad B	×	✓	×	×	✓	×
Ahmad T	✓	✓	✓	×	✓	✓
Rahman AU	✓	✓	×	✓	✓	×

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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This Manuscript was approved by the Ethical Review Board of Khyber College of Dentistry. Vide No. 06/ADR/KCD. Dated: 17 01 2023

ORIGINAL ARTICLE

CAUSES OF INDUCED ABORTION IN MARRIED WOMEN OF DISTRICT TURBAT OF BALUCHISTAN, PAKISTAN

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ABSTRACT

Objective: To determine the causes of induced abortion in married women of the Turbat district of Baluchistan.

Materials and Methods:

This cross-sectional study, conducted from December 2021 to February 2022, involved 276 married women between the ages of 18 and 45 who had at least one child. Convenient sampling was used to recruit participants, and interviews were used to collect data. Questionnaires about socioeconomic status, contraceptive use, and induced abortion were used to collect this biographical information. The study's statistical analysis was performed using SPSS v.20.0.

Results: According to the participants, 13.40% of those interviewed had at least one induced abortion. The main causes of these abortions were unexpected pregnancy (35.13%), having more than one child (35.13%), contraceptive failure (21.62%), and poverty (8.10%). Over 72.97% of women who had undergone induced abortion were aged below 39 years, and half of them (54.05%) had more than five children. The study also revealed that almost all of the women who had abortions were unemployed.

Conclusion: The study found unexpected pregnancies, contraceptive failure, and socioeconomic issues in district Turbat as causes of induced abortions. It highlights the importance of addressing the dynamics of induced abortion in Pakistan through legislative reforms and improved family planning education and services. The results encourage culturally and religiously appropriate policies and programs that empower women through reproductive health awareness and family planning.

Keywords: Induced Abortion, Married Women, Contraceptive Failure, Unplanned Pregnancy, Socio-Economic Factors, Reproductive Health, Family Planning

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INTRODUCTION

In the field of Forensic Medicine, abortion is defined as the premature expulsion of the products of conception at any period of gestation before full term. The products of conception may be the embryo or later-stage fetus[1]. There are two types of abortions, namely spontaneous and artificial. Spontaneous abortions are those which occur naturally without interference as a result of diseases, while induced or artificial abortions are those which occur as a result of interference. Induced abortions are justifiable or legal, while criminal abortions are not justifiable[2]. The statute law of miscarriage in Pakistan gives importance to the stages of gestation, making the offense more serious if it is done in the later stage of pregnancy if it is done without good faith. According to the stage of gestation, criminal abortion is of two types:

Isqat-e-Haml: Causing a woman with a child whose organs have not been formed to miscarry without the aim of saving the life of the mother.

Isqat-e-Janin: Causing a woman with a child whose limbs or organs have been formed to miscarry without good faith to save the life of the mother [3].

Worldwide, each year, about seven crore and thirty lac people-induced abortions take place. Around six out

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of 10 of all unintended pregnancies end in induced abortion. The frequency of unsafe abortion is 46% of all abortions, which majority means 96-97%% take place in developing countries[4]. In Pakistan, about eight lac and ninety thousand induced abortions take place per annum, and the rate of abortion is twenty-nine (29) per 1000 women whose age range is 15-49[5].

Unsafe abortion is a leading cause of maternal mortalities and morbidities. Approximately 97% of all unsafe abortions worldwide take place in underdeveloped nations.

The major causes of maternal mortality are bleeding, infections, and substances used for this purpose [6]. Indonesia is a Muslim country where the unsafe abortion rate is high compared to the rest of the Muslim world[7]. The two most populated Muslim countries in the world are Indonesia and Pakistan about five thousand and four hundred to two thousand and five hundred terminations of pregnancies occur every day[8].

There are multiple causes of induced abortion in married women, among which the most important ones are socioeconomic and failure of contraception. Social-economic causes account for 60% of induced abortions, while the remaining 40% were medical-related issues such as congenital fetal abnormalities, intrauterine death, women's health problems, and viral infections[9]. In Pakistan, the major determinants of induced abortion were poverty, illiteracy, multiparity, and non-use of contraceptive methods[10].

Several amendments were made to abortion law in Pakistan. The amendments were made to ensure the conformity of the law with the injunctions of the holy Quran and Sunnah. As a result of the amendment to the Pakistan Penal Code in 1997, abortion was legalized in the early stages of pregnancy 'to save the life of the woman' and 'to provide necessary treatment.'

The current law in Pakistan legalizes abortion only to save the life of the woman or provide necessary treatment, that is why almost all abortions take place secretly[11]. This includes abortion procuring by married women with or without the consent of the husband.

This study aimed to assess the determinants (causes) of induced abortion in married women of the Turbat district of Baluchistan. This study highlights the need for wider education about family planning services in the community to educate females about their own reproductive-related decisions to make legislation regarding induced abortion and to make amendments about marriage.

MATERIAL & METHODS

This cross-sectional study was conducted in the district Turbat of Baluchistan. The study population comprised 276 married women aged 18 to 45 years having one or more children. The respondents were selected through a convenient sampling technique. Data was collected over three months between December 2021 and February 2022.

Married women having at least one child were included in the study. Women who had severe acute illnesses were excluded from this study. An interviewer-administered questionnaire was used for data collection. The questionnaire includes information on biographic data, socioeconomic status, failure of contraceptive methods, unintended pregnancy, and induced abortion. The underlying reasons for induced abortions, like unintended pregnancy, enough children, too soon pregnancy, poverty, and failure of contraception, were asked of the respondents.

The questionnaire was administered in a very confidential setting in English and Urdu language. As the participants were unable to understand English and Urdu, the questionnaire was verbally translated into Balochi language as district Turbat is a Balochi-speaking area. Interviewers collected the data from the married women of district Turbat. Spss version v.20.0 was used for data analysis. Frequency and percentages applied for categorical variables.

ETHICAL CONSIDERATION

Data gathering in the Turbat district adhered to tight confidentiality protocols due to the area's strong religious and traditional beliefs. The respondents were given the option to participate voluntarily, with the requirement that they maintain the confidentiality of their names and residences. The collected information was maintained in strict confidentiality.

RESULTS

The results section provides an in-depth analysis of findings from this study concerning induced abortion, participants' demographic characteristics, and reasons for performing abortions among married women living in the Turbat district.

All participants (276) were married women who had at least one living child. 13.40% of the participants had at least one induced abortion, while the rest, 239, had no abortion in their life, as shown in Table 1.

Table 2 indicates that 94.6% of women confirmed one Induced abortion, and others confirmed two in a total survey of 37 women.

Table 3 indicates that the main causes of abortion, such as one-child and unplanned pregnancy, were 35.13% each in women having more than one child. Contraception failure (21.62%) and poverty (8.10%) were also important contributing factors to abortion in the sample surveyed above.

Table 4 shows the distribution of women's age groups in the study showed that 37.84% of the women were in the age group of 25-29 years, followed by 27.02% aged 40 and above, 16.22% aged 30-34 years, 10.81% aged 18-24 years, and 8.10% aged 25-29 years.

In terms of the number of children, the majority of women who had induced abortions (54.05%) had five or more children, followed by 43.24% with two to four children, and only a small percentage (2.70%) had just one child as shown in tale 6.

Table No 1: Prevalence of Induced Abortion Among Married Women

Induced abortion	Frequency	Percentages
Yes	37	13.40%
No	239	86.60%
Total	276	100%

Table No 2: Prevalence of Induced Abortion by Number of Incidents

Number of induced abortions	Women had induced abortion	Percentages
1	35	94.60%
2	2	5.40%
Total	37	100%

Table No 3: Causes of induced abortion

Causes of criminal-induced abortion	Frequency	Percentages
More than one child	13	35.13%
Unplanned pregnancy	13	35.13%
Failure of contraception	8	21.62%
Poverty	3	8.10%
Total	37	100%

Table No 4: Distribution of Women by Age Group

Women age group	Number of women	Percentages
18-24 years	4	10.81%
25-29 years	3	8.10%
25-29 years	14	37.84%
30-34 years	6	16.22%
40 and above	10	27.02%
Total	37	100%

Table No 5: Number of Children Among Women Who Had Induced Abortion

Number of children	Frequency	Percentages
5 and above	20	54.05%
2 -4	16	43.24%
One	1	2.70%

DISCUSSION

This cross-sectional study was conducted in the Turbat district of Baluchistan, Pakistan, among 276 married women to determine the reasons for induced abortion. The same socio-economic and reproductive challenges that have been emphasized by Bankole et al. (12) are supported by this study. The study revealed unintended pregnancy and having more than one child as the main reasons for induced abortion, each contributing to 35.13% of cases, followed by contraceptive failure (21.62%) and poverty (8.10%), which is consistent with findings by Ganatra et al. (13). Most women who underwent induced abortions were below 39 years of age, unemployed, and had more than five children, showing the relation between reproductive health and socio-economic factors. These results highlight the immediate need for better family planning education, accessible contraceptive services, and socio-economic support to address the factors that lead to induced abortion.

CONCLUSION

This study also emphasizes the need for increased community awareness and access to family planning services. The findings revealed an informed gap in contraceptive knowledge and accessibility, which, if closed, could lead to fewer unwanted pregnancy-related abortions. Furthermore, the study highlights many legal and cultural aspects of inducing abortion in Pakistan. This gap must be closed with law updates that are culturally and spiritually suitable for this region, as well as preserving girls' health by balancing reproductive rights. It promotes increased sex education, improved supplementary family planning services, and a more favorable legislative environment. These indicators are crucial for educating Malakand women and those living in similar settings on how to make informed reproductive health decisions, which will result in a greater overall quality of life.

