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Editorial

Awareness, Prevention and Risk Factors of Chronic Kidney Disease

Mohsin Masud Jan

Editor

Chronic kidney disease (CKD) has emerged as one of the most prominent causes of death and suffering in the 21st century.

Non-communicable diseases (NCDs) present a significant global health challenge in the current century and have replaced communicable diseases as the most common causes of morbidity and premature mortality worldwide¹. Initially, four NCDs (cardiovascular disease, cancers, chronic respiratory diseases and diabetes) were prioritized in the Global NCD Action Plan² endorsed by the World Health Assembly in 2008 but systematic reviews of various population based studies have now revealed the significance of chronic kidney disease as a separate entity requiring emphasis on prevention, early detection and treatment^{3,4}.

In developing countries including Pakistan, the burden of CKD is growing⁵ and is exacerbated due to poor community awareness, a disproportionately higher burden of known CKD risk factors and poor access to renal replacement therapy⁶.

Nearly 850 million people in the world have some sort of kidney disease and about five to 10 million people currently either require dialysis or kidney transplantation. Estimates suggest that if the global burden of kidney diseases keeps increasing, it would be one of the leading causes of mortality in the world by 2040.

Kidney diseases are silent killers, which can largely affect your quality of life. There are several ways to reduce the risk of developing kidney disease.

Keep fit, be active; Regular workouts keep your body functioning well and help prevent various diseases, including heart diseases and obesity (the risk factors of kidney disease). It also helps in maintaining normal blood pressure levels. According to the National Health Service, healthy adults should aim at about 150 minutes of moderate-intensity workout in a week, if you don't exercise at all, start with 20 minutes of light exercise. Some of the exercises that you can do are brisk walking, jogging, cycling and swimming.

Eat a healthy diet; This can help to maintain an ideal body weight, reduce your blood pressure, prevent diabetes, heart disease and other conditions associated with chronic kidney disease. It will be easier to control your salt intake. You make sure that you have plenty of veggies, fresh fruits, and whole grains that provide you with all the macronutrients (carbs, proteins and fats) and micronutrients (minerals and vitamins).

Check and control your blood pressure and blood sugar levels; High blood pressure and diabetes are two

of the most common underlying conditions for kidney diseases. If you have either of the diseases or if you are at risk of developing them, say from family history, it is important to keep watch on your blood pressure and blood sugar levels. Your blood pressure should be below 140/90 mm hg and your fasting blood sugar levels should be below 99 mg/dl.

Take appropriate fluid intake; Water helps kidneys in filtering out all the waste from the body. It also ensures that your kidneys get proper blood supply. So, if you tend to be dehydrated often, you might get kidney damage. Now, most people are told to drink at least 8 to 10 glasses of water per day. However, according to the National Kidney Foundation, the number may vary as per your age, physical activity, the climate around you and your health condition. For example, patients who are on dialysis are often told to reduce their water intake since their kidneys are not filtering excess water. Excess water may lead to a reduction in sodium levels in the body, which may also negatively affect your health. Men are generally recommended to take about three liters of fluid through the day and women should take about 2.2 liters of fluid per day.

Avoid Smoking; Smoking slows the flow of blood to the kidneys. When less blood reaches the kidneys, it can decrease their ability to function normally. Smoking also increases the risk of kidney cancer by about 50 per cent.

Avoid excessive use of pain-killers; Excess use of pain killers can increase the risk of chronic kidney disease. If you have low blood pressure or are dehydrated, some of these pain killers can also lead to acute kidney injury.

Have your kidney function checked if you have one or more of the 'high risk' factors; if you have diabetes, if you have hypertension, obese and have a family history of kidney disease.

Kidney damage or decreased renal function for three months or more is clinically considered as chronic kidney disease (CKD)⁷. Several countries have listed CKD as one of the top five causes of mortality in 2015, according to the Global Burden of Disease report⁸. In Pakistan, prevalence of it is reported to be in between 12.5% to 31.2%⁹. The prevention of CKD is less costly as compared to its treatment and leading comorbidities^{10,11}. CKD is a major public health concern that affects people all over the world. CKD has a direct impact on the worldwide burden of morbidity and mortality because of its effect on cardiovascular risk and end-stage kidney disease¹².

Disease knowledge and awareness are critical educational components that can aid individuals in

improving their ability to control their own health. CKD self-care is complicated and requires patients to keep track of their disease (e.g., monitoring their blood pressure and weight as well as their body temperature and cholesterol level), fluid intake management, and diet; engage in physical activity; adhere to medication regimens; comprehend new information; and communicate with health-care practitioners and other patients.

A higher prevalence of chronic kidney disease is also associated with social deprivation¹³. There were correlations observed between risk factors for chronic renal disease, such as smoking, drinking alcohol, increasing belly circumference (obesity), and elderly awareness of the condition¹⁴.

Hypertension is the strongest cardiovascular risk factor worldwide and is also closely associated with CKD.¹⁵ The prevalence of CKD among hypertensive US adults was 35.8% in 2011 to 2014, compared with a prevalence of 14.4% in prehypertensives and 10.2% among nonhypertensive individuals.¹⁶ A significant association between hypertension and the prevalence of CKD was also reported in a meta-analysis that included 75 global studies.¹⁷

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Radiographic Comparison Between Shaping Ability of Reciprocating WaveOne Primary Files and Rotary ProTaper Gold Files in Curved Mesial Root Canals of Mandibular 1st Molars: An In Vitro Study

Shaping Ability of ProTaper Gold and WaveOne Gold Systems in Curved Mesial Root Canals

Sudesh Kumar¹, Yawar Ali Abidi¹, Isma Sajjad¹, Maham Lone¹, Samira Adnan¹ and Jamshed Skeikh²

ABSTRACT

Objective: The objective of this study is to evaluate the shaping capabilities of the ProTaper Gold Rotary file system and the WaveOne Gold Reciprocating file system in curved mesial root canals of extracted mandibular first molars, regarding the change in canal angle.

Study Design: Experimental Study (In-vitro)

Place and Duration of Study: This study was conducted at the department of Operative Dentistry, Sindh Institute of Oral Health Sciences, JSMU, Karachi from January 2020 to December 2022.

Methods: Total 60 extracted mandibular 1st molars teeth were included and divided into two groups. ProTaper Gold files (Dentsply Sirona, Switzerland) were used to shape Group 1 at the working length and group 2 was shaped with WaveOne Gold reciprocating files (Dentsply Sirona, Switzerland) according to manufacturer's instructions.

Results: Mean±SD of canal straightening (change in canal angle) was noted as 3.28±1.24 v/s 2.91±1.42 among WaveOne Gold Reciprocating file system vs the ProTaper Gold Rotary file system & p-value was found to be non-significant i.e. (p=0.286).

Conclusion: It is to be concluded that the shaping ability of Wave One Gold Reciprocating file system and the Pro Taper Gold Rotary file system in curved mesial root canals in extracted mandibular 1st molars was similar considering change in angle of canal. It will take more prospective, carefully monitored randomised studies to confirm the present findings.

Key Words: Mesial Root Canals, Pro Taper, Shaping Ability, Wave One

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INTRODUCTION

In endodontics, the most crucial stage is cleaning and structuring the root canal system. Preservation of integrity of canal during shaping is required to prevent unnecessary removal of root dentin that may weaken the tooth. In curved canals many iatrogenic errors for

instance apical canal transportation, uncentered preparation, ledge formation or perforation can occur.¹

² Minimal change in canal shape is an important requirement with progression and advancement of filing systems. In comparison to conventional cleaning and shaping, NiTi rotary system has made major change in endodontics. Specially designed nickel titanium (NiTi) files helped the clinician to prepare curved canals more predictably as compared to conventional techniques. A new reciprocating single-file method recently came to light, promising to prepare canals with just one file and with a lower risk of contamination and instrument separation.³

Many studies have been conducted to determine the filing systems that produce less modifications in curved canals. Stringheta et al found no difference in shaping ability of Waveone Gold, Protaper Next, Reciproc and Prodesign Logic when studied on micro-computed tomography.⁴ Few other studies that were conducted reached at a conclusion that all system (WaveOne, WaveOne Gold, ProTaper Gold, Reciproc, Mtwo,

¹. Department of Operative Dentistry / Pediatric Dentistry², SIOHS, JSMU, Karachi.

Correspondence: Dr. Sudesh Kumar, Ex-FCPS Resident, Department of Operative Dentistry, Sindh Institute of Oral Health Sciences (SIOHS), Jinnah Sindh Medical University (JSMU), Karachi.

Contact No: 03330206459

Email: sudeshluhana@gmail.com

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ProTaper Next, RaCe and BioRaCe) are similar in respect to centering ability and transportation and no significant differences were found regarding canal straightening.⁵⁻⁸ Van der Vyver et al found WaveOne Gold better than Protaper Next in canal shaping.¹ The shaping ability of ProTaper and waveOne primary when compared in stimulated canal by few researchers concluded that waveone produce less modifications in canal.⁹⁻¹⁰ When these different filing systems were compared in extracted teeth on CBCT, better result of Waveone than Protaper were seen.^{11,12} Yet there are many researches that supports the better shaping ability of Protaper and found it better than Waveone in centering ability and transportation.^{3,13-17}

The rationale of this study was to compare ProTaper gold and waveone filing system to aid in finding the best system to use in curved canal and preserve the canal's original shape. Studies that have been performed previously are giving mixed results and no conclusive statement has been achieved. Further studies are still required to find out better filing system in the curved canals.

METHODS

Sixty extracted mandibular 1st molars, with curved mesial canals, meeting the inclusion criteria (Curved mesial canals of mandibular 1st molar, fully formed roots, Angle range 20-30°), were selected from the collection of teeth obtained from the Oral Surgery Department of SIOHS, JSMU. As the teeth was extracted for caries, orthodontic or periodontal reasons, not specific for the study, so the Jinnah Sindh Medical University Institutional Review Board has granted the exemption Teeth was stored in 0.2% Thymol solution until use. Mesial root was sectioned and separated at cementoenamel junction from remaining tooth structure using diamond rotary cutting instrument (Mani, Tochigi, Japan). The #10 stainless steel (SS) K type file (Mani, Tochigi, Japan) was used to create the glide path. An initial digital radiograph (PSPIX2, ACTEON, SOPRO, France) was taken with #2 sensor (ACTEON, SOPRO, France) using 10# K type stainless steel file (Mani, Tochigi, Japan) at working length (figure#7). Teeth with angle range 20-30° were included in the study, as determined by Schneider method (figure#6). Teeth was then divided into two groups. ProTaper Gold files (Dentsply Sirona, Switzerland) were used to shape Group 1 at the working length and group 2 was shaped with WaveOne Primary reciprocating files (Dentsply Sirona, Switzerland) according to manufacturer's instructions. Canals were instrumented along with sodium hypochlorite irrigant 2.5% (Endosol, Pakistan) and EDTA 17% (Meta Biomed, Korea). After instrumentation, the specimens were scanned using a radiograph with #25 k type stainless steel file (Mani, Tochigi, Japan). Again, the angle was determined by Schneider method then change in canal angle was

measured (figure#8). Data was entered in SPSS version 23 (SPSS Inc., Chicago, USA). With SPSS version 23, data analysis was carried out. Mean and Standard deviation of canal straightening (change in canal angle) were determined. To calculate the difference between the two groups, the T test was used. A statistically significant result was defined as $P < 0.05$.