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Authors Contribution:

Following authors have made substantial contributions to the manuscript as under

Authors	Conceived & designed the analysis	Collected the data	Contributed data or analysis tools	Performed the analysis	Wrote the paper	Other contribution
Amjad R	✓	×	✓	×	✓	×
Yasmin RS	✓	✓	×	✓	✓	×
Ali A	×	✓	×	×	✓	×
Khattak MA	✓	✓	✓	×	✓	✓
Iqbal F	✓	×	✓	×	✓	×
Aziz I	✓	✓	×	✓	✓	×

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Ethical Approval:

This Manuscript was approved by the Ethical Review Board of Makran Medical College, Turbat, Balochistan. Vide No. MMC/ERC/09-2021. Dated: 05 11 2021

ORIGINAL ARTICLE

COMPARISON OF SENSITIVITY OF BLOOD CULTURE, C-REACTIVE PROTEIN, AND ARTERIAL BLOOD GASES IN EARLY NEONATAL SEPSIS IN A TERTIARY CARE CENTRE, PESHAWAR

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ABSTRACT

Objectives: To determine the sensitivity of serum levels of C-reactive protein (CRP) and arterial blood gases (ABGs) along with blood culture in the diagnosis of early-onset neonatal sepsis.

Material and methods: This cross-sectional study was conducted at the Department of Pediatrics, Town Women and Children Hospital, Peshawar, from March 2020 to March 2023. A total of 215 neonates diagnosed with Early onset neonatal sepsis were included in the study. Full blood count, arterial blood gases, blood culture, and C-reactive protein were determined and assessed for diagnostic utility.

Results: Amongst the 215 neonates, the mean age was 5±2 days. There were 131 (61%) males and 84 (39%) females, with a male-to-female ratio of 1.1 to 0.7. Blood cultures were positive in 77 (36%) and negative in 138 (64%) cases. Arterial blood gases were abnormal in 180 (83%) cases and negative in 35 (17%) cases. Using the standard CRP cut-off value of 5 mg/dl, C-reactive protein was positive in 191 (88%) cases and negative in 24 (12%) cases. Sensitivity for blood culture, arterial blood gases, and C-reactive protein were 35%, 83%, and 88% respectively.

Conclusion: C-reactive protein and arterial blood gases are more sensitive for accurate and timely diagnosis of Early Onset Neonatal Sepsis in a resource restraint setup.

Keywords: Arterial blood gases, Blood culture, C-Reactive Protein, Early Onset Neonatal Sepsis, Mean platelet volume.

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INTRODUCTION

Early onset neonatal sepsis (EONS) is defined as the systemic bacterial infection of the full-term neonate presenting early in 72 hours of life, while in preterm neonates, it is usually considered up to 7 days of life. It is a life-threatening and serious condition. It remains the most important cause of high mortality and morbidity among children under five years of age in developed and developing countries. According to the United Nations Inter-Agency Group for Child Mortality Estimation (UN-IGME), in 2019 alone, neonatal mortality was highest in South Asia, with 25 deaths per 1,000 live births. A child born in South Asia was 9 times more likely to die in the first four weeks of life than a child born in a high-income country. Unfortunately, Pakistan has the highest neonatal mortality rate of 41.2 deaths per 1,000 live births, the risk of dying in the first month of life is about 55 times higher as compared to the rest of countries in the region. [1] The most common cause of neonatal death is, by far, neonatal sepsis. [2, 3]

The diagnosis of EONS is especially challenging owing to nonspecific signs in newborns and time-consuming investigations like blood cultures. Clinical signs of early-onset neonatal sepsis, according to WHO's Integrated Management of Childhood Illness (IMCI) guidelines, are described as the existence of any one of the following such as problem in feeding, moving only upon stimulation, severe chest retractions, history of convulsions, higher than normal or lower than lower temperature (normal being 35.5 C-37.5 C), and respiratory rate 60/min or more. [4] Delay in recognizing such patients and inappropriate treatment is associated with high complications and

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high mortality rates. Traditional markers like blood culture are still considered the gold standard and are of limited utility due to time consumption, cost-effectiveness, risk of contamination, large amounts of blood required, and non-availability in underdeveloped regions. [5] Prevalence of EONS is also noted to be around 74% as opposed to late-onset neonatal sepsis, which is around 30%. [6] Molecular methods such as PCR, Cytokines, and chemokines such as IL-6, IL-8, Gamma-Interferon, TNF-Alpha, sICAM &CD-64, Presefpsin and hormones like PCT (Procalcitonin) are being scrutinized as a surrogate biomarker used for diagnosis of EONS. [7, 8]

C-reactive protein, also known as pentraxin protein, is one of the newer ways to assess acute phase protein, which was discovered by Tillett and Francis in 1930. [9] CRP plays an important acute phase reactant protein synthesized in the liver due to humoral response to the bacterial invasion or inflammatory stimuli in neonatal sepsis. Usually, it correlates with the severity of neonatal sepsis, but its production varies significantly during the neonatal period. It is reliable, inexpensive, most widely used, easily available, safe, and an extensively studied biomarker. Its results are available in a few minutes to within an hour, although the point of care (POC) assay system is still a challenge. [10] The progress of the disease and duration of antibiotic therapy can be accurately monitored. [11] CRP has its limitations as it cannot differentiate between viral and bacterial infection and the simple stress of birth that a neonate goes through. Within 6 to 8 hours of infection, the CRP levels rise, and it reaches a peak at 24-48 hrs. It has a serum half-life of 5-7 hours. [12] Interleukin 6 (IL-6) is released because of inflammation, which triggers the increased production of CRP in the liver. The best predictive value of CRP has been observed if measured within 24-48 hours of onset of infection. Therefore, repeatedly near normal CRP values are of better diagnostic value against bacterial sepsis and can ensure safe use and discontinuation of antibiotics.

Despite its usefulness, CRP cannot be considered alone as an exclusive marker of infection. [13] Other parameters such as clinical history, birth history, clinical status, and other blood tests like White blood cell count, neutrophil band ratio, and platelets should be used as well. Due to the intricate pathophysiology of sepsis, it is likely that not just looking at one biomarker but probably a conjunction of biomarkers will be useful. [14]

Very limited studies have been done to investigate the role of blood gases in early-onset neonatal sepsis (EONS). Metabolic acidosis is usually present in neonatal sepsis due to septicemia, poor perfusion secondary to sepsis, and underdeveloped compensatory mechanisms. [15-18] Severe acidosis at presentation is associated with poor outcomes. Serial blood gases are a good indicator of metabolic changes occurring during the disease. [19-23.] In the current situation of Pakistan, with limited resources and unexplained neonatal deaths contributing to a higher proportion of mortality among under-fives, we must look at this old problem from new perspectives. We need local guidelines to help direct interventions for prevention, early diagnosis, and treatment of such burdensome conditions. [24, 25]

MATERIAL AND METHODS

This Cross-sectional analytical study was carried out in the Department of Pediatrics, Town Women and Children Hospital, Peshawar, for three years, i.e., from 01-03-2020 to 01-03-2023. A total of 215 neonates diagnosed with early-onset neonatal sepsis were enrolled using a non-probability purposive sampling technique.

Neonates enrolled were selected according to inclusion criteria, which included signs or symptoms of suspected sepsis in the form of respiratory distress, shock, changes in temperature, apnea, feeding difficulty, seizures, hypotension, oxygen dependency, poor peripheral perfusion, tachycardia, altered mental status, lethargy, skin mottling and unexplained acidosis. Neonates on antibiotics before the study, neonates with apparent malformations and an Apgar score of less than 7, and those with hypoxic-ischemic encephalopathy and prematurity were excluded. Detailed history regarding prenatal infections, modes of delivery, and use of antibiotics before delivery was obtained. Neonates were examined regularly for signs of sepsis, such as respiratory distress, fever, poor feeding, and lethargy.

High-suspicion neonates were investigated during their stay to establish the cause and diagnosis of EONS, who exhibited clinical signs and symptoms of sepsis at the time of admission or who developed sepsis during their hospital stay. The included patients were subjected to three classifications: the first classification was according to the result of the blood culture, divided into two subgroups (probable, if suspected sepsis with negative blood culture and proven, if with positive blood culture). Those with proven sepsis comprised two subgroups according to the positive CRP positive and negative, and the third was based on the blood gases positive for metabolic acidosis and negative.

Patients were recruited according to the declaration of Helsinki guidelines, and all parents of neonates were informed about the aim of the study and their written consent was obtained after approval of the Hospital ethics committee. Three milliliters of blood were obtained via venipuncture from a peripheral vein under an aseptic technique and sent for Full blood count and CRP using a Roche Diagnostic Cobas c311 hematology analyzer.

Blood gases were obtained using a heel prick and, via the capillary method, analyzed immediately in a blood gas analyzer (Medica Easylyte). Samples for blood Cultures and sensitivity were also sent. The results were analyzed using the statistical package SPSS 20. Percentages and frequencies were calculated. The Mean and standard deviation were calculated for continuous variables. Sensitivity was calculated by using the following formula: Sensitivity = True positive / (True positive +False Negative)

RESULTS

Amongst the 215 neonates, most neonates were aged 2 days old with a mean of 48 hours. There were 131 (61%) males and 84 (39%) females with a male-to-female ratio of 1.1 to 0.7, as shown in Table 1.

Characteristics of neonates are shown in Table 1, including males 131 (61%) and females 84 (39%) because male-gender neonates are more likely to be taken to the hospital for further management as compared to female neonates. Less than half of the neonates n=105 (48%) were of weights more than 2 kg. Rest was less than 2 kg of weight {n=110 (52%)}. In our present study, 134 (62%) of neonates were discharged after recovery. In comparison, the overall mortality of neonates was noted to be 67 (38%), excluding the fate of 14 neonates who left the hospital against medical advice. Among the expired neonates, there were more males, 53 (79%), as compared to females, 14 (21%) showing better survival in female neonates.

Table No 1: Characteristics of Neonates

Characteristics	Frequency n (%)
Gender	
Males	131(61%)
Females	84(39%)
Birth weight	
<1500-gm	18
<1500-2000kg	92
>2000kg-2500kg	105
Outcome	
Recovered	75males+59 females=134
Expired	53males+14 females=67
Not known due to LAMA	3males+11 females=14

Table No 2: Blood Cultures Results

Positive result	77 (36%)
Negative result	138 (64%)
Organisms	Gram Negative Organisms E-Coli:13 (38%)
	Gram Positive
	Staph Aureus 11 (30.8%)
	Pseudomonas 8 (22%)
	Klebsiella 3 (7%)

Table No 3: Comparison of Diagnostic accuracy of Blood culture, CRP, and ABGs

Diagnostic modality	True positives	True positive+ False negative	Sensitivity
Blood culture	77	77+138	35%
CRP	191	191+24	88%
ABGs	180	180+35	83%

As shown in Table 2, the most common gram-negative organisms isolated were E-Coli followed by Pseudomonas and Klebsiella. Among gram positives, the most common cultured pathogen was Staphylococcus Aureus.

DISCUSSION

Newborns are at a very critical time in their lives due to a weak immune system, which makes them more prone to infections. Early onset neonatal sepsis is usually acquired from pathogens in the maternal genital tract. [26] The mortality rate ranges between 20-50% depending upon the causative agent and type involved, higher being with gram-negative and Enterococcus species. [27, 28] The microorganisms involved differ between developed countries and developing countries. Pakistan has the highest neonatal mortality of 46/1000 live births and is one of the five countries in Asia, contributing to 49% of neonatal deaths. [29, 30] About 99% of children from developing nations contribute to the 1.6 million neonatal deaths, and nearly half are from Pakistan. According to a Cohort study in Pakistan, 45% of deaths occurred within 48 hours of birth and 70% within the first week of life. Causes of such high death rates include low birth weight, Prematurity, Birth asphyxia, and infections. [31] Under such circumstances, it is a big challenge for clinicians to curb the emerging threat along with anti-microbial resistance to usual antibiotics in a resource restraint setting. [32]

Conventionally, the diagnosis is usually made by hematological tests, including CRP. The sensitivity and specificity of these vary widely in the literature. The challenge in the management of such neonatal sepsis is timely and accurate diagnosis. [33] There is a dire need for diagnostic tests that have high sensitivity as well as a quick turnaround time so that neonates can be taken off undesirable long antibiotic treatment. Another major problem is the identification of causative agents, which also results in delays in treatment. [34] Our present study is done to evalu-

ate the usefulness of CRP and blood gas analysis as disease markers. These are easily performed, and results are also readily available in a shorter period when compared to the gold standard of blood cultures. [35] In our present study, we used quantitative analysis of CRP and blood gas analysis by heel prick of neonates. It was done on 215 neonates who were included according to the criteria of preterm neonates (28-36 weeks of gestation) of less than 72 hours of age and term neonates of less than 72 days old.

According to many studies, the lone diagnostic value of CRP is around 78% sensitivity. The higher negative predictive value of CRP is around 80%, meaning it can help to stop undesired prolonged use of antibiotics. [36] Serial estimation of CRP along with blood gases was better at predicting the diagnosis and can help clinicians start necessary antibiotics until the culture results are available. In resource restraint areas like Pakistan, CRP, and blood gases are invaluable means in the management of such neonatal infections. All such neonates suspected of Early-onset Neonatal sepsis may be screened with these initial tests, making sure neonatal sepsis is diagnosed early and reliably, and unnecessary antibiotics are not used.

In our present study, the majority of neonates were aged 2 days old with a mean of 48 hours. There were 61% of males and 39% of females with a male-to-female ratio of 1.1 to 0.7. This slight male predominance is also reported by Faisal et al. [37] The reason can be attributable to X X-linked gene regulatory factor contributing to male neonates' more susceptibility to infections and the fact in developing countries with resource constraint settings; there is a higher likelihood of a male neonate to be brought for medical treatment as compared to female neonates.

Blood cultures were positive in 36% and negative in 64% of cases. There were also studies reporting the same rate between 30-45% positivity. [38-40] Cultures positive for the EONS like other studies done pointing to the third world countries' low standards of Laboratory Quality control apart from other factors. In our present study, the 190 neonates had signs and symptoms of sepsis but mostly had negative cultures. Our present study implies that about 88% of suspected cases of EONS can be diagnosed correctly by CRP estimation. Similarly, a negative CRP test can help stop the usage of antibiotics in neonates. [41]

CONCLUSION

C-reactive proteins, along with blood gases, are a better diagnostic indicator of early-onset neonatal sepsis. The quantitative estimation of CRP, as well as Blood gas analysis, is a simple and cost-effective way to aid the diagnosis. Such methods can help in the accurate diagnosis of EONS. In a resource-poor setting, such a combination can prove invaluable, as blood cultures are expensive and time-consuming. This combination can help to screen neonates with suspected EONS and can aid in timely and accurate diagnosis.

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Authors Contribution:

Following authors have made substantial contributions to the manuscript as under

Authors	Conceived & designed the analysis	Collected the data	Contributed data or analysis tools	Performed the analysis	Wrote the paper	Other contribution
Ali M	✓	×	✓	×	✓	×
Khan MI	✓	✓	×	✓	✓	×
Rehman N	×	✓	×	×	✓	×
Shafi M	✓	✓	✓	×	✓	✓
Hussain S	✓	×	✓	×	✓	✓
Tariq S	✓	×	×	×	×	✓

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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ORIGINAL ARTICLE

FREQUENCY OF POSTOPERATIVE COMPLICATIONS ASSOCIATED WITH IMPACTED MANDIBULAR THIRD MOLAR REMOVAL IN PATIENTS PRESENTING TO A TERTIARY CARE HOSPITAL

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ABSTRACT

Objectives: To determine the frequency of postoperative complications associated with impacted mandibular third molar removal in patients presenting to a tertiary care hospital (Hayatabad Medical Complex, Peshawar)

Material and Methods: A descriptive Cross-sectional study was conducted on 132 patients with post-op complications after third molar removal. Both genders and patients ages 17 to 60 were added. Patients with missing clinical history, radiographs, and fractured mandibles were excluded from the study. Postoperative complications were recorded on a predesigned proforma.

Results: Mild pain was found in 49 (37.1%) patients, moderate pain was found in 71 (53.8%) patients, and severe pain was recorded in 12 (9.1%) patients. Dry socket was found in 16 (12.1%) patients. Infection was found in 5 (3.8%) patients. Inferior alveolar nerve (IAN) damage was found in 3 (2.3%) patients and Lingual nerve damage was found in 6 (4.5%) patients.

Conclusion: In our study, the postoperative complications of concerns in patients associated with impacted mandibular third molar removal were dry socket in 12.1% of patients, infection in 3.8% of patients, IAN nerve damage in 2.3% of patients, and lingual nerve damage that was found in 4.5% patients.

Key Words: Complications, mandible, third molar surgery

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INTRODUCTION

An impacted tooth fails to erupt in the normal functional position within its expected time of eruption. This may be due to a lack of space in the dental arch, obstruction of the third molar due to another tooth or bone, or development in an abnormal position. Impaction is mostly associated with lower third molar. It accounts for 98% of all the impacted teeth. [1] The suggested etiology of the increased impaction rate is inadequate space in the retromolar area. There is a higher incidence of impaction in females than in males. [2, 3] The patients' age and depth of impaction may be directly related to the post-op complication. [4] Postoperative complications are related to the tooth position based on Winter's classification. The chances of complications are almost twice as high with Mesio-angular and disto-angular impactions compared to other types of tooth impaction. [5] However, some authors suggest that horizontal and disto-angular impactions result in more adverse post-op results. [6]

Complications after third molar surgery are pain, dry socket, swelling, paresthesia of the lingual or inferior alveolar nerve, bleeding, and infection. The frequency of dry sockets varies widely, with mild pain reported in 37.7% of cases on the 3rd post-op day, ranging from 0.5% to 68.4%. Some studies indicate a rate between 5% to 10%. It was found to be more common in females. The frequency of postoperative infection varies between 1.5% and 5.8% and between 0.9% and 4.3%. [7]

There is a 0.7% to 1.0% incidence of inferior alveolar nerve and lingual nerve damage, respectively. [8] The depth of impaction, the patient's age, and the operator's experience are directly proportional to the overall incidence of complications. Mesio-angular and disto-angular

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impaction presents with more complications after surgery. Inferior alveolar nerve position is associated with two predictors of injury, i.e., direct contact and narrowing of the inferior alveolar nerve (IAN) canal. [9]

The rationale of this study was to find out the frequency of postoperative complications after mandibular third molar extraction to generate local data. This information will be shared with other practitioners, and strategies for reducing complications will be developed. Furthermore, this study will also assist in conducting a clinical audit.