RESULTS

In this in-vitro experimental study, 60 extracted teeth total—30 in each of the WaveOne and ProTaper groups—were used to compare the shaping ability of the ProTaper Gold Rotary file system and the WaveOne Gold Reciprocating file system in curved mesial root canals of extracted mandibular first molars (in terms of change in canal angle). The results were analysed as follows: Mean \pm SD of canal straightening (change in canal angle) in WaveOne group was 3.28 ± 1.24 with C.I (2.81----3.74) and ProTaper group was 2.91 ± 1.42 with C.I (2.37----3.44) as presented in TABLE 2.

Mean \pm SD of canal straightening (change in canal angle) was noted in 3.28 ± 1.24 v/s 2.91 ± 1.42 between WaveOne Gold Reciprocating file system vs the ProTaper Gold Rotary file system & p- As indicated in TABLE 3, the value was determined to be non-significant, or $p = 0.286$.

Table No. 1: Comparison of Canal Angle Before Canal Preparation Between Groups n=60

		n	Minimum	Maximum	Mean	\pm sd
GROUP	Wave One	30	21	29	25.3	2.3
	Pro Taper	30	22	29	24.6	1.97

n= number of canals

Table No. 2: Descriptive statistics of canal straightening (change in canal angle) n=60

Change		n	Minimum	Maximum	Mean	\pm sd	95% C. I
GROUP	Wave One	30	1	5.5	3.28	1.24	2.81----3.74
	Pro Taper	30	0.5	5.0	2.91	1.42	2.37----3.44

n= number of canals

Table No. 3: Comparison Of Canal Straightening (Change In Canal Angle) Between Groups N=60

Group	Change in Canal Angle		P-value.*
	Mean	\pm sd	
Waveone (n=30)	3.28	1.24	0.286
Protaper (n=30)	2.91	1.42	

n= number of canals

*Applied Independent t-test

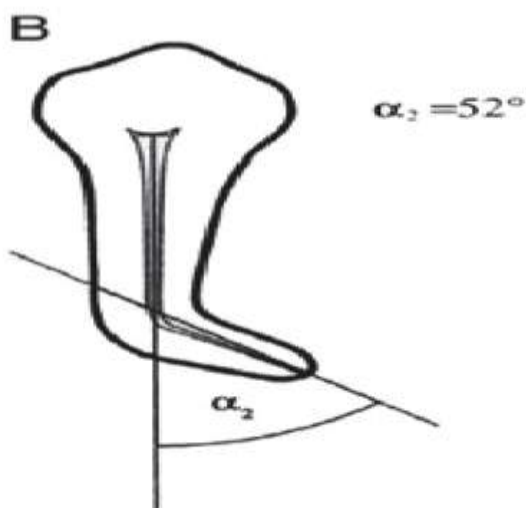


Figure No. 1: Schneider method of measuring canal angle

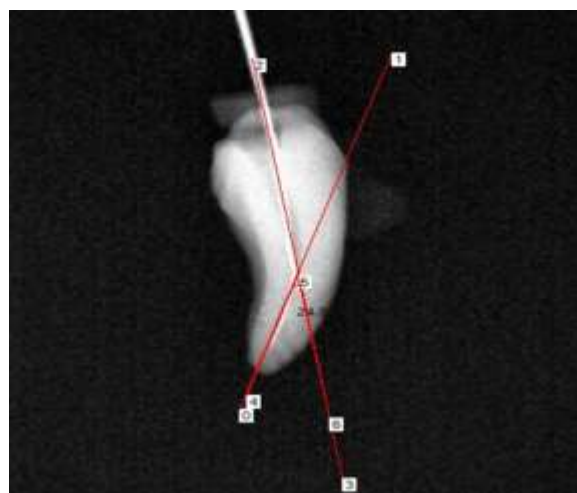


Figure No. 2: Initial Radiograph measuring canal angle

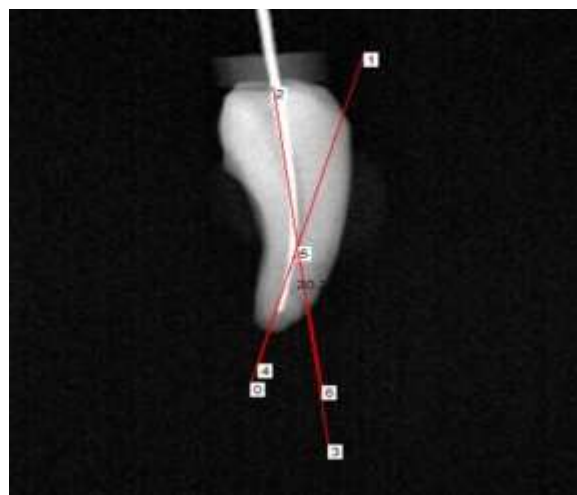


Figure No. 3: Radiograph after instrumentation measuring angle of canal

DISCUSSION

The ensuing root canal disinfection and obturation are directly impacted by canal shaping, one of the most essential phases in endodontic treatment. A root canal which is properly prepared should maintain the canal's original outline and have a constantly tapering funnel shape.¹⁸ These aims are usually difficult to attain because of the very variable root canal architecture and canal curvature, especially when shaping significantly curved canals.¹ Curved root canal mechanical preparation remains challenging, nevertheless, due to typical issues such the rigidity of the instruments used for canal preparation, and hidden canal curvatures in two-dimensional radiography.¹

Compared to the manually operated stainless steel files that were previously in use, the nickel-titanium (NiTi) alloy known as Nitinol has made endodontic practice more effective in terms of quality, accuracy, speed, and risk reduction.⁴ This is because NiTi files are more flexible, better resistant to fracture, and have a shape memory effect.⁴ When compared to stainless steel hand instruments, the usage of nickel titanium devices has decreased operator fatigue and increased the success rate of root canal therapy. As a result, a variety of engine-driven dental systems with NiTi tools of various shapes and sizes are now on the market. Since their initial debut, advancements have been achieved in alloy processing, design, and rotation motion. The most recent stage NiTi equipment for root canal preparation are reciprocating single-file systems. Yared proposed a reciprocating motion based on a balanced force approach, and it was recommended to prepare curved root canals with a single F2 ProTaper device in a reciprocating motion.¹⁹ This has been demonstrated to be equally effective at cleaning surrounding root canals as the entire ProTaper system. It is claimed that reciprocating single-file systems can reduce the risk of cross-contamination and instrument failure while completely preparing root canals with just one instrument.¹⁹

Little information has been made available so far on the reciprocating file's shaping capabilities. To evaluate the qualities of these novel files, thus, a comparison between these single file systems and known rotational multi-file NiTi systems must be made.

Abdulrahman Abdullah et al. investigated the shaping abilities of the ProTaper Gold and WaveOne Gold systems in artificial S- and L-shaped canals in an in vitro study. In summary, WaveOne Gold outperformed ProTaper Gold in shaping capabilities, exhibiting fewer aberrations in the canal and quicker canal preparation. The findings indicated that a significantly significant difference in preparedness was found.²⁰

Yuan et found that degree of canal straightening (change in canal angle) was higher in WaveOne Primary group that is $13.11 \pm 2.86\%$ compared to ProTaper Next group that is $10.86 \pm 3.31\%$.⁵ A study by Yoo Y, et al found that mean for WaveOne as 3.74 ± 0.45 and 2.94 ± 0.66 for ProTaper.¹² In present study, mean canal straightening (change in canal angle) was noted in 3.28 ± 1.24 v/s 2.91 ± 1.42 between WaveOne Gold Reciprocating file system vs the protaper Gold Rotary file system & P-Value ($p=0.286$) was determined to be non-significant.

In contrast to what we found, V Pathak et al.'s study sought to determine how well four single-file systems could shape the extremely curved MB root canals of mandibular first molars. Canal straightening was assessed by measuring the curvature of the canal both before and after Shaping. The results revealed that while F360 and OneShape continuous files successfully preserved the original curvatures, WOG and WO reciprocating files significantly straightened the canals. A statistical investigation verified the noteworthy distinctions in the ways the file systems affected the curvature of the canal.²¹

We selected mandibular mesiobuccal roots from first molars because their curvatures are usually quite unusual. Schneider's approach was used to evaluate the angle of curvature, which was set at 20° to 30° . The American Association of Endodontists (AAE) considers 25° to 30° to be a moderate degree of curvature, meaning that it can produce results for a wide range of patients. One potential weakness of the current study is that, as it was conducted on extracted teeth in vitro, root canal preparation cannot be directly compared to an in vivo setting. Furthermore, different outcomes in root canal shape may arise from the angulation of the teeth that are present in the oral cavity. To provide endodontists reliable recommendations, more evaluations of the evaluated brands' clinical performance in vivo are necessary. To understand how the patented advanced metallurgy processing of WaveOne Gold and ProTaper Gold system affects its qualities, further research into the metallurgy and mechanical properties along with clinical usage of these systems is necessary.

CONCLUSION

It can be concluded that, when taking into account changes in canal angle, the shaping abilities of the ProTaper Gold Rotary file system and the WaveOne Gold Reciprocating file system in curved mesial root canals of extracted mandibular first molars were comparable. Additional well-controlled and prospective randomized trials are needed to confirm the present findings.

Author's Contribution:

Concept & Design of Study: Sudesh Kumar

Drafting: Yawar Ali Abidi, Isma Sajjad
Data Analysis: Maham Lone, Samira Adnan, Jamshed Skeikh
Revisiting Critically: Sudesh Kumar, Yawar Ali Abidi
Final Approval of version: Sudesh Kumar

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Prevalence of Peripheral Neuropathy in Pediatric Patients with Type 1 Diabetes Mellitus

Peripheral
Neuropathy in
Pediatric Patients
with Type 1
Diabetes

Nazir Ahmed Malik¹, Nimra Naheed Malik², Somayia Sidiqa¹, Somayia Javed³ and
Tabassum Fatma⁴

ABSTRACT

Objective: The objective of this study was to study the prevalence of peripheral neuropathy in pediatric patients suffering from type 1 diabetes mellitus.

Study Design: A multicenter cross-sectional study.

Place and Duration of Study: This study was conducted at the HITEC-IMS Taxilla, Al -Ihsan Hospital Rawalpindi & Nusrat Hospital Rawalpindi from Jan 2023 to August 2023.