MATERIAL AND METHODS

A descriptive cross-sectional study was conducted at the Department of Oral and Maxillofacial Surgery Hayatabad Medical Complex, Peshawar, from 1st October 2020 to 31st October 2022. Ethical approval was obtained from the research and ethical committee of Hayatabad Medical Complex. A total of 132 patients from both genders with ages ranging from 17 to 60 years who were diagnosed and indicated for impacted lower third molar removal were included in the study. Informed verbal consent was obtained from the patient after explaining the study's purpose and benefits.

A detailed history, clinical examination, and orthopantomogram (OPG) were advised to confirm the diagnosis and classification of the impacted third molar in the lower jaw. One week after the tooth extraction, a follow-up was conducted. During this visit, data on any post-operative complications, such as signs of infection, IAN injury, lingual nerve damage, or dry socket, were collected using a pre-designed proforma.

Subsequently, the data was entered into a secure electronic database for proper data management and storage, adhering to privacy and confidentiality guidelines. Confidentiality and data handling protocols were followed throughout the data collection process, and the researcher's signature was obtained on the completed proforma to authenticate their involvement in the study.

The collected data was then analyzed using SPSS version 20. Mean and standard deviation were calculated for numerical variables like age. Frequencies and percentages were calculated for categorical variables like gender, post-operative complications, and classification of impacted lower third molars.

Table No 1: Frequency of Age distribution of the study population

Age groups	Frequency	Percent
17 to 25	29	22.0
26 to 45	53	40.2
46 to 60	50	37.9
Total	132	100.0

Table No 2: Frequency of complications in an impacted tooth

Complications	Yes (%)	NO (%)	Total
Dry socket	16 (12.1)	116 (87.9)	132 (100)
Infection	5 (3.8)	127 (96.2)	132 (100)
IAN damage	3 (2.3)	129 (17.7)	132 (100)
Lingual nerve damage	6 (4.5)	126 (95.5)	132 (100)

RESULTS

This study was conducted on 132 patients who presented to OPD for impacted third molar removal. The mean age of the patients was 38.39±13.12 years (Table 1). Considering gender distribution, there were 69 (52.3%) males and 63 (47.7%) females. Pain on the Visual Analogue Scale (VAS), mild pain was found in 49 (37.1%) patients, moderate pain was found in 71 (53.8%) patients, and severe pain was recorded in 12 (9.1%) patients. The frequency of various complications is shown in Table 2. According to the class of impaction, horizontal impaction was found in 24 (18.2%) patients, mesioangular impaction was found in 42 (31.8%) patients, vertical impaction was found in 30 (22.7%) patients and disto-angular impaction was found in 36 (27.3%) patients.

DISCUSSION

Third molars in the lower jaw are most impacted, and surgical extractions have become one of the most common dentoalveolar surgeries.[10] Reasons for impaction may be lack of space and late eruption sequence compared to other teeth in the jaw. Common symptoms of impacted lower third molar may include inflammation of the overlying gums, decay of the adjacent molar, cystic lesions, neoplasms, and pathological root resorption. According to studies, an impacted third molar weakens the angle of the jaw, making it vulnerable to fracture. Crowding, Temporomandibular disorders (TMDs), and oral and facial pain may be related to the third molars' failure to erupt in the jaw.

The symptomatic impacted mandibular third molars may require removal through forceps or surgically by reflecting mucoperiosteum and bone/tooth cutting. Before undergoing any procedure, the patient is informed of the

rationale for the surgery and the potential consequences. [11]

Pain is inevitable following the third molar surgery. When the effects of the local anesthetic wear off, the post-surgical discomfort begins and peaks 6 to 12 hours after surgery. Mild postoperative pain was reported by 37.1 % of participants in our study, whereas moderate pain was reported by 53.8 %. Results of pain experience are almost comparable to other studies, which reported that 37.7% of patients experienced mild pain on the third postoperative day, whereas 43.4 % reported no pain on the seventh day.[11] Compared to a regional study, the frequency of mild, moderate, and severe pain after 1 week of third molar extraction was 41%, 10%, and 4%, respectively. [12]

The incidence of dry sockets is lower with atraumatic extraction (0.5% to 5.6%) than surgical extraction, with about 30% of lower third molar impactions reported.[12,13] A dry socket may develop after two to five days post-extraction. This condition may present acutely with throbbing pain and an unpleasant odor. [14] Our study found 12.1% cases of dry sockets, while in one study, the reported prevalence was 2.7%, and in a regional study, there were 4.2% cases of dry sockets. [6, 8]

Postoperative infection may range from 1.5% to 5.8% or 0.9 % to 4.3%, comparable to our findings of 3.8%. Infection following mandibular third molar removal is a rare problem. Localized sub-periosteal abscess-type infections account for around half of all infections. These are mainly caused by debris that accumulates beneath the mucoperiosteal flap and can be removed with surgical debridement and drainage. Only a small percentage of postoperative infections are severe enough, which may necessitate surgery, usage of antibiotics, and or hospitalization.[15]

Third molar surgery may sometimes be associated with lingual or inferior alveolar nerve (IAN) injury. These complications vary with the position of the respective impactions, approximation with the inferior dental canal, and the surgeon's expertise. IAN nerve injury was reported to be 2.3%, while Lingual nerve injury was 4.5%. Injury related to inferior dental and lingual nerve varied from 0.4% to 22%. A local study in Pakistan showed 1.2% IAN associated with third molar extraction.[16,17] The sensory deficit varied from 0.1 % to 22 % and 0.26 % to 8.4 % with the lingual nerve and inferior dental nerve, respectively, after extracting the third molar impaction. [8]

CONCLUSION

In our study, the postoperative complications of concern in patients associated with impacted mandibular third molar removal were dry socket in 12.1% of patients, infection in 3.8% of patients, IAN nerve damage in 2.3% of patients, and lingual nerve damage that was found in 4.5% patients.

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Authors Contribution:

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Fahimuddin	✓	×	✓	×	✓	×
Naeem K	✓	✓	×	✓	✓	×
Kayani H	×	✓	×	×	✓	×
Ashraf N	✓	✓	✓	×	✓	✓

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ORIGINAL ARTICLE

FREQUENCY AND DETERMINANTS OF ROAD TRAFFIC ACCIDENTS AMONG DRIVERS OF KHYBER PAKHTUNKHWA PAKISTAN: A PUBLIC HEALTH PERSPECTIVE

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ABSTRACT

Objective: The objective of this study was to assess the frequency and determinants of road traffic accidents among drivers of Peshawar, Kohat, and Swat Districts, Khyber Pakhtunkhwa, Pakistan.

Methods: A cross-sectional descriptive study was conducted by the Department of Community Medicine at Nowshera Medical College, Nowshera, from August 2023 to March 2024. After obtaining ethical approval, a total of 159 drivers were enrolled. A self-structured questionnaire was used to collect information regarding demographics & determinants of road traffic accidents. SPSS Software version 23.0 was used for data analysis, and finally, results were presented in tables. The chi-square test was used for statistical association.

Results: The prevalence of accidents was 59.75%. Moreover, 10.69% of drivers had an age < 18 years; 70.44% were tobacco smokers, 54.08% had < 5 years of driving experience, and 59.12% were illiterate. Additionally, 68.55% had a monthly income of less than 35000 PKR, 55.97% worked 7 days a week, and 27.04% had no valid driving license. Furthermore, 76.10% didn't check their vehicles; 27.04% had no driving license, 65.41% used mobile while driving, 37.11% were using seat belts, and 30.82% were over-speeding.

Conclusions: The prevalence of accidents was moderate to high rate. The important determinants of road traffic accidents revealed a strong significant association with age, years of driving experience, literacy status, hours of sleep per day, tobacco & other drug addiction. Moreover, the use of mobile phones, availability of seat belts & their compliance, and over-speeding were important determinants, and thus, appropriate measures were needed to prevent and reduce the prevalence of road traffic accidents.

Keywords: Road Traffic Accidents: Drivers, Illiteracy, Tobacco Smoking, Seat Belts, Seat Belt, Mobile.

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INTRODUCTION

Worldwide, road traffic plays a vital role in the economy as well as the development of a nation. [1] However, road traffic accidents are the 8th leading cause of disability, morbidity, and mortality both in developing and developed countries and are considered as the major public health problems. [2, 3, 4] According to the Haddon Matrix, many determinants of agent, host, and environments showed association with road traffic accidents. [5, 6] Moreover, the interplay of pre-event, event, and post-event factors results in the causation of accidents. [6 7]Furthermore, it is estimated that due to road traffic accidents, the total number of accidents will rise by 55% and deaths by more than 75%.[8, 9]

The prevalence of road traffic accidents is on the rise due to demographic imbalances, with an increased number of vehicles on roads and road networks accompanied by drivers' lack of awareness of road safety and poor attitude of drivers regarding road safety measures. [2, 10] We know that when car quantity increases, then accidents and injuries related to road traffic problems are increased. [11],

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[10] According to the WHO statement, 1.42 million individuals suffered injuries, impairment, or deaths. [5 12] Moreover, according to WHO, RTAs will result in socio-economic disruptions to individuals, families, and countries as their incidence and prevalence are increasing day by day, both in developed and developing countries. [6, 13, 14] Moreover, the important causes responsible for road traffic accidents were the drivers, vehicles, and environmental factors as laid down in the Haddon Matrix, comprising before-accident, during-accident, and after-accident determinants. [15] Many international studies have revealed the relationships between personal behavioral, demographic, legislative, and vehicle determinants and road traffic accidents. [3] Moreover, human factors, such as driver errors, are one of the significant contributors to road traffic accidents. [16, 17]. Furthermore, over-speeding and violation of rules and regulations of road safety results in a higher prevalence of road traffic accidents. [1, 3]

There is strong evidence between road traffic accidents and the education level of drivers. [2] Moreover, smartphone usage among drivers, fatigue, and long routes are the important factors causing accidents. [12, 13, 15] Furthermore, exhaustion of drivers due to overwork as well as less rest are the major factors in causing 15–30% of all road traffic accidents. [7, 16, 18] Moreover, unlicensed drivers were involved in most of the road traffic accidents. [15 19] Furthermore, many studies have found a strong relationship between eyesight problems and medical conditions among drivers in road traffic accidents. [20, 21, 22] Road traffic accidents are prevalent in developing countries due to the presence of all direct and indirect factors affecting road traffic accidents. Besides disability and injury, road traffic accidents result in loss of working days. Therefore, this cross-sectional study was conducted to assess the frequency of road traffic accidents and their important determinants among drivers of districts Peshawar, Kohat & Swat in Khyber Pakhtunkhwa, Pakistan.