Methods: The study invited parents of paediatrics patients with type 1 diabetes to participate. Participating parents who consented were provided with questionnaires, encompassing neurological examinations and assessments of nerve dysfunction through nerve conduction studies (NCS). The questionnaire also gathered comprehensive information on demographics, family status, education level, chronic illnesses, weight, height, BMI, and access to the healthcare system. NCS procedures were meticulously explained to the participants and conducted using the standard "Allerger's Scorpio Electromyography machine" in a room maintained at an optimal temperature of 72 degrees Fahrenheit. Skin temperature, recorded at 97 degrees Fahrenheit, and ideal lighting conditions were ensured during the examination. The selected nerves for the procedure included median, ulnar, tibial, peroneal, and sural nerves. Reference values for NCS were obtained from a clinician specializing in neuromuscular disorders in infancy, childhood, and adolescence. With parental permission, blood samples were collected to measure blood glucose, HbA1c, Liver Function Tests (LFTs), vitamin B12, lipid profile, thyroid-stimulating hormone (TSH), urea, and creatinine in the children.

Results: The findings from this research indicate that prevalence of peripheral neuropathy in children with type 1 diabetes is 46%. There is a noteworthy association between glycemic control and the prevalence of peripheral neuropathy. The study's overall outcome reveals a 55.2% increase in nerve conduction per unit of HbA1C. The mean age of the study population is 12.8 ± 3.665 years. Notably, the results of nerve conduction studies (NCS) are statistically significant. Furthermore, there are no significant differences observed between the groups concerning lipid profile, vitamin B12 levels, thyroid-stimulating hormone (TSH), urea, and creatinine.

Conclusion: The prevalence of diabetic neuropathy in children is 46%. Major risk factors in this condition are the duration of the disease and uncontrolled glucose level. The use of nerve conduction studies is more reliable than clinical evaluation for the diagnosis of neuropathy. Moreover, neuropathy has a direct relation with elevated levels of glucose. There is no evidence of retinopathy.

Key Words: diabetes, nerve conducting studies, juvenile diabetes, glucose level.

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INTRODUCTION

¹. HIT Hospital Taxila, Rawalpindi.

². Al Ehsan Hospital Rawalpindi

³. Nusrat Hospital Rawalpindi

⁴. Shifa Trust Eye Hospital, Rawalpindi

Correspondence: Dr. Nazir Ahmed Malik, Child Specialist,
HIT Hospital Taxila, Rawalpindi.

Contact No: 03337613234

Email: drnamalik@hotmail.com

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Diabetes Mellitus (DM) is a metabolic disease characterized by elevated blood glucose levels¹. It constitutes a significant global health issue. The global estimate indicates that in 2021, approximately 8.4 million people had T1DM worldwide and by 2040, the number of people living with T1DM is projected to reach 17.4¹.

Diabetes is mainly caused by elevated levels of glucose for longer periods. Diabetes may result from either a deficiency in insulin secretion, a reduction in insulin effectiveness, or a combination of both factors². Type 1 diabetes, also known as juvenile diabetes or Insulin-dependent diabetes, typically results from the destruction of beta cells, leading to a deficiency in insulin³. Diabetes, if undiagnosed for a long period can lead to other major problems like cardiovascular

disease, kidney malfunction, retinopathy, neuropathy, and foot amputation⁴.

Neuropathy, a significant complication of diabetes, manifests in both type 1 and type 2 diabetes, impacting 60% of the population in the Western world⁵. Retinopathy and nephritis have also been seen in young populations suffering from type 1 diabetes⁶. 10% of children have complained about peripheral neuropathy with type 1 diabetes which includes the signs and symptoms in the lower limbs⁷.

Along with the peripheral nervous system, diabetes can also affect the autonomic nervous system. Peripheral neuropathy caused by diabetes mellitus is usually referred to as polyneuropathy⁸. The effect of diabetes on the nervous system can be divided into 2 stages which are subclinical and clinical. Subclinical refers to electrophysiological abnormalities in nerve function without evident clinical signs or symptoms of peripheral neuropathy. In contrast, clinical neuropathy implies an abnormal neurological examination that shows evident impairment in peripheral sensory and motor polyneuropathy^{9,10}. Metabolic theory suggests that when the levels of glucose are elevated they damage nerve cells which leads to the accumulation of sorbitol and because of that myoinositol levels drop hence resulting in damage to nerve and myelin¹¹.

The diagnosis of diabetic peripheral neuropathy is based upon symptom profile, neurological examination, quantitative sensory testing, nerve conduction studies (NCS), and quantitative autonomic function testing¹². Neuropathy due to other causes such as Charcot Marie Tooth Disease and Guillain-Barre syndrome should be ruled out while diagnosing diabetic neuropathy¹³.

Different nerve fibers including motor, sensory and autonomic must be assessed thoroughly to confirm the origin of disease. Sensory neuropathy is the most common peripheral neuropathy. There are certain non-neuropathic conditions that resemble peripheral neuropathy that should be ruled out in individuals with a lack of sensory involvement. Autonomic dysfunction can occur with all kinds of neuropathies. Wasting of muscles and fatigue is more common in foot extensor muscles which may lead to foot drop¹⁴.

Electromyography and nerve conduction studies should be done to rule out the clinical diagnosis of peripheral neuropathy. Laboratory assessment includes an initial metabolic profile comprising of blood glucose levels, HbA1C, liver, kidney and thyroid functions. Additionally, medical professionals typically order tests based on a thorough clinical evaluation to help guide diagnosis and treatment¹⁵. Other tests include examination of cerebrospinal fluid, genetic testing, nerve biopsy, peripheral nerve imaging which is done with nerve ultrasound or MRI¹⁶.

METHODS

This cross-sectional multicentre study was conducted in HIT hospital Taxilla, Rawalpindi, Al-Ihsan Hospital

Rawalpindi & Nusrat Hospital Rawalpindi. The duration of study was from January 2023 to August 2023. The study invited parents of paediatrics patients with type 1 diabetes to participate. The objective was to ascertain the prevalence of peripheral neuropathy in this specific demographic region. Participating parents who consented were provided with questionnaires, encompassing neurological examinations and assessments of nerve dysfunction through nerve conduction studies (NCS). The questionnaire also gathered comprehensive information on demographics, family status, education level, chronic illnesses, weight, height, BMI, and access to the healthcare system. NCS procedures were meticulously explained to the participants and conducted using the standard "Alleger's Scorpio Electromyography machine" in a room maintained at an optimal temperature of 72 degrees Fahrenheit. Skin temperature, recorded at 97 degrees Fahrenheit, and ideal lighting conditions were ensured during the examination. The selected nerves for the procedure included median, ulnar, tibial, peroneal, and sural nerves. Reference values for NCS were obtained from a clinician specializing in neuromuscular disorders in infancy, childhood, and adolescence. With parental permission, blood samples were collected to measure blood glucose, HbA1c, Liver Function Tests (LFTs), vitamin B12, lipid profile, thyroid-stimulating hormone (TSH), urea, and creatinine in the children.

Statistical Analysis:

The data was summarized for quantitative analysis based on demographic traits, height, weight, and nerve conducting studies. The mean and standard deviation were calculated for each continuous data parameter to derive average results. Parametric tests, including one-way analysis of variance (ANOVA), student's t-test, and chi-square, were employed to compare the groups. Shapiro-Wilk test is used to assess the normality of data. SPSS Version 23 was used for statistical analysis of data by setting the level of significance to less than 0.05 p value. Mainly the study's focus is to provide the awareness on prevalence of peripheral neuropathy in children and adolescents.

RESULTS

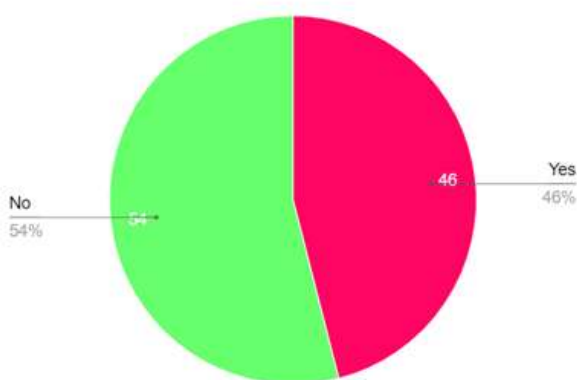
There were 100 participants in the study. 45 patients were males and 55 were females. There were 30 children with age 4 to 7 and 70 with 10-14 years. There were no children with chronic illness other than diabetes. The mean age of the study population is 12.8 ± 3.665 . There was no sign of retinopathy. The prevalence of peripheral neuropathy was 46%. A high amount of prevalence was seen in children of age 4-14. The result of NCS was significant. The prevalence of peripheral neuropathy with glycemic control is significant. The overall result of the study shows that nerve conduction increases by 55.2% as per unit of HbA1C.

Table No. 1: Demographic Characteristics

Demographics		Frequency	Percentage
Gender	Male	45	45%
	Female	55	55%
Age in years	4-7	30	30%
	10-14	70	70%
Chronic disease other than diabetes	yes	0	0%
	no	100	100%

Table No. 2: Mean and SD for age,duration of disease, HbA1C (n=100)

Parameter	Mean	SD
Age in years	12.8	3.665
Duration of disease in years	6.8	2.148
HbA1C	10.9	1.82

Pie Chart**Figure No. 1: Prevalence of peripheral neuropathy****Table No. 3: Comparison of NCS & HbA1C in patients with and without neuropathy**

	Mean	SD	P value
NCS			
Normal	5.0	1.442	0.05
Neuropathic	5.8	2.704	
Mean HbA1c level			
No neuropathy	10.6	1.674	<0.001
Neuropathy	11.2	1.799	

Table No. 3: Comparison of glycemic control with prevalence of neuropathy

Neuropathy	Good control (<=8.5)	Fair control (6.6-7.6)	Poor control (>9)
No	1%	76.9%	40%
Yes	0	23.1%	60%

DISCUSSION

The purpose of this study is to know the prevalence of neuropathy in children with Type 1 diabetes mellitus. A total of 100 children were assessed with type 1 diabetes, who had this disease since last five years.

This study shows that type 1 diabetes is more common in females as compared to males. Our study results are comparable with another study conducted in India⁴.

A significant number of children with Type 1 Diabetes Mellitus may have subclinical peripheral neuropathy, meaning nerve dysfunction that is not clinically evident. Poor glycemic control and a longer duration of diabetes are mentioned as risk factors for the development of nerve dysfunction in these children¹⁷.

The Rochester Diabetic Neuropathy Study focused on individuals with Type 1 Diabetes Mellitus (T1DM) who had diabetic neuropathy. The study revealed that among these patients, 54% exhibited polyneuropathy, indicating nerve damage affecting multiple peripheral nerves. Additionally, 22% presented with asymptomatic carpal tunnel syndrome, a condition involving pressure on the median nerve in the wrist, and 11% had symptomatic carpal tunnel syndrome.