MATERIALS AND METHODS

After approval from the ethical review committee, a descriptive cross-sectional study was conducted from August 2023 to March 2024 by the Department of Community Medicine, Nowshera Medical College Nowshera, from drivers of Peshawar, Kohat and Swat, districts Khyber Pakhtunkhwa Pakistan. According to the WHO sample size calculator, a sample size of 159 drivers was selected based on 10% prevalence, 95% confidence interval, and 5% absolute precision. Moreover, those drivers who were not permanent residents of the study areas were excluded. A semi-structured questionnaire was prepared for important determinants. Data was collected regarding demographics and important determinants of drivers, comprising all important direct and indirect factors affecting road traffic accidents. SPSS version 23.0 & Microsoft Office 2010 was used for data management. Finally, frequency and percentage were calculated along with demographic characteristics of drivers and finally presented in the form of tables. For statistical associations, the Chi-Square Test (x^2-test) was applied to categorical variables, and the p-value was calculated for interpretation.

RESULTS

The frequency and percentage of road traffic accident/s among 159 drivers of selected districts of Khyber Pakhtunkhwa Pakistan are shown in Table No. 1. The demographic and personnel characteristics of drivers of selected districts of Khyber Pakhtunkhwa Pakistan are shown in Table No. 2. The important determinants of Road

Table No 1: Showing Frequency of History of Road Traffic Accidents among 159 Drivers of Khyber Pakhtunkhwa Pakistan

History of Road Traffic Accidents	Yes	95	59.75%
	No	64	40.25%

Table No 2: Showing Demographic & Personnel Characteristics Of Drivers of Khyber Pakhtunkhwa Pakistan

Demographics of Drivers	Variables	Frequency	Percentage
Age	< 18 years	17	10.69
	18-35 years	74	46.54
	35-60 years	43	27.04
	60 & above	25	15.72
Experience of Driving	< 1 year	25	15.72
	1-5 years	61	38.36
	5-10 years	52	32.70
	< 10 years	21	13.21
Educational Status	Illiterate	94	59.12
	Middle/ Secondary	48	30.19
	Above Secondary	17	10.69
Monthly Income in PKR	< 20000	44	27.67
	20000-35000	65	40.88
	35000-50000	33	20.75
	> 50000	17	10.69
Marital Status	Married	117	73.58
	Unmarried	42	26.42
Working Days per Week	Five	29	18.24
	Six	41	25.79
	Seven	89	55.97
Driving Hours Per Day	6-7	24	15.09
	8-9	37	23.27
	10-11	63	39.62
	12 & above	35	22.01
Average hours of sleep per day	< 6	38	23.90
	6-8	78	49.06
	9 & above	43	27.04

Table No 3: Showing Association of Determinants with History of Road Traffic Accidents among drivers of Khyber Pakhtunkhwa Pakistan

Determinants	Variables	History of Accidents f (%)	No History of Accidents f (%)	X2- test (p-value)
Age	< 18 years	15 (9.43)	2 (1.26)	6.423* (0.0113)
	18 & above	80 (50.31)	62 (38.99)	
Experience of Driving in Years	< 5 years	59 (37.11)	27 (16.98)	4.781*(0.0144)
	5 & above	36 (22.64)	37 (23.27)	
No of hours sleep per day	< 8 Hours	64 (40.25)	19 (11.95)	21.76*(0.0001)
	8 & above	31 (19.50)	45 (28.30)	
Educational Status	Illiterate	71 (44.65)	29 (18.24)	10.463*(0.0006)
	Literate	24 (15.09)	35 (22.01)	
Having Driving License	Yes	64 (40.25)	52 (32.70)	3.735*(0.0266)
	No	31 (19.50)	12 (7.55)	
Do you smoke tobacco?	Yes	73 (45.91)	39 (24.53)	4.645*(0.0311)
	No	22 (13.84)	25 (15.72)	
Are you addicted to alcohol?	Yes	7 (4.40)	4 (2.52)	0.074**(0.3926)
	No	88 (55.35)	60 (37.74)	
Are you addicted to any other drugs?	Yes	52 (32.70)	11 (6.92)	22.537*(0.0001)
	No	43 (27.04)	53 (33.33)	
Have you checked the vehicle last month?	Yes	11 (6.92)	27 (16.98)	19.698*(0.0001)
	No	84 (52.83)	37 (23.27)	
Have you done a medical checkup in the last 12 months?	Yes	18 (11.32)	30 (18.87)	14.152*(0.0001)
	No	77 (48.43)	34 (21.38)	
Do you have any eyesight problems?	Yes	31 (19.50)	14 (8.81)	1.696**(0.0964)
	No	64 (40.25)	50 (31.45)	
Is there any problem with your vehicle currently?	Yes	36 (22.64)	16 (10.06)	2.889*(0.0446)
	No	59 (37.11)	48 (30.19)	
Do you follow traffic laws?	Yes	71 (44.65)	48 (30.19)	0.908**(0.1703)
	No	24 (15.09)	16 (10.06)	
Do you have any acute medical condition?	Yes	23 (14.47)	10 (6.29)	1.14**(0.1428)
	No	72 (45.28)	54 (33.96)	
Have any chronic medical conditions?	Yes	27 (16.98)	18 (11.32)	0.011**(0.4581)
	No	68 (42.77)	46 (28.93)	
Use of mobile phone while driving	Yes	67 (42.14)	37 (23.27)	2.732*(0.0482)
	No	28 (17.61)	27 (16.98)	
Is there a seat belt in a vehicle?	Yes	50 (31.45)	43 (27.04)	3.337*(0.0339)
	No	45 (28.30)	21 (13.21)	
Are you using a seat belt while driving?	Yes	49 (30.82)	51 (32.08)	12.946(0.0002)
	No	46 (28.93)	13 (8.18)	
Do you drive too fast/ over-speed?	Yes	28 (17.61)	21 (13.21)	11.31*(0.0004)
	No	67 (42.14)	43 (27.04)	

Traffic Accidents among drivers of selected districts of Khyber Pakhtunkhwa Pakistan are shown in Table No. 3.

DISCUSSION

This study was conducted to find the frequency of road traffic accidents and to assess important determinants affecting road traffic accidents among drivers of selected districts and thus might help in the prevention and control strategies regarding road traffic accidents.

Underage driving is one of the important determinants of road traffic accidents. In our study, the prevalence of drivers aged less than 18 years was 10.69%, whereas

an international study by Masoumi et al., 2016; showed a prevalence of 5.3%. [6] Moreover, in our study, 15.72% were aged 60 or above 60 years, whereas, in the study of Boulagouas et al., 2020, it had an 11.04% prevalence. [1] Furthermore, in our study, 57.23% had aged less than 35 years, while the study of Wontorczyk & Gaca, 2021 had 55% of study participants aged below 35 years. Thus, both studies revealed similar findings due to the lack of employment facilities. [17]

Globally, determinants like education level, work burden, and sleep hours showed a strong relationship with road traffic accidents. A study by Mekonnen et al. (2019) found that 56.0% of drivers were literate and 31.9% of drivers worked for more than 12 hours, whereas in our study, the prevalence was 30.195 and 22.01%, respectively. [5] In our study, 10.69% had education above secondary level, while the study of Tadege, 2020, revealed a literacy prevalence of 22.4%. [2] Moreover, in our study, 55.79% of drivers worked seven days a week, as was found in studies by Smit, 2016; Yan et al., who found 30.76%% and 41.25% prevalence, respectively. [13 16] Furthermore, in our study, 23.90% of drivers had less than six hours of sleep per day, whereas a study by Mekonnen et al., 2019 revealed a prevalence of 31.9% or less sleep, and thus, drivers reported drowsiness during their driving time [5].

The implementation of rules and regulations regarding road traffic accidents and safety plays a significant role. According to our study, 26.42% of drivers didn't have valid driving licenses while driving on roads, as was reported and supported in a study by Boulagouas et al., 2020, which found 10.28% non-compliance toward license. [1] Moreover, in our study, 84.28% used mobile phones while driving, whereas, in the study of Boulagouas et al., 2020, 75.07% used mobile gadgets while driving [1].