Furthermore, 7% of the T1DM patients in the study showed signs of visceral autonomic neuropathy, which affects the nerves regulating internal organs. Lastly, 3% displayed other types of neurological damage, suggesting a diverse range of neuropathic complications in this population¹⁸.

According to our study the mean duration of disease is 6.8 ± 2.148 . Comparable results were quoted in a meta-analysis done in Pakistan on adult diabetic patients¹⁹. Toopcizadeh et al, in their study found that there was no statistically significant difference between age, chronicity of disease and glycemic control between the groups of patients with and without peripheral neuropathy²⁰.

Our study results of the relation between neuropathy and HbA1c are same as in the previous studies which is significantly correlated i-e " $p < 0.001$ "^{17,21}. Ziegler et al quoted in his study that neuropathy can be prevented by achieving a good glycemic control in the initial years after developing the disease²². However there are studies which show that there is no correlation between neuropathy and HbA1C^{23,24}. The nerve conduction increases by 55.2% for every unit increase in HbA1C. This can be compared with other studies 5.2%¹⁷, 27.5%¹⁹ and 13.2%³ in regards to peripheral neuropathy.

This study has reviewed the glucose and HbA1c levels in the blood and their effects on peripheral neuropathy. However, its impact on brain and spinal cord in the individuals suffering from peripheral neuropathy is beyond the scope of discussion. There was no evidence of retinopathy on evaluation. The BMI and lipid profile of all the children were normal.

More accurate results can be seen in studies performed for longer duration. We could not assess other factors of neuropathy in diabetes mellitus due to economic constraints.

CONCLUSION

The prevalence of diabetes neuropathy in children with type 1 diabetes is 46%. Major risk factors in this condition are the duration of the disease and uncontrolled glucose level. The use of nerve conduction studies is more reliable than clinical evaluation for the diagnosis of neuropathy. Moreover, neuropathy has a direct relation with an elevated level of glucose. There is no evidence of retinopathy.

Author's Contribution:

Concept & Design of Study: Nazir Ahmed Malik
Drafting: Nimra Naheed Malik,
Somayia Sidiqa

Data Analysis: Somayia Javed,
Tabassum Fatma

Revisiting Critically: Nazir Ahmed Malik,
Nimra Naheed Malik

Final Approval of version: Nazir Ahmed Malik

Conflict of Interest: The study has no conflict of interest to declare by any author.

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Awareness and Understanding of the Antimicrobial Stewardship Among Medical Professionals at Teaching Hospital of Rahim Yar Khan, Southern Punjab

Awareness of the Antimicrobial Stewardship Among Medical Professionals

Muhammad Zafar Majeed¹, Ghulam Mustafa², Muhammad Bilal Ghafoor³, Faiza Sarwar³, Hafiz Haseeb Ahsan¹ and Asma Manzoor³

ABSTRACT

Objective: To determine the first-hand knowledge regarding awareness of antimicrobial stewardship among house officers, postgraduate trainees, and consultants working in teaching hospital of Rahim Yar Khan.

Study Design: cross-sectional single-centre study

Place and Duration of Study: This study was conducted at the at Sheikh Zayed Hospital Rahim Yar Khan from May 2023 to December 2023.

Methods: This cross-sectional single-centre study was conducted in 08 months from May 2023 to December 2023 at Sheikh Zayed Hospital Rahim Yar Khan, a teaching hospital of Southern Punjab, Pakistan. A total of 200 participants were recruited including house officers, postgraduate trainees, and consultants. A self-developed questionnaire comprised of 30 questions was distributed, and all the data was analysed by using SPSS version 23.

Results: Regardless of experience and educational attainment, the findings showed that participants lacked knowledge on antimicrobial stewardship. The results showed that just 14 individuals (7.0%), had a more improved understanding of antimicrobial stewardship. Of the participants, 87 (43.5%) had learned their information online. The house officers, postgraduate trainees, and consultants all had low level of awareness regarding antimicrobial stewardship.

Conclusion: This study showed that there is a poor knowledge of antimicrobial stewardship among medical professionals. However, the participants expressed support for the implementation of antimicrobial stewardship in all healthcare settings, including teaching institutions.

Key Words: Antimicrobial Stewardship, Medical Professional, Awareness

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INTRODUCTION

According to the US Centres for Disease Control and Prevention (CDC), antibiotic resistance is becoming more prevalent and a bigger issue. The World Health Organisation (WHO) has identified antibiotic resistance as one of the top ten dangers. It undermines modern healthcare and enhances changes to therapy for different types of infections.¹

¹. Department of Medicine / Community Medicine² / Pathology³, Sheikh Zayed Medical College/Hospital, Rahim Yar Khan.

Correspondence: Dr. Muhammad Bilal Ghafoor, Associate Professor of Pathology, Sheikh Zayed Medical College/Hospital, Rahim Yar Khan, Pakistan.

Contact No: 0333-3303300

Email: drbilal.ryk@gmail.com

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About 500,000 cases of infection with various strains of newly identified or antibiotic-resistant bacteria have led to a rise in its prevalence.^{2,3} Antimicrobial therapy is selected according to the traits of the causing bacteria as well as the symptoms and complaints of the patient. The pathogen and colonising flora gain resistance to the antimicrobial medicine in order to gain its potency. Licenced medical professionals, including doctors and surgeons, are required to deliver their patients the greatest medication options based on their individual needs. Antimicrobial medication prescribers are tasked with two different, frequently incompatible roles. With their help, they tried to give each patient the best care possible, but they also had a responsibility to stop the spread of antibiotic resistance and maintain the usefulness of antibiotics for both current and future patients as well as the public's health.⁴ The Infectious Diseases Society of America (IDSA) has acknowledged antimicrobial stewardship (AMS) as a critical intervention in the fight against antimicrobial resistance (AMR). Antimicrobial stewardship (AS), according to IDSA, is the process of optimising antimicrobial preference, the dosage, route, and duration of therapy to

maximise clinical recovery or infection prevention while minimising unintended consequences, such as the emergence of resistance, adverse drug events, and cost.^{5,6} As stated in AS principles, medical facilities with a well-established laboratory infrastructure for microbiology might readily switch from traditional empirical therapy to targeted therapy upon identification of culture results. The concept of the "role of education in antimicrobial stewardship" is a way to simplify or de-escalate the use of antibiotics. Targeted therapy saves costs and minimises unintentional exposure to broad-spectrum antibiotics. De-escalation may also entail stopping empirical antibiotic treatment based on poor culture results and clinical guidelines.^{5,7,8} Targeted therapy emphasises the prescription of older, narrow-spectrum drugs. This is a common practice in northern European countries with restricted antimicrobial application, such as Scandinavia and the Netherlands, and has been taught in medical schools.

Antibiotic prescribers should be at the forefront of the fight against antimicrobial resistance (AMR) in order to reduce improper antibiotic consumption and foster an antimicrobial stewardship (AMS) culture. In the fight against antimicrobial resistance (AMR), it is crucial to comprehend the level of knowledge, attitudes, and practices of young doctors, particularly house officers, as well as the degree to which universities and postgraduate schools view AMR as a key educational concern. Thus, the purpose of this research is to learn firsthand how well-informed house officers, postgraduate trainees, and consultants are about antimicrobial stewardship programmes (ASP).

METHODS

This cross-sectional study was conducted at Sheikh Zayed Hospital Rahim Yar Khan, Pakistan from May 2023 to December 2023 after approval from the Institutional Review Board. The study comprised of a questionnaire, the responses have been compared against the definition proposed by WHO, APIC, and the Society for Healthcare Epidemiology of America (SHEA).¹⁰ All these three reliable sources included two main components of ASP; careful and need-based prescription of Antibiotics and reduce bacterial resistance. Keeping in mind these components we categorized results in 'Satisfactory' and 'Not Satisfactory' categories. This questionnaire assisted in the evaluation of the overall knowledge, attitude, and practical approach towards antibiotic usage, resistance, and Antibiotic Stewardship Program of all the participants. It comprised of 30 questions. The first two questions were open-ended while the remaining 28 questions were close ended with two options of 'Yes' or 'No'.

Using the snowball sampling method, a total of 200 participants have been invited to be part of this study

from Sheikh Zayed Hospital Rahim Yar Khan, including 68 (34%) house officers, 66 (33%) PGRs and 66 (33%) Consultants.

Statistical analysis: Statistically, the questionnaire was examined using SPSS version 23. Percentages have been calculated for the categorical data. The p-values were considered as two-tailed and a p-value of < 0.05 was set as significant.

RESULTS

More than 90 % of the participants mainly house officers were unaware of the actual concept and idea behind antimicrobial stewardship (Table-I). A large number of participants have acquired knowledge regarding antibiotics from the internet; House officers 27 (38.2%), PGRs 31 (47%), and Consultants 29 (43.9%), followed by Pharmacology guidebooks. Few of them also need medical representatives from pharmaceutical companies or pharmacists to update their knowledge as shown in Table-II ($p=0.3$).

The remaining 28 questions have 'Yes' or 'No' options. The results are presented in table-III in the form of percentages. According to outcomes, more than 90 % of the participants have responded 'Yes' to acquiring knowledge regarding the updated antibiotic spectrum. All of the consultants have responded in favour of the knowledge regarding the spectrum of a different antibiotic, while only a few PGRs and House officers responded against it ($p=0.01$) with updated knowledge of antibiotics is necessary ($p=0.03$). More than 90 % of the consultants and PGRs have responded in favour of the updated knowledge of antibiotics in medical careers while surprisingly 26.50 % of house officers have voted against it ($p=0.1$). More than 93 % of the participants have agreed that ASP improves patients' quality of life ($p=0.1$), with results signifies ASP reduces bacterial resistance ($p=0.001$) and ASP decreases hospital stays and costs ($p=0.02$). Most of the medical staff would like more education on antibiotic resistance ($p=0.000$) with hand washing plays an important role in prevention of infection ($p=0.000$). Surprisingly the results of prescribing broad-spectrum antibiotics before definite diagnosis was also significant ($p=0.000$). The analysis of results also showed that following the national guidelines before prescribing antibiotics was significant ($p=0.00$). Knowledge of most resistant organisms in hospital is necessary with significant results ($p=0.03$) and knowing the common bacteria that causes different infection in our body is also important ($p=0.000$). Knowing the antibiotic susceptibility pattern of different antibiotics have significant result as well ($p=0.00$). However contrary to common belief, the results of prescribing antibiotics in common cold, sore throat, flu, diarrhea etc was significant with $p=0.000$.

Table No. 1: Knowledge regarding the Antibiotic Stewardship Program

Doctors Group	Satisfactory	Not Satisfactory	Total	P value
House officers	4(5.9%)	64(94.1%)	68 (100%)	0.7
PGRs	4(6.1%)	62(93.9%)	66 (100%)	
Consultants	6(9.1%)	60(90.9%)	66 (100%)	

Table No. 2: Source of knowledge regarding Antibiotics

Doctor Group	Medical Reps. Or pharmacist	Internet	Pharma Guidebooks	Others	Total	P Value
House officers	13(19.1%)	27(39.7%)	26(38.2%)	2(2.9%)	68	0.3
PGRs	12(18.2%)	31(47.0%)	20(30.3%)	3(4.5%)	66	
Consultants	11(16.7%)	29(43.9%)	18(27.3%)	8(12.1%)	66	

Table No. 3: Responses of participants to questions regarding Antibiotics Prescription

Questions	Consultants		PGRs		House Officers		P value
	Yes	No	Yes	No	Yes	No	
Strong Knowledge of antibiotics is important in a medical Career?	97%	3%	89.4%	10.6%	91.2%	8.8%	0.1
Prescribing broad Spectrum Antibiotics causes Antibiotic Resistance?	78.8%	21.2%	83.3%	16.7%	82.4%	17.6%	0.6
Knowing the spectrum of different antibiotic groups is necessary?	100%	0.00%	92.4%	7.6%	91.2%	8.8%	0.01
Does ASP improve the quality of patient care?	84.8%	15.2%	74.2%	25.8%	73.5%	26.5%	0.1
ASP Reduces Bacterial Resistance?	83.3%	16.7%	71.2%	28.8%	60.3%	39.7%	0.001
ASP decreases hospital stays and costs?	77.3%	22.7%	72.7%	27.3%	60.3%	39.7%	0.02
Updated knowledge of antibiotics is necessary?	98.5%	1.5%	90.9%	9.1%	89.7%	10.3%	0.03
Cost-effectiveness should be considered in prescribing antibiotics?	74.2%	25.8%	75.8%	24.2%	85.3%	14.7%	0.13
I would like more education on antibiotic resistance?	97%	3%	90.9%	9.1%	73.5%	26.5%	0.000
I would like more education on appropriate use of antibiotics?	89.4%	10.6%	87.9%	12.1%	82.4%	17.6%	0.2
Antibiotic Resistance is a major problem all across the world?	78.8%	21.2%	90.9%	9.1%	79.4%	20.6%	0.04
Inappropriate use of antibiotics causes antibiotic bacterial resistance?	97%	3%	93.9%	6.1%	92.6%	7.4%	0.3
Patients' noncompliance is a major cause of Bacterial Resistance?	59.1%	40.9%	72.7%	27.3%	72.1%	27.9%	0.07
Poor infection control by health care causes bacterial resistance?	63.6%	36.4%	68.2%	31.8%	69.1%	30.9%	0.6
Hand washing plays an important role in prevention of infection?	98.5%	1.5%	87.9%	12.1%	79.4%	20.6%	0.000
Use of antibiotic in animals and poultry fields causes antibiotic bacterial resistance?	18.2%	81.8%	31.8%	68.2%	22.1%	77.9%	0.05
Prescribe broad spectrum antibiotics before definite diagnosis?	48.5%	51.5%	21.2%	78.8%	33.8%	66.2%	0.000
Prescribe narrow spectrum antibiotics when there is a definite diagnosis?	72.7%	27.3%	71.2%	28.8%	73.5%	26.5%	0.9
Follow the national Guidelines before prescribing antibiotics?	92.4%	7.6%	78.8%	21.2%	72.1%	27.9%	0.00
Knowledge of most resistant organisms in hospital is necessary?	97%	3%	87.9%	12.1%	88.2%	11.8%	0.03
Knowing the spectrum of activity of selected antibiotic is necessary?	93.9%	6.1%	90.9%	9.1%	89.7%	10.3%	0.5
Knowing the common bacteria that causes different infection in our body is important?	98.5%	1.5%	86.4%	13.6%	70.6%	29.4%	0.000
Knowing the antibiotic susceptibility pattern of different antibiotics?	81.8%	18.2%	77.3%	22.7%	61.8%	38.2%	0.00

Contact hospital pharmacist for antibiotic choice?	43.9%	56.1%	43.9%	56.1%	54.4%	45.6%	0.2
Contact microbiologist to know the common resistant organisms and antibiotic susceptibility in the hospital?	83.3%	16.7%	80.3%	19.7%	82.4%	17.6%	0.8
Contact the clinical pharmacist to see availability of the drug?	81.8%	18.2%	72.7%	27.3%	79.4%	20.6%	0.2
Prescribe antibiotics in common cold, sore throat, flu, diarrhea?	15.2%	84.8%	19.7%	80.3%	38.2%	61.8%	0.000
Interpreting an Antibioigram?	62.1%	37.9%	62.10%	37.9%	41.2%	58.8%	0.2

DISCUSSION

This cross-sectional survey-based study has delivered some very contrasting results regarding antimicrobial stewardship in Rahim Yar Khan, Pakistan. As indicated by the outcomes, there were only a few individuals in all three categories who had satisfactory knowledge about the Antimicrobial Stewardship Program (ASP). The highest recorded option of 'Satisfactory' was of consultants with a frequency of 9.1 % only ($p=0.7$). The Internet is the most utilized source of updating knowledge among all three categories of professionals regarding antibiotics which has its benefits and losses ($p=0.3$).

According to Pereira et al (2015), E-learning is now widely used in the field of medical education. It facilitates face-to-face, online, and mixed learning by blending traditional classroom methods with online approaches. The World Wide Web has made knowledge more accessible, web-based learning provides increased access to learning by overcoming distance.¹⁰ The observed efficiency of a blended e-learning curriculum on basic health care prescription practice prompted the creation and deployment of blended modules for primary care in the United Kingdom (UK) and Scotland.^{11,12} Furthermore, despite its claimed effectiveness, INTRO, an online curriculum piloted in five European nations, presented crucial cautions regarding the significance of such programs being responsive to the learning requirements and practices of diverse cultures and healthcare systems.¹³

In an article by Pulcini and Gyssens (2013), it has been mentioned that the Antibiotic Stewardship Program has been mainly conducted at the postgraduate level which could manifest the practice among the professionals. It becomes evident that antimicrobial stewardship is more likely to be successful if it begins much earlier.⁴ The results of the current study have also similar outcomes in terms of the knowledge of house officers regarding ASP, which is alarming for an underdeveloped country. According to Gyssens (2018), AS education is required for the whole healthcare workforce as well as the general public. To have the most influence, this type of training should begin early in the undergraduate program.¹⁴

In Pakistan, antimicrobial stewardship program is still an untested methodology for combating antibiotic resistance. This study found that interviewed physicians had little awareness about ASP. As there is no ASP-related subject in the ongoing medical curriculum at both the undergraduate and postgraduate levels.^{15,16,17} It is perhaps unsurprising that physicians are currently not aware of the functions of a hospital ASP. In Pakistan, the health system bears a gap in good doctor-pharmacist coordination, may it be a discussion before prescriptions or advice on a difficult case. Most doctors make decisions on their own and consider consulting a pharmacist abominable. We need to develop a good physician-pharmacist relationship in our setups to improve the quality of health care.^{18,19} Additionally, an antibiogram is a very useful measure to recognize the prevalence of any microbial infection. Unfortunately, this technique is not very common in Pakistan which eventually aggravates the antibacterial resistance among the general population.²⁰

Only a few studies have been conducted regarding awareness and implementation of antimicrobial stewardship program in Pakistan. This study has a major limitation because it is a single-centre study. Although it has been conducted in one of the main public sector medical institutes of Punjab, Pakistan this study cannot represent the views and knowledge level of all the young doctors, trainees, and consultants of Pakistan.

CONCLUSION

This report demonstrates the medical community's glaring lack of efforts in antimicrobial stewardship. It is a regular issue to provide broad-spectrum antibiotics in the absence of a definitive diagnosis. Prior to writing an antibiotic prescription, chemists are not consulted. It is imperative that medical professionals attend appropriate awareness seminars addressing antimicrobial stewardship in due course.

Author's Contribution:

Concept & Design of Study:	Muhammad Zafar Majeed
Drafting:	Ghulam Mustafa, Muhammad Bilal Ghafoor
Data Analysis:	Faiza Sarwar, Hafiz

Haseeb Ahsan, Asma Manzoor
 Revisiting Critically: Muhammad Zafar
 Majeed, Ghulam Mustafa
 Final Approval of version: Muhammad Zafar
 Majeed

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Exploring the Impact of Social Media on Mental Health: A Comparison Between Young Students and the Elderly in Pakistan

Shafqat Huma, M Asif Kamal, Muhammad Fahim Qasim, Zain Ullah Khan and Ali Ahsan Mufti

ABSTRACT

Objective: The basic aim of the study is to find the impact of social media on mental health a comparison between young students and the elderly in Pakistan.

Study Design: mixed-method approach study

Place and Duration of Study: This study was conducted at the Institute of Psychiatry, Benazir Bhutto hospital Rawalpindi from November 2022 to October 2023.

Methods: This mixed-method approach study was conducted in Institute of Psychiatry, Benazir Bhutto hospital Rawalpindi from Nov 2022 to October 2023 to investigate the divergent impacts of social media on the mental health of young students and elderly individuals. Data were collected through a combination of surveys, questionnaires, interviews, and focus groups. Structured surveys and questionnaires assessed social media usage patterns, mental health indicators, self-esteem, social comparison tendencies, and perceived benefits or drawbacks of social media.

Results: Data was collected from 300 participants of different age groups. Young students predominantly comprised undergraduate students (70%) engaged in full-time education, with a gender distribution of 45% male, 54% female, and a minimal representation of other genders (1%). For young students, social connectivity displayed a positive correlation (0.5) with reduced feelings of loneliness, while entertainment and recreation exhibited a moderate positive correlation (0.3) with improved mood. Additionally, information seeking did not exhibit significant correlations with stress or anxiety (0.2), whereas self-expression showed a mild correlation (0.2) with enhanced self-esteem.

Conclusion: It is concluded that social media usage manifests distinct impacts on the mental health of young students and elderly individuals, delineating divergent patterns in stress, anxiety, and feelings of isolation.

Key Words: Social Media, Mental Health, Young Students, Pakistan

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INTRODUCTION

The influence of social media on mental health has become a subject of profound interest in contemporary society, particularly concerning how it affects different age demographics. This study endeavors to delve into the nuanced impact of social media on the mental well-being of two distinct age groups: young students and the elderly^[1]. In recent years, social media platforms have rapidly evolved, becoming ubiquitous channels for

communication, information dissemination, and social interaction^[2]. However, the repercussions of prolonged social media usage on mental health have sparked debates, with concerns regarding its effects on psychological well-being. The juxtaposition of young students, often early adopters and heavy users of social media, with the elderly, who may engage in these platforms for varied purposes, offers a compelling comparative lens to explore these implications^[3].