Driver's behavior, addiction to drugs & alcohol, and literacy level are also vital determinants and have significant roles in the causation of road traffic accidents. In a study by Gicquel et al., 2017 8-10% of drivers were found to have alcohol exposure, while in our study, around 6.92% were exposed to alcohol. [15] Moreover, in our study, 23.9% of drivers checked their vehicles in the last 12 months, whereas a study by Aghayari et al., 2021, showed a prevalence of 36.5%. [12]

Furthermore, in our study, 79.87% of vehicles had seat belts, and only 52.20% used them while driving, whereas a study by Masoumi et al., 2016 reported that 100% of vehicles had seat belts, and 100% compliance was shown by drivers. [6]

Additionally, in the study of Tajvar et al., 2015, 44.80% of drivers didn't use seat belts, and thus, our findings were consistent with Tajvar et al., 2015 study and less as compared to Masoumi et al., 2016 study. [3 6] Thus, illicit drug use, improper vehicle maintenance, and non-compliance with seat belts were important determinants affecting road traffic accidents among drivers.

CONCLUSION

It was concluded that road traffic accidents showed moderate to high prevalence among the selected districts. Moreover, road traffic accidents revealed a significant association with the age of drivers, driving experience, driving license, literacy status, number of hours of sleep per day, tobacco smoking & other drug addiction. Furthermore, the use of mobile phones during driving, the availability of seat belts & their compliance, and speeding, i.e., driving too fast, also revealed significant associations with road traffic accidents. Therefore, individual, social, and legislative interventions were needed to reduce the prevalence of road traffic accidents among drivers.

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Authors Contribution:

Following authors have made substantial contributions to the manuscript as under

Authors	Conceived & designed the analysis	Collected the data	Contributed data or analysis tools	Performed the analysis	Wrote the paper	Other contribution
Ishtiaq M	✓	×	✓	×	✓	×
Ullah N	✓	✓	×	✓	✓	×
Khan MJ	×	✓	×	×	✓	×
Khan MK	✓	✓	✓	×	✓	✓
Mustafa A	×	✓	×	×	✓	×
Iftikhar B	✓	✓	×	✓	✓	×
Khan SA	×	✓	×	×	✓	×

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Ethical Approval:

This Manuscript was approved by the Ethical Review Board of Nowshera Medical College Nowshera. Vide No. 2595/NMC/PS/DEAN. Dated: 05 07 2022

DENTAL ABSCESS UNLEASHING AS NECROTIZING FASCIITIS IN AN ELDERLY PATIENT: A CASE REPORT

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ABSTRACT

An elderly patient with a medical history of Type 2 diabetes and hypertension, a complex clinical presentation of dental abscess leading to necrotizing fasciitis, thorough examinations, pertinent laboratory findings, radiological results, multidisciplinary evaluations, a definitive diagnosis, and a meticulously designed treatment plan is the subject of this extensive case report, which offers an in-depth analysis of a unique clinical case. The report emphasizes the case's importance in terms of its instructive value and the practical implications it provides for therapeutic practice. With the help of the multidisciplinary team and extensive assessments, a complete treatment plan comprising surgical procedures, medication, and therapeutic modalities was developed. This case study highlights the value of interdisciplinary cooperation and highlights significant insights discovered in managing medical cases.

Keywords: Necrotizing fasciitis, Dental abscess, Type 2 diabetes, Hypertension.

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INTRODUCTION

A dental abscess is a localized collection of pus in the alveolar bone near the tooth's root. [1] It is polymicrobial, containing both facultative anaerobes, such as Streptococcus anginosus and Streptococcus viridians, and strict anaerobes, particularly anaerobic cocci, Fusobacterium and Prevotella species. [2] It is frequently the result of dental cavities, deep fillings, trauma, or unsuccessful root canal treatment. The most common indications and symptoms of Dental abscess are pain, redness, swelling, tumor, and loss of function, all of which occur near the affected tooth. The treatment of choice would be surgical drainage and antibiotics. [3] If not treated promptly, it can further lead to complications such as cavernous sinus thrombosis, airway obstruction, brain abscess, septicemia, shock, and rarely necrotizing fasciitis. Necrotizing fasciitis is a potentially fatal bacterial skin infection characterized by subcutaneous tissue and underlying fascia necrosis. Also, there is a rapid spread of infection; the treatment requires surgical debridement of non-viable tissue and administration of broad-spectrum antibiotics. It is said to be least common and aggressive in the head and neck region, especially the face, this report shows a dental abscess complicating into necrotizing fasciitis. [4]

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CASE PRESENTATION

A 60-year-old female patient with a history of Diabetes Mellitus type 2 and hypertension from Afghanistan arrived at the emergency room in Peshawar complaining primarily of tooth pain, right facial swelling, and occipital pain for one month after the patient had dental crowning treatment progressing to breathing difficulties, peri-orbital edema, facial edema, left-sided jaw angle deviation, and immobile eyelids on her right side. In the emergency room, she was irritable, drowsy, mentally altered, and severely acidotic, with elevated blood sugar levels (553 mg/dl) and a Glasgow coma scale score of 13/15.

The patient underwent a comprehensive evaluation by a multidisciplinary team of medical professionals. Following a pulmonologist's initial assessment (Table No. 1), recommended head and neck CT. In addition to potassium chloride (25ml two ampules OD) and NISF normal saline (1000ml IV infusion), the patient's previous treatment regimen of Meronem (1g TDS), ATEM Nebulizer Solution 0.025% (6 hourly 2ml), Ventolin Respirator solution (6 hourly 20ml), paracetamol (1g/100ml OD), Lantus (20 units OD), and Humulin (IV infusion adjusted

according to RBS) was maintained. Evaluation by the ENT Surgeon reported implanted lower teeth, unsatisfactory oral hygiene, intact bluish right buccal mucosa, pus collection in the right upper molar and pre-molar cavities, limited mouth opening, and soft to firm palpable consistency were among the noteworthy findings. Visualization of the larynx was difficult, and the right side showed signs of periorbital edema. Additionally, he recommended adding sodium chloride nasal drops (2 drops Q.I.D) and ofloxacin eyedrops (3 drops BD) along with stringent oral cleanliness and hydration. The primary physician added dextrose saline 0.5% (70 ml/hour), NISF (70 ml/hour), Vancomycin (1 g TDS) following serum levels of 13.2 ug/ml, Resource Diabetes (3 spoons in 150 ml water TDS), and continued with Ofloxacin eye drops, Sodium Chloride nasal drops, Meronem, and Potassium Chloride the following morning after the ABGs had improved. The sublingual and submental areas had a hard consistency, suggesting that the lower teeth could be the source of the infection, according to the maxillofacial Surgeon. Necrotizing fasciitis was suspected after a diagnostic process comprising repeated pricks on the affected side; however, no bleeding was seen, supporting the tentative diagnosis of necrotizing fasciitis. Therefore, acetylsalicylic acid was added to the treatment regimen, Polyfax plus (topical Q.I.D) was prescribed, and staying warm was advised. Debridement of the damaged lower teeth was recommended as a surgical option. The plastic surgeon noted swelling on the right forehead that extended to the right submandibular area, ecchymotic patches from the right temporal to the right submandibular areas, and noticeable black patches that suggested epidermolysis further advising CT angiography (CTA) or Doppler ultrasonography. No flow was visible in the distal branches of the external carotid artery. The patient was started on Enoxaparin Sodium 6000 units (50mg BD) and the patient's family was counseled accordingly about the patient's condition and treatment plan. The patient underwent a variety of lab tests during her stay, some of which are listed below.

Table No 1: Baseline Workup of Patient on First Presentation.

Lab Test	Result	Normal Range
Hemoglobin	11.90g/dl	11 – 16g/dl
Red Blood Cell Count	4.24 ×10^12/L	4.5 – 5.5× 10^12/L
Total Leukocyte count	34.40 ×10^9/L	4 - 11×10^9/L
Platelets	964.00 ×10^9/L	140 – 450×10^9/L
Neutrophils	93 %	40 – 75%
C Reactive Protein	15.95 mg/dL	<0.5mg/dl
Pro thrombin Time	12.3 Seconds	11 Seconds
A.P.T. T	55.3 Seconds	30 Seconds
D. Dimer	1502 ng/ml	Up to 250ng/ml
Lactic Acid (Arterial)	35.6 mg/dl	4.5 – 14.5mg/dl
Troponin I	< 10.0 pg/ml	13.8 – 17.5 pg/ml
RBS	553 mg/dl	110 – 165mg/dl
Hba1c	15.1 %	4.9 -5.9%
Urine Albumin	+	Nil
Urine Ketones	++++	Nil
Malarial Parasite	No MP Seen	
Dengue	Negative	
Urine C/S	Fungal count, more than 105 organism/ml, with profuse growth of Candida specie obtained after overnight aerobic incubation at 37°C.	
Blood C/S	Culture yielded growth of Coagulase-negative Staphylococcus obtained after 48 hrs aerobic incubation at 37°C.	
LFTs	Within Normal Range	
Urea	80 mg/dL	10 - 40mg/dl
Creatinine	1.22 mg/dl	0.2 – 1.2mg/dl
eGFR	47.78 mL/ Min/1.73m^2	60 - 125mL/ Min/1.73m^2
Sodium	137.9 mmol/L	135 – 145mmol/L
Potassium	4.64 mmol/L	3.5 – 5.0mmol/L
Chloride	101.4 mmol/L	98 – 107 mmol/L
Bicarbonate	7.5 mmol/L	22 – 30 mmol/L
Ph	7.429	7.35 -7.45
PO2	119.6 mmHg	83 – 108 mmHg
PCO2	18.7 mmHg	40 – 46 mmHg

DISCUSSION

Necrotizing fasciitis is an uncommon yet severe soft tissue infection that encompasses the widespread and swift destruction of fascial planes, subcutaneous tis-

Figure 1: Necrotizing fasciitis in a 60-year-old lady.

sue, and muscles. It can present as a typical dental abscess. [5] The development of dental abscess-associated necrotizing fasciitis is influenced by several risks, such as poor dental care and immunocompromised states. Surgical exploration remains the gold standard. Increasing clinical suspicion is assisted by a score called "LRINEC (Laboratory Risk Indicator for Necrotizing Fasciitis)," which evaluates laboratory testing of leukocyte count, CRP, and Creatinine. [6]

In the absence of radiological findings, it is crucial not to wait for surgery when Cervical Necrotizing Fasciitis is believed to be very likely. Death is reported in delayed surgery beyond 90 hours. When complicated with mediastinitis, mortality rises to 41% from 7% - 21%. [7]

The cornerstone of management includes surgical debridement that seeks to remove necrotic tissues and control the spread of infection. Immediate broad-spectrum intravenous antibiotics are started. Tooth extraction or drainage of a fistula resulting from the dental abscess should be carried out before managing the source of infection. Adjunctive hyperbaric oxygen therapy for increased tissue oxygenation can also be used. If not treated or improperly managed, dental abscesses may progress into necrotizing fasciitis. [8] Teamwork between surgical, dental, and medical teams is essential for improving patients. More research will be required to identify new diagnostic and therapeutic approaches toward improving care and outcomes for patients with dental abscess-associated necrotizing fasciitis.

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AUTHOR'S AGREEMENT

Journal of Medical Sciences (KMC Peshawar pISSN 1997-3438)

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I certify that

A) None of the material in the manuscript has been published previously/currently under consideration for publication elsewhere.

B) The article has not been accepted for publication elsewhere

C) I have not signed any right or interest in the article to any third party

D) I am able/willing to produce the data on which this article is based, should the Editorial Board of the Journal of Medical Sciences request such data.

E) Animal Care Committee/Institutional Review Board approval was granted for this study.

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8. Author agreement is signed by all authors.
9. Letter of ethical review of concerned hospital/study place.
10. A processing and publication fee of Rs. 15,000/-(Pakistani) for local authors and $ 250 (US) for international authors has been approved by the competent authority. The fee should be submitted as bank draft/online payment through the account (IBAN) no: PK56NBPA0388004048685170 (Branch code: 0388 / National Bank of Pakistan, University campus branch, Peshawar, Pakistan). See the fee Submission Process in the editorial Policy on the website.

EDITORIAL POLICY

THE EDITORIAL POLICY OF THE JOURNAL OF MEDICAL SCIENCES (JMS), KHYBER MEDICAL COLLEGE, PESHAWAR

Overview

This document highlights the mission, objectives, and editorial policy of JMS regarding the publication process by adhering to the guidelines of COPE (Committee in Publication Ethics) and ICMJE (International Committee of Medical Journals Editors). Each component of the editorial policy is explained in the next sections.

A MISSION OF JMS

To publish relevant, scientific, and accessible material to help medical students and health professionals in their practice, teaching and learning, and career development

B OBJECTIVES OF JMS

a. To publish clinical, epidemiological, public health, educational, translational, and allied sciences research to enable scientists, clinicians, and researchers to learn about developments and innovations in these disciplines

b. To publish high-quality descriptive and experimental research, review articles, editorials, and case reports enhancing the understanding of the scientific community regarding clinical practice and education

c. To provide a platform for the scientific community in promoting their career development through publishing quality research

C EDITORIAL POLICY

1 Open access

JMS is an Open access scholarly literature source that is free of charge and often carries less restrictive copyright and licensing barriers than traditionally published works, for both the users and the authors. However, it complies with well-established peer review processes and tries to maintain high publishing standards.

2 Peer review process

The review process of JMS is following a "triage approach". Upon submission of a manuscript, either online or physical, the document undergoes a preliminary open (un-blinded) review in the chief editor's office. The document is either accepted for further review, sent for revision back to the authors, or rejected at that time. Further review of JMS follows a blinded approach, where the article is sent to 2 reviewers, local and international reviewers. During this process, all the relevant information about the authors and reviewers is kept confidential. However, we encourage sharing reviewers' comments with co-reviewers of the same paper in a blinded manner, so reviewers can learn from each other in the review process. We also encourage the readers to send us the post-publication reviews about research work in the form of letters to the editors, which are then published and shared with the authors of relevant articles. The editorial board has the authority to retract an article if a serious violation of credibility or quality of research is found after the article is published.

The journal is under no obligation to send submitted manuscripts for review, and under no obligation to follow reviewer recommendations, favorable or negative at all times. The editor of a journal is ultimately responsible for the selection of all its content, and editorial decisions may be taken on issues unrelated to the quality of a manuscript, such as suitability for the journal. An editor can reject any article at any time before publication, including after acceptance if concerns arise about the integrity of the work.

3 Authorship

According to the ICMJE criteria, authorship is based on 4 criteria; (1) conceptualization and designing, (2) AND, data collection, (3) AND, writing and critical review,

(4) AND, taking responsibility for the authenticity and integrity of all the research process. All those designated as authors should meet all these 4 criteria. The co-authors should declare their roles and contributions to the research process explicitly. Those who do not meet all 4 criteria should be ACKNOWLEDGED only. If agreement cannot be reached about who qualifies for authorship, the institution(s) where the work was performed, not the journal editor, should be asked to investigate. If authors request removal, addition, or change in the sequence of an author after manuscript submission or publication, journal editors should seek an explanation and signed statement of agreement for the requested change from all listed authors and the author to be removed or added. The corresponding author is the one individual who takes primary responsibility for communication with the journal during the manuscript submission, peer review, and publication process. The corresponding author typically ensures that all the journal's administrative requirements, such as providing details of authorship, ethics committee approval, clinical trial registration documentation, and disclosures of relationships and activities, are properly completed and reported. The maximum number of authors for any manuscript must not exceed 6. If the number of authors exceeds this number, an explicit rationale for their role must be provided, which will be decided by the committee comprising the chief editor, executive editor, and managing editor.

4 Submission of manuscript

The manuscript should be submitted through the journal website which is using the Online Journal System (OJS) along with the Institution research and ethics board (IREB) certificate. The article should have the following format:

4.1: The abstract should be structured with a word count of not more than 250 words.

4.2: The fonts should be Calibri, with size 12, and spacing of 1.5, with justified margins in MS office format.

4.3: The whole document should not be more than 3000 words (excluding references and appendices).

4.4: The number of figures and tables should not exceed 5 in the whole document.

4.5: The pictures and tables should be black and white in color.

4.6: Copied pictures and tables from other sources will not be entertained unless written approval from the original researcher and publisher is provided

4.7: Only that article will be considered for publication where the data is collected during the last 5 years.

4.8: Fifty percent of the references must be from the last 5 years. The introduction section must not have more than 30% of the total references.

4.9: any article having a similarity index of more than 50% will be declined altogether. For those having a similarity index of more than 19% but less than 50%, the authors will be given one chance to correct the manuscript.

5 Institutional Research and Ethics Board (IREB) certificate

Under no circumstances, an article will be accepted if approval from the relevant ethical board/committee is not taken before the start of the research. The board/committee should assess the proposal of research in both ethical and technical aspects before giving a certificate of approval.

6 Conflict of interest

To ensure transparency in the research conduction, writing, and publication, the authors, peer reviewers, and editors have to declare conflicts of interest regarding financial aspects, academic competitions, and relationships during the writing, reviewing, and publishing of the manuscripts. Details of sponsors along with their roles and access to data should be clearly stated.

7 Confidentiality

The editorial board in no way should publicize the work of a researcher in any form unless it is published. They should not publicize the comments and critiques given by reviewers. Similarly, the reviewers are bound to keep the confidentiality of the work of researchers during and after the review. The work of researchers and the critique should never be discussed or exemplified in forums. The confidentiality of the researchers should be maintained in every possible way when the documents are sent for review. However, our review process is open (non-blinded) in the first phase, as per the policy of the journal. In this case, the policy is displayed on the journal`s website for the researchers. Reviewers must not retain the manuscript for their personal use and should destroy paper copies of manuscripts and delete electronic copies after submitting their reviews. If a manuscript is rejected, it should be deleted from the editorial system. If an article is published, the manuscript along with its reviews and other relevant documents should be retained for a period of 3 years and then deleted. The only situation where confidentiality needs to be breached is when a situation of fraud or misconduct is found during the review process or after publication. Still, the authors and sometimes the reviewers, have to be notified.

8 Correction and retraction of articles

The guidelines for the correction and retraction of articles are as follows:

8.1: A specific page is allocated in the journal (both electronic and printed) that will be used for news related to corrections in articles published in previous journals.

8.2: The editor should also post a new article version in the journal with details of the changes from the original version and the date(s) on which the changes were made.

8.3: Previous electronic versions will prominently note that there are more recent versions of the article (that will be placed at the end of the abstract). Similarly, the authors or others should cite the more recent version.

8.4: If the error is judged to be unintentional, the underlying science appears valid, and the changed version of the paper survives further review and editorial scrutiny, then retraction with the republication of the changed paper, with an explanation, allows full correction of that research paper.

8.5: If a serious violation of credibility or quality of a research paper is found after the publication, the article has to be retracted after approval of at least 3 members of the editorial board in consultation with the chief editor. The whole process will follow the guidelines presented by Committee on publication ethics (COPE).

8.6: The retracted article should be notified on the website and the word “retracted” should be mentioned along with the title of the article.

9- Correspondence

Correspondence for submitting an article in JMS will be through a corresponding author. The duties of a corresponding author have already been presented in a previous section. Correspondence regarding debating an article is given high value and a separate page for letters to the editors has been allocated. Derogatory and demeaning letters are screened and letters that promote debates and critique are encouraged to be published. However, correspondence about the articles published in the last 1 year will be included only.