People of all ages, adults and adolescents, utilize a diverse array of social media platforms to engage in meaningful connections, both in intimate settings with loved ones and in expansive networks encompassing friends, acquaintances, and professional peers^[4]. It is worth emphasizing that the younger generation is dedicating an ever-growing portion of their time to engaging in online networking platforms, indulging in e-games, exchanging messages, and immersing themselves in various forms of social media^[5]. A Research found that nearly majority of Americans use social media and the percentage of usage was higher of using Facebook. 68% Facebook and other on Twitter,

Institute of Psychiatry, Benazir Bhutto Hospital, Rawalpindi.

Correspondence: Shafqat Huma, Trainee Resident, Institute of Psychiatry, Benazir Bhutto Hospital, Rawalpindi.

Contact No: 0321 4734347

Email: shuma_2775@yahoo.com

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Pinterest, and Instagram. Statistical scale shows that spending time on social media is significantly on higher rate. On average, 28% of the time internet is being used for social media interaction. The total population of the world that uses social media is 4.48 billion, making that 56.8% of the world population⁴, and 84% of those users are young adults. According to a graph, we found online, women use Facebook, Instagram, and Pinterest more whereas men use Twitter, LinkedIn, YouTube, TikTok, Reddit, and WhatsApp more. Both genders use Snapchat an equal amount^[6]. Considering one developing country i.e., the USA, has 72.3% of social media users⁴ whereas a developing country i.e., Pakistan 31.5% of social media users. Young students, amidst their formative years, navigate a digital landscape intertwined with social connectivity, self-expression, and peer validation^[7]. Their immersion in social media environments raises questions about its potential impact on stress, self-esteem, social comparison, and overall mental health. Conversely, the elderly population, often adapting to these platforms later in life, might experience distinct effects^[8]. For them, social media could serve as a means of connectivity, combating isolation, and accessing information. Yet, concerns persist regarding potential feelings of exclusion, information overload, and the impact of constant digital engagement on their mental well-being^[9].

This comparative exploration seeks to discern potential differences and similarities in how social media influences the mental health dynamics of these two disparate age groups. By scrutinizing various aspects such as usage patterns, psychological responses, coping mechanisms, and perceived benefits or drawbacks, this study aspires to shed light on the intricate relationship between social media usage and mental health across generations.

METHODS

This mixed-method approach study was conducted in Institute of Psychiatry, Benazir Bhutto hospital Rawalpindi from Nov 2022 to October 2023 to investigate the divergent impacts of social media on the mental health of young students and elderly individuals. Inclusion Criteria:

- Participants aged between 18 to 25 years, enrolled in college or university programs, actively engaged in social media platforms.
- Participants aged 60 years and above, with varied levels of familiarity with and usage of social media platforms.
- Willingness to provide informed consent for participation in the study.
- A minimum level of social media engagement, ensuring an active presence on social platforms at least several times per week.

Exclusion Criteria: Participants unable or unwilling to provide informed consent for their involvement in the study.

Participant Selection: The study involved a comprehensive participant selection process to ensure representation from both young students and elderly individuals. Random or stratified sampling methods were employed to recruit participants from diverse socio-economic backgrounds. Inclusion criteria specified age brackets for young students (18 to 25 years) and elderly individuals (60+ years), aiming for a balance in gender and demographic characteristics. Participants were required to provide informed consent for their participation, and a minimum level of social media usage was a criterion for inclusion.

Data Collection: Data were collected through a combination of surveys, questionnaires, interviews, and focus groups. Structured surveys and questionnaires assessed social media usage patterns, mental health indicators, self-esteem, social comparison tendencies, and perceived benefits or drawbacks of social media. Interviews and focus groups provided qualitative insights into participants' experiences, emotions, and coping strategies related to social media use and mental health. Quantitative metrics, such as the frequency of social media use, types of platforms used, duration, and content consumption, were collected for objective analysis. The study focused on various variables to provide a comprehensive understanding of the impact of social media on mental health. Social media usage patterns, mental health indicators (stress, anxiety, depression), psychological factors (self-esteem, social comparison tendencies), and perceived benefits or drawbacks were considered. The research explored how these variables differed between young students and the elderly, shedding light on unique aspects within each age group.

Statistical Analysis: Data were analysed using SPSS v29.0. The data analysis involved both comparative and correlational approaches. Comparative analyses were conducted to statistically compare social media usage patterns and mental health indicators between young students and the elderly. Correlation studies explored associations between specific social media habits and mental health outcomes within each age group. Thematic analysis was applied to qualitative data from interviews and focus groups, identifying recurring themes and narratives.

RESULTS

Data was collected from 300 participants of different age groups. Young students predominantly comprised undergraduate students (70%) engaged in full-time education, with a gender distribution of 45% male, 54% female, and a minimal representation of other genders (1%). Conversely, the elderly cohort demonstrated a diverse educational background, with 60% holding a

Bachelor's degree and 30% possessing higher qualifications, while employment status showcased a majority retired population (70%) and a relatively balanced gender distribution (40% male, 58% female, and 2% other).

Table 1 No: Demographic data of participants

Demographic Variable	Young Students (%)	Elderly Individuals (%)
Gender Male/Female/Other	Male (45), Female (54), Other (1)	Male (40), Female (58), Other (2)
Age (years)	18-25 (100)	60-75 (95), 75+ (5)
Education Level	Undergraduate (70), Graduate (30)	High School (10), Bachelor's Degree (60), Master's/PhD (30)
Employment Status	Part-time Job (20), Full-time Student (80)	Retired (70), Part-time Work (30)
Socio-economic Status	Lower (25), Middle (50), Upper (25)	Lower (40), Middle (50), Upper (10)
Urban/Rural Residence	Urban (80), Rural (20)	Urban (60), Rural (40)

Young students, on average, spent 2.5 hours daily, with a predominant focus on Instagram (35%) and messaging apps (65%) for their social interactions. In contrast, the elderly allocated 1.2 hours per day to social media engagement, displaying a preference for Facebook (60%) and WhatsApp (40%) as their primary platforms for connectivity and information exchange.

Table No. 2: Social media usage pattern among both groups

Age Group	Average Daily Usage (Hours)	Preferred Platforms
Young Students	2.5	Instagram (35%), Messaging Apps (65%)
Elderly Individuals	1.2	Facebook (60%), WhatsApp (40%)

Table No. 3: Mental health indicators in both groups

Age Group	Stress Level (out of 10)	Anxiety Level (out of 10)	Depression Level (out of 10)
Young Students	6.0	6.5	4.8
Elderly Individuals	3.8	3.0	4.2

Young students reported higher stress levels (6.0 out of 10) and anxiety levels (6.5 out of 10), while

experiencing lower levels of depression (4.8 out of 10). Conversely, elderly individuals exhibited comparatively lower stress (3.8 out of 10) and anxiety (3.0 out of 10), with slightly elevated levels of depression (4.2 out of 10).

Table No. 4: Psychological factors in both groups

Age Group	Social Comparison Tendencies (%)	Self-Esteem Level (out of 10)
Young Students	70	6.2
Elderly Individuals	20	7.1

Table No. 5: Association between Social-Media Platform Usage for Different Purposes and Mental Well-Being

Age Group	Purpose of Social Media Usage	Mental Health Indicator Correlations
Young Students	Social Connectivity	Positive correlation with reduced feelings of loneliness (0.5)
	Information Seeking	No significant correlation observed with stress or anxiety (0.2)
	Entertainment & Recreation	Moderate positive correlation with improved mood (0.3)
Elderly Individuals	Self-Expression	Mild correlation with enhanced self-esteem (0.2)
	Social Connectivity	Strong negative correlation with feelings of isolation (-0.6)
	Information Seeking	Moderate positive correlation with mental stimulation (0.4)
	Entertainment & Recreation	No significant correlation observed with mood or anxiety (0.1)
	Self-Expression	Positive correlation with a sense of fulfillment (0.3)

For young students, social connectivity displayed a positive correlation (0.5) with reduced feelings of loneliness, while entertainment and recreation exhibited a moderate positive correlation (0.3) with improved mood. Additionally, information seeking did not exhibit significant correlations with stress or anxiety (0.2), whereas self-expression showed a mild correlation (0.2) with enhanced self-esteem. Conversely, among the elderly, social connectivity revealed a strong negative

correlation (-0.6) with feelings of isolation, while self-expression exhibited a positive correlation (0.3) with a sense of fulfillment. Information seeking demonstrated a moderate positive correlation (0.4) with mental

stimulation, while entertainment and recreation did not show significant correlations with mood or anxiety (0.1).

Table No. 6: Gender Variation in Social-Media Platform Usage for Different Purposes and Mental Well-Being

Age Group	Gender	Purpose of Social Media Usage	Mental Health Indicator Correlations
Young Students	Male	Social Connectivity	Positive correlation with reduced feelings of loneliness (0.6)
		Information Seeking	No significant correlation observed with stress or anxiety (0.1)
		Entertainment & Recreation	Moderate positive correlation with improved mood (0.4)
		Self-Expression	Mild correlation with enhanced self-esteem (0.3)
	Female	Social Connectivity	Positive correlation with reduced feelings of loneliness (0.5)
		Information Seeking	No significant correlation observed with stress or anxiety (0.2)
		Entertainment & Recreation	Moderate positive correlation with improved mood (0.3)
		Self-Expression	Mild correlation with enhanced self-esteem (0.2)
Elderly Individuals	Male	Social Connectivity	Strong negative correlation with feelings of isolation (-0.7)
		Information Seeking	Moderate positive correlation with mental stimulation (0.5)
		Entertainment & Recreation	No significant correlation observed with mood or anxiety (0.2)
		Self-Expression	Positive correlation with a sense of fulfillment (0.4)
	Female	Social Connectivity	Strong negative correlation with feelings of isolation (-0.6)
		Information Seeking	Moderate positive correlation with mental stimulation (0.4)
		Entertainment & Recreation	No significant correlation observed with mood or anxiety (0.1)
		Self-Expression	Positive correlation with a sense of fulfillment (0.3)

DISCUSSION

The comparison of social media impacts on the mental well-being of young students and elderly individuals revealed intriguing insights into their usage patterns and associated mental health indicators^[10]. The observed higher stress and anxiety levels among young students correlated with their predominant use of social media for connectivity and entertainment^[11]. Conversely, the elderly, utilizing social platforms primarily for information seeking and family connections, showcased lower stress and anxiety levels but grappled with feelings of isolation, particularly notable in their negative correlation with social connectivity^[12]. These findings underscored the divergent impacts of social media usage on loneliness and isolation across age groups, indicating the varied psychological needs and influences of digital engagement^[13]. Moreover, the study highlighted the nuanced associations between different purposes of social media use and mental

health indicators within each age cohort^[14]. For young students, social connectivity emerged as a crucial factor, positively correlating with alleviated feelings of loneliness^[15-17]. Conversely, among the elderly, social connectivity exhibited a significant negative correlation with feelings of isolation, emphasizing its pivotal role in combating social detachment within this demographic^[18-19]. Additionally, self-expression emerged as a positive contributor to a sense of fulfillment among the elderly, indicating the potential psychological benefits of creative digital engagement in older age groups.

These findings underscore the need for tailored interventions and awareness campaigns that recognize the distinct social and emotional needs of different age demographics. For young students, strategies focusing on fostering healthy connectivity and reducing social comparison pressures might be pivotal, while initiatives for the elderly should aim at mitigating feelings of isolation through enhanced social connectivity.

CONCLUSION

It is concluded that social media usage manifests distinct impacts on the mental health of young students and elderly individuals, delineating divergent patterns in stress, anxiety, and feelings of isolation. The study revealed the crucial role of social connectivity for both cohorts, albeit with contrasting effects on loneliness and isolation. These findings emphasize the necessity for tailored interventions and educational initiatives to address age-specific mental health concerns stemming from social media usage, developing healthier digital environments across generations.

Author's Contribution:

Concept & Design of Study: Shafqat Huma

Drafting: M Asif Kamal,
Muhammad Fahim
Qasim

Data Analysis: Zain Ullah Khan, Ali
Ahsan Mufti

Revisiting Critically: Shafqat Huma, M Asif
Kamal

Final Approval of version: Shafqat Huma

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Post-Operative Complications of Pneumonectomy and It's Management

Complications of
Pneumonectomy
and It's
Management

Muhammad Imran¹, Nasir Ali⁴, Zeeshan Ehsan², Jamil ur Rehman¹, Jawad Hameed³ and Muhammad Sheharyar Ashraf³

ABSTRACT

Objective: To evaluate post-operative complications of pneumonectomy and their management.

Study Design: Prospective study

Place and Duration of Study: This study was conducted at the thoracic surgery Lady Reading Hospital, Peshawar from January 2023 to December 2023.

Methods: Overall, 150 patients were included in this study. The study examined various factors including age, sex, preoperative conditions, pulmonary function, gas exchange tests, indications for operation, preoperative clinical stage, neoadjuvant treatment, type of analgesia, morbidity.

Results: Minor complications were observed in 83.3% patients. The most common minor complication in the patients was atrial dysrhythmia, noted in 53.6% patients. Major complications were observed in 56.7% patients. The most common major complication was pneumonia and noted in 51.8% patients. BMI was the effect modifier for the major complications, ($p < 0.050$).

Conclusion: Pneumonectomy poses higher risks compared to other lung surgeries. Sleeve resections should be considered first. A multidisciplinary team must assess the necessity of pneumonectomy and be vigilant for potential complications. Preoperative evaluation and postoperative monitoring are important for early complication detection and treatment.

Key Words: Pneumonectomy, Post-operative complications, Management, Pneumonia, COPD

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INTRODUCTION

Pneumonectomy, a surgical procedure involving the removal of an entire lung, carries risks of various complications including respiratory issues like pneumonia and atelectasis, cardiovascular problems such as arrhythmias or pulmonary embolism, potential infections in surgical wounds¹, bleeding complications, post-operative pain², and nutritional challenges due to difficulty in eating or swallowing³. On April 5, 1933, Evarts Graham achieved the first successful pneumonectomy, targeting T2 N1 squamous cell carcinomas; however, despite advancements in surgical methods and perioperative care, pneumonectomy continues to entail higher mortality and morbidity rates compared to lesser resections^{4,5}.

¹. Department of Thoracic Surgery / Cardiothoracic Surgery² / Anesthesia³, Lady Reading Hospital, Peshawar.

⁴. Department of Cardiac Surgery, Rehman Medical Institute, Peshawar.

Correspondence: Dr. Jawad Hameed, Assistant Professor of Anesthesia, Lady Reading Hospital, Peshawar.

Contact No: 0333 9202031

Email: drjawadhameed@gmail.com

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The management of post-operative complications following pneumonectomy typically involves a multidisciplinary approach, where the surgical team, intensivists⁶, respiratory therapists, and other specialists collaborate to address specific issues^{7,8}. This may include prescribing antibiotics to prevent or treat infections, employing respiratory therapy techniques such as chest physiotherapy and incentive spirometry to promote lung expansion and prevent complications like atelectasis, managing pain through analgesic medications or regional anesthesia techniques, administering intravenous fluids and electrolyte management to maintain hydration and prevent pulmonary edema⁹, closely monitoring vital signs and oxygen saturation for early detection and management of complications, and implementing rehabilitation interventions such as physical and respiratory therapy to aid in regaining strength, mobility, and respiratory function post-surgery¹⁰.

The findings of this study can guide the surgeons in implementing preventive measures to reduce the risk of complications associated with pneumonectomy. Strategies such as pre-operative optimization of pulmonary function and perioperative physiotherapy may help mitigate postoperative complications.

METHODS

Study was conducted at department of thoracic surgery Lady Reading Hospital, Peshawar from January 2023 to

December 2023. Study was started after ethical approval from hospital ethical board and written informed consent was taken from patients. In this study, patients diagnosed with small cell lung cancer or low-grade malignant histological types such as carcinoid tumor, mucoepidermoid carcinoma, or unclassified carcinoma were excluded from the analysis. The study examined various factors including age, sex, preoperative conditions, pulmonary function, gas exchange tests, indications for operation, preoperative clinical stage, neoadjuvant treatment, type of analgesia, morbidity, and operative mortality.

The preoperative respiratory function was meticulously evaluated using blood gas analysis, spirometry, and a lung perfusion scan, alongside the assessment of predicted postoperative forced expiratory volume in 1 second (ppoFEV). Patients with risk factors for coronary artery disease (CAD) underwent further assessment via echocardiography, myocardium scintigraphy, or coronary angiogram. Additionally, the American Society of Anesthesiology (ASA) score was utilized for risk classification. Clinical and pathological staging adhered to the TNM criteria of the international system for staging lung cancer. Standard pneumonectomy, defined as the intrapericardial or extrapericardial removal of the entire lung while performing radical dissection of the mediastinal lymph nodes without resecting the mediastinal chest wall or diaphragmatic structures, was the surgical approach employed.

The clinical and surgical variables associated with complications include patients aged over 70 years, those with a body mass index (BMI) exceeding 30, smokers, individuals with chronic obstructive pulmonary disease (COPD), those classified under higher ASA classes, individuals with coronary artery disease (CAD), patients with advanced carcinological staging (IIIA, IIIB), those who underwent neoadjuvant therapy, the side of the operation, the chosen technique for bronchial stump closure, and the utilization of epidural analgesia.

SPSS version 27 was applied and p value 0.05 was considered as significant after test of significance.

RESULTS

Overall, 150 patients were included in this study with mean age 58.46 ± 5.59 years. Majority of the patients 94 (62.7%) were less than 60 years of age. There were 103 (68.7%) males and 47 (31.3%) females. The average BMI of the patients was 26.68 ± 2.86 kg/m². There were 37 (24.7%) patients' current smokers. COPD was noted in 31 (20.7%) patients. Most of the patients i.e. 78 (52.0%) had ASA II. There were 44 (29.3%) patients had II carcinological stage. Neoadjuvant therapy was given to 14 (9.3%) patients. Right and left pneumonectomy was noted as 100 (66.7%) and 50 (33.3%), respectively. Bronchial stump coverage was

observed in 42 (28.0%) patients. Further, Epidural analgesia was given to 69 (46.0%) patients. (Table. 1). Minor complications were observed in 125 (83.3%) patients. The most common minor complication in the patients was atrial dysrhythmia, noted in 68 (53.6%) patients. Major complications were observed in 85 (56.7%) patients. The most common major complication was pneumonia and noted in 44 (51.8%) patients. (Table. 2). BMI was the effect modifier for the major complications, ($p < 0.050$). (Table. 3).

Table No. 1: Demographic and baseline characteristics of the study patients

Variable	Presence
Age (years)	58.46 ± 5.59
<60	94 (62.7)
≥60	56 (37.3)
Sex	
Male	103 (68.7)
Female	47 (31.3)
BMI (kg/m ²)	26.68 ± 2.86
<25	45 (30.0)
≥25	105 (70.0)
Smoking status	37 (24.7)
COPD	31 (20.7)
ASA	
I	35 (23.3)
II	78 (52.0)
III	37 (24.7)
CAD	28 (18.7)
Carcinological staging	
I	50 (33.3)
II	44 (29.3)
IIIA	31 (20.7)
IIIB	25 (16.7)
Neoadjuvant therapy	14 (9.3)
Pneumonectomy	
Right	100 (66.7)
Left	50 (33.3)
Bronchial stump coverage	42 (28.0)
Epidural analgesia	69 (46.0)
N (%), Mean±S.D	

Table No. 2: Minor and major complications in the whole study patients

Variable	Presence
Minor complication	125 (83.3)
Atrial dysrhythmia	68 (53.6)
Bronchoscopy for secretions	34 (27.2)
Vocal cord paralysis	24 (19.2)
Major complications	85 (56.7)
Reintubation	6 (7.1)
Reoperation for bleeding	7 (8.2)
Bronchopleural fistula	12 (14.1)
Empyema	3 (3.5)
Pneumonia	44 (51.8)
Pulmonary oedema /ARDS	5 (5.9)

Pulmonary emboli	5 (5.9)
Myocardial infarction	3 (3.5)
N (%)	

Table No. 3: Association of major complication with demographic and baseline variables of the patients

Variable	Major complication		p-value
	Yes 85 (56.7%)	No 65 (43.3%)	
Age (years)			
<60	51 (60.0)	43 (66.2)	0.440
≥60	34 (40.0)	22 (33.8)	
Sex			
Male	60 (70.6)	43 (66.2)	0.562
Female	25 (29.4)	22 (33.8)	
BMI			
<25 kg/m ²	31 (36.5)	14 (21.5)	0.038
≥25 kg/m ²	54 (63.5)	51 (78.5)	
Smoking status			
Yes	24 (28.2)	13 (20.0)	0.246
No	61 (71.8)	52 (80.0)	
COPD			
Yes	18 (21.2)	13 (20.0)	0.860
No	67 (78.8)	52 (80.0)	
ASA			
I	23 (27.1)	12 (18.5)	0.427
II	41 (48.2)	37 (56.9)	
III	21 (24.7)	16 (24.6)	
CAD			
Yes	19 (22.4)	9 (13.8)	0.185
No	66 (77.6)	56 (86.2)	
Carcinological staging			
I	30 (35.3)	20 (30.8)	0.719
II	24 (28.2)	20 (30.8)	
IIIA	19 (22.4)	12 (18.5)	
IIIB	12 (14.)	13 (20.0)	
Neoadjuvant therapy			
Yes	8 (9.4)	6 (9.2)	0.970
No	77 (90.6)	59 (90.8)	
Pneumonectomy			
Right	53 (62.4)	47 (72.3)	0.200
Left	32 (37.6)	18 (27.7)	
Bronchial stump coverage			
Yes	25 (29.4)	17 (26.2)	0.660
No	60 (70.6)	48 (73.8)	
Epidural analgesia			
Yes	37 (43.5)	32 (49.2)	0.488
No	48 (56.5)	33 (50.8)	

DISCUSSION

In this study average BMI of the patients was 26.68±2.86 kg/m². There were 24.7% patients' current smokers. COPD was noted in 20.7% patients. Most of the patients i.e. 52.0% had ASA II. There were 29.3% patients had II carcinological stage. In previous studies

conducted by Alloubiet al¹¹ and Algar et al¹², it was reported that underlying pulmonary disease, particularly COPD, has been advocated as a major risk factor for postoperative complications.