10- The fee submission process

A processing and publication fee of Rs. 10,000/-(Pakistani) for local authors and $ 250 (US) for international authors have been approved by the competent authority. The fee should be submitted as bank draft/ online payment through the account (IBAN) no: PK56NBPA0388004048685170 (Branch code: 0388 / National Bank of Pakistan, University campus branch,

Peshawar, Pakistan) as follows:

01. Article processing fee of 3000/- PKR at the time of submission of the article. This amount will be non-refundable.

02. Article publication fee of 7000/- PKR at the time of acceptance of article after external review. This amount will be refundable if the article is rejected for any reason.

03. For international authors, the amount of 250 US dollars will be accepted after both internal and external review. Researchers belonging to countries other than Pakistan are advised to submit the fee after the whole process of review is completed and the article is accepted for publication.

04. There will be no fee exemption in any circumstances, including members of the editorial board.

11 Roles of the editorial board, editors, and members

The editorial board of JMS is following the Higher Education Commission (HEC) policy for research journals. The roles of the editorial board for JMS are mentioned below:

11.1: The roles of the Editorial Board are:

11.1.1: To offer expertise in their specialist area

11.1.2: To review submitted manuscripts

11.1.3: To advise on journal policy and scope

11.1.4: To work with the Editor to ensure the ongoing development of the journal

11.1.5: To identify topics for special issues of the journal or recommend a Conference that would promote the journal, which they might also help to organize and/or guest edit

11.1.6: To attract new and established authors and articles

11.1.7: To submit some of their work for consideration, ensuring that they adhere to Conflict of Interest rules and stating their relationship to the journal. This is very important as the journal cannot be seen to publish only papers from members of the Editorial Board.

11.1.8: Editorial Boards must have a regular communication forum with other boards of similar nature, either face-to-face in person (depending on their country of origin, funding availability, etc.) or as more journals are doing today, communicating by teleconference, Skype, or other web platforms.

11.2: The Patron:

The Patron is usually the Dean of the institute and is overall in charge of the journal, who needs to be kept informed of the decisions taken by the editorial board. The patron is the final authority to approve the decisions and policies of the editorial board.

11.3: The Chief Editor:

11.3.1: The criteria for selection of Chief Editor are:

i. Expertise and experience in the specialist field related to the journal

ii. Publication record of several articles and /or books (usually in / related to the specialist field)

iii. Being a reviewer for an international peer-reviewed journal

iv. Senior research position with equivalent experience in research and scholarship

v. Enthusiasm to undertake the Editor role

vi. Preferably a diploma, master or doctoral degree in Education and Research

It is not necessary to fulfill all the criteria to become a chief editor.

11.3.2: The roles of the Chief Editor are:

i. The key role of a journal`s chief editor is to promote scholarship in the specialist field associated

with the journal, whilst also promoting the journal as the best journal to publish in. For any journal, the editor will need to encourage new and established authors to submit articles and set up a reliable panel of expert reviewers. Editors are also responsible for offering feedback to reviewers when required and ensuring that any feedback to authors is constructive.

ii. Editors should also familiarize themselves with the Committee on Publication Ethics (COPE) 'Code of Conduct and Best Practice Guidelines for Journal Editors'.

iii. Depending on how the journal is managed and how it is structured, an Editor may have to make all the decisions regarding which articles to accept or reject for publication.

11.3.3: Managing editor:

i. The roles of managing editor are:

ii. To help the chief editor to achieve the above-mentioned goals

iii. To communicate with the authors, reviewers, publishers, and other agencies for the smooth running of the journal

iv. To regularly evaluate the research work

v. Communicate with funding and regulating agencies (HEC and others) for grants and accreditations.

11.3.4: Executive editor:

The roles of the executive editor are:

i. To evaluate the research articles presented for publication

ii. To help the editorial board in policymaking

iii. They help the editorial board in smooth publishing

iv. To communicate with reviewers and collaborate with external agencies for relevant purposes

11.3.5: Section editors:

Section editors are allotted different responsibilities. Some of these are mentioned below:

i. Bibliography

ii. Proof-reading

iii. Academic writing reviewing, grammar, and spell checking

iv. Dissemination of articles for review

v. Contact with publishers under the supervision of the senior editorial team

vi. Training of future reviewers, young members, other faculty members

vii. others

11.3.5: Editorial advisory board:

Editorial advisory board members consist of national and international senior academicians, researchers, clinicians, and others to help the current editorial board in designing, implementing, and evaluating policies regarding upgrading the quality of research work. These people also share best practices to help the editorial team to refine their research work.

12 Policy regarding recruitment and continuation of the editorial board

The policy for recruitment and continuation of the editorial board is based on the guidelines discussed in the previous section. The chief editor, managing editor, and executive editors are recruited by the patron in-Chief. Members are then selected by them from amongst the faculty who have an aptitude for research, and their names are endorsed by the patron. The tenure of the editorial board is decided by the Patron after a period of 3 years whether to continue or recruit a new team or member. The editorial advisory board members are recruited for an indefinite period by the editorial team of JMS.

13 Plagiarism policy

The journal is following the plagiarism policy of the Higher Education Commission of Pakistan, and for this purpose, a plagiarism standing and review committee has been established under the chairmanship of the Chief Editor of JMS along with 4 members amongst se-

nior faculty. The committee has been given the authority to review research papers and plagiarism complaints related to published work in the journal.

14 Allegations of research Misconduct

The policies of the COPE, WAME, and ICMJE serve as the foundation for the policy of research misconduct in our journal.

Before submitting, authors must carefully read the journal's author guidelines and research ethical principles and adhere to them.

While authors have the right to recommend potential reviewers for the peer-review process, all potential reviewers will have their credentials and potential conflicts of interest carefully examined before they are invited to review.

A manuscript that is undergoing peer review or a published article may be the subject of a report of research misconduct. The application and management process for claims of author misconduct should go as follows:

14.1: An article submitted or to be published in the JMS if allegedly suspected of scientific misconduct, an official complaint for the same must be received by the office of the managing editor via email, contact@jmdsci.com. For instance, in case of plagiarism, the copied section should be underlined and the original and suspected sections should be explicitly pointed out. The complaint must specify the particular matter and details of the misconduct.

14.2: an investigation will be carried out by the editorial board and the corresponding author of the suspected article will be kept in contact. An explanation will be asked from the corresponding author in this respect. If the misconduct is accepted, the managing editor will take the following steps:

In the case of published articles, retraction might be considered.

In the case of unpublished articles, the review process may stop or continue depending on the changes suggested to the corresponding author.

If the corresponding author does not respond in the stipulated time or the response is unsatisfactory, the article may be declined or retracted.

14.3: Before reaching any conclusion in case of retraction of an already published article, the editorial team will be in consultation with the experts within or outside the institution.

14.4: If during the review process, suspicion of gifted authorship is identified, the editor in charge of the article may ask the corresponding/principal author about the role of the authors, and if the response is found to be unsatisfactory, the review process may stop or the article may be declined altogether.

15 Appeal and complaint process

The JMS follows the recommendations of COPE regarding the appeal and complaint process (https://publicationethics.org/appeals) as follows:

15.1: The authors may ask the managing editor for inquiring about the status of the article through the official email of the JMS (contact@jmedsci.com) citing their official article ID.

15.2: The author may contact the managing editor for inquiring about the reason for the rejection of articles during the review process by the above email link.

15.3: Sometimes, the authors may re-upload an article as a new submission if they have modified the article as suggested by the editors

15.4: For withdrawal of an article during the review process, the corresponding author will write

a request through the OJS to the relevant editor for retraction.

15.5: Reconsideration of the decision will be conducted only at the discretion of the managing and chief editors.

16 Contact information

The office of the managing editor or chief editor should be contacted anytime during working hours or can be contacted through their emails for correspondence.

17 Archiving and Data Repository

- In accordance with our open-access policy, we permit the self-archiving of published papers after their publication in JMS. Without requesting permission from the journal or publisher, authors are free to archive their academic works in PDF format at any time and retain ownership of the intellectual property. However, a yearly subscription is required to access the print edition of the entire magazine issue, which can be stored in libraries in the country and overseas for 500 US dollars or 5000 Pakistani rupees respectively.
- In the "Archives" tab of the website (https://jmedsci.com/index.php/Jmedsci/issue/archive), you can access every issue of the journal from the past.
- Writers of articles that appear in JMS have the right to deposit their accepted manuscript in institutional or centralized repositories and can immediately make it publicly accessible after doing so provided that the journal is attributed as the original place of publication and that correct citation details are given.
- The real-time data backup of the whole server for the Journal of Medical Sciences (JMS) is created on the remote VPS (Virtual Private Server) of Khyber Medical College(KMC). Parallel mirror Imaging (PMI) is also created on the JMS server. JMS Publishing has further made sure that the metadata of all its open-access journals is compliant with well-known repository services and their digital crawlers may regularly collect it for record and preservation

References

ICMJE recommendations

COPE guidelines

SCOPUS

This document is prepared in January 2020 to be used by an editorial board, reviewers, researchers, and faculty as a guide to making them aware of policies and procedures for publishing, conducting, writing, reviewing, and evaluating the research published in JMS. This document is developed by including the recommendations of ICMJE (2019) and COPE guidelines and in case of any conflict, lack of clarity, and ambiguity, the recommendations of the latest ICMJE recommendation and COPE will prevail.

KHYBER MEDICAL COLLEGE, PESHAWAR - PAKISTAN