Previous study conducted by Bernard et al¹⁴ reported rate of respiratory insufficiency ranging from 3.3% to 21.8%, with post-pneumonia rates falling between 3.3% and 17.4%. Chest physiotherapy is strongly advocated to mitigate atelectasis and prevent secondary infections. Given the grave risk of pneumonia post-pneumonectomy, meticulous preoperative assessment, emphasis on preserving functional residual volume through pre- and postoperative physiotherapy, effective pain management, and prompt mobilization are imperative for improved patient outcomes.

In this study coronary artery disease was found in 18.7% of patients and its part of major complication in 22.4% of patients and emphysema in 3.5% of patients. Weinmann et al¹⁴ reported that myocardial ischemia or infarction was directly attributed to operative death in two patients with pre-existing coronary artery disease (CAD). We advocate for the implementation of a stringent selective screening process to identify patients necessitating heightened preoperative care, including myocardial revascularization if feasible, prior to surgery. Empyema was observed in 2.4% of our patients, while the occurrence rate ranged from 2% to 16% according to existing literature¹⁵.

Vocal cord paralysis and arrhythmias were found 19.2% and 53% in this study. In a study Alloubi et al¹² recurrent laryngeal nerve damage is the second most common complication after pneumonectomy. Treatment involves assessing the extent and permanence of the injury. Fiberoptic study helps in precise evaluation of laryngeal function. Prevention, through techniques like the "no-touch" approach and avoiding excessive coagulation during surgery, is emphasized. In previous study conducted by Vaporciyan et al¹⁶ reported arrhythmia is the most common complication after thoracic surgery, especially following pneumonectomy. Its incidence ranges from 11 to 47%, with supraventricular arrhythmias, such as atrial fibrillation, being most common. These arrhythmias typically occur within the first 72 hours post-surgery.

In this study pulmonary edema and pulmonary emboli was observed in 5.9% of patients. İşik et al¹⁷ found higher risk of pulmonary artery thrombus with transfixation ligature than continuous suture closure due to intimal damage. Prevention outweighs treatment in all diseases. Nagahiro et al¹⁸ strongly advocate intermittent pneumatic compression. Anticoagulant therapy raises concern of increased bleeding and epidural hematoma risk.

CONCLUSION

Pneumonectomy poses higher risks compared to other lung surgeries. Sleeve resections should be considered first. A multidisciplinary team must assess the necessity of pneumonectomy and be vigilant for potential complications. Preoperative evaluation and postoperative monitoring are important for early complication detection and treatment.

Author's Contribution:

Concept & Design of Study: Muhammad Imran
Drafting: Nasir Ali, Zeeshan Ehsan
Data Analysis: Jamil ur Rehman, Jawad Hameed, Muhammad

Sheharyar Ashraf
Revisiting Critically: Muhammad Imran, Nasir Ali

Final Approval of version: Muhammad Imran

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Gynecomastia Grades 1 and 2: Evaluating Surgical Outcomes by combining Glandular Excision with Liposuction

Outcome of
Excision with
Liposuction in
Gynecomastia
Grades 1 and 2

Riaz Ahmed Khan Afridi¹, Zahra Tauqeer¹, Sadaf Obaid³, Saddam Hussain², Arifa Afzal¹
and Bakhtawar Kakar¹

ABSTRACT

Objective: This study evaluates the results of integrating liposuction with glandular excision for grade 1 and 2 gynecomastia, focusing on both complications and patient satisfaction.

Study Design: Observational study

Place and Duration of Study: This study was conducted at the Plastic Surgery clinic, Institution Based Private Practice, Lady Reading Hospital Peshawar from April 2023 to December 2023.

Methods: The study included 40 participants aged 18 and above, specifically targeting individuals with grade 1 and 2 gynecomastia, as well as idiopathic cases. Data was recorded in a specified Performa and was analyzed using spss version 20. All enrolled patients underwent same treatment involving both liposuction and glandular excision.

Results: age range observed was between 19-27 years, with grade 2a as the most prevalent grade observed (n=28), followed by grade 2b (n=7) and grade 1 (n=5). A total of 85% patients considered the procedure satisfactory. The observed complication rate was 10%, with hematoma, nipple retraction, and asymmetry being the most frequently encountered issues.

Conclusion: A uniform surgical approach was employed for all the patients, resulting in satisfaction of the majority, as their concerns were effectively addressed.

Key Words: Liposuction, Glandular Excision, Gynecomastia

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INTRODUCTION

Gynecomastia, a benign condition characterized by enlargement of male breast tissue, involving histological changes in glandular size, stromal, and fatty elements. It can occur bilaterally or unilaterally, affecting individuals across different age groups with varying severity.¹ Patients seek medical attention due to psychosocial and cosmetic concerns.²

While most of the cases are idiopathic, thorough systemic and hormonal assessments are essential for gynecomastia patients to exclude potential contributing factors like renal insufficiency, hypogonadism, testicular tumors, liver cirrhosis, and hyperthyroidism.³

¹. Department of Burns and Plastics Surgery / General Surgery², Lady Reading Hospital Peshawar.

³. Department of Plastic Surgery, Khyber Teaching Hospital, Peshawar.

Correspondence: Sadaf Obaid, Experiential Registrar, Plastic Surgery, Khyber Teaching Hospital, Peshawar.

Contact No: 03345086939

Email: sdfobid07@gmail.com

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A common factor among all these causes is either an imbalance in hormones mainly estrogens and androgens or increased responsiveness of breast glands to circulating estrogen, leading to glandular hyperplasia, followed by fibroblast proliferation, and neovascularization.^{4,5,6}

The Simon classification system, widely employed for grading gynecomastia, categorizes it into four grades based on breast enlargement and skin excess. Grade I involves minor enlargement without skin excess, Grade IIA features moderate enlargement without excess skin. Grade IIB shows moderate enlargement with slight skin redundancy, and Grade III includes significant breast enlargement with noticeable skin excess resembling pendulous female breast.^{7,8} Management of gynecomastia involves addressing the underlying cause. However, in idiopathic cases if the condition persists for over a year, surgical intervention becomes the primary option.^{9,10}

Depending on the grade, various surgical modalities have been described for correcting gynecomastia. Liposuction without glandular excision has shown several disadvantages.¹⁰ This study aims to assess the efficacy of combining glandular excision with liposuction in patients classified as grade 1 and 2, considering patient satisfaction scores and potential complications.

METHODS

This descriptive study was conducted at Plastic Surgery clinic, Institution based private practice, lady Reading Hospital Peshawar from April 2023- DEC 2023 following approval from institutional ethical board. After explaining the study protocol, informed consent was signed by all participating patients.

Inclusion criteria: Patients having grade 1 and 2 gynecomastia persisting for more than 1 year, only idiopathic cases and individuals aged 18 years and above.

Exclusion criteria: Pseudo gynecomastia patients (defined as breast enlargement only due to fatty tissue) were excluded.

Data Collection Procedure: After hospital admission, detailed clinical history, physical examination and investigations for anesthesia and surgical fitness was recorded. Patients were monitored on the fourteenth and twenty-first days post-operatively, and a follow-up visit was conducted at three-month for any complications. level of discomfort and satisfactory scores were recorded and analyzed using self-assessment sheets. Variables like age, grade of gynecomastia, concern of patient, lipoaspirate suctioned out, complications and patient satisfaction score were analyzed. Patient satisfaction score was rated as 1-5, with 1 being dissatisfied and 5 being the most satisfied.

A single observer collected the data, and a different author conducted the analysis to minimize any potential bias.

Surgical Technique: All the surgeries were performed by single expert surgeon. Pre-operative marking was performed in the upright position followed by photographic documentation. Procedure was performed in supine position; tumescent fluid infiltration was carried out through a 1 mm incision at the lateral to

inframammary fold. This tumescent fluid, composed of 10ml of 20mg bupivacaine, 10ml of 2% lidocaine, and 1ml of adrenaline in 1L of Ringer lactate, served to emulsify fats, disrupt fibro-fatty elements, and provide a hemostatic effect. The addition of bupivacaine helps in alleviating the pain for almost 12 hours post operatively.

After allowing 10 minutes for the tumescent fluid to take effect, liposuction commenced using a 3mm cannula through the same lateral incision, followed by a 2mm cannula to address fine irregularities. Gland excision was then performed through a per areolar incision, sparing a 1cm cuff of retro areolar tissue to prevent nipple retraction and preserve sensation. Finally, liposuction was conducted for the final contour. No drains were utilized, and postoperative compression was initiated immediately after the procedure. Patients were scheduled for follow-up visits on 14th day, 30th day, and 6 months postoperatively.

RESULTS

A total of 40 patients were enrolled in this study, with a mean age of 24.2 years, (range:19-27 years) and an average weight of 74.5 kg.

The study recorded a mean lipoaspirate volume of 231 ml.

Pre-operative grading was done using Simons classification. The most prevalent gynecomastia grade observed and treated was 2a, accounting for 70% (28 patients), followed by 2b at 17.5% (7 patients), and only 12.5% (5 patients) presented with grade 1 gynecomastia.

21 Patients sought treatment primarily for cosmetic reasons, while others underwent surgery due to concerns about carcinoma, pain, and psychosocial issues.



Figure No.1: Oblique view of patient Showing Grade 1



2-weeks Post-op



Figure No.2: Frontal view of patient showing grade 2a

2 weeks post op

Table No.1: Cross Tabulations of Complications with Grade

Complications		Grading of the Disease according to Simon Criteria			Total
		1	2a	2b	
	Nil	4	26	6	36
	Asymmetry	0	1	1	2
	Nipple Retraction	0	1	0	1
	Hematoma Formation	1	0	0	1
Total		5	28	7	40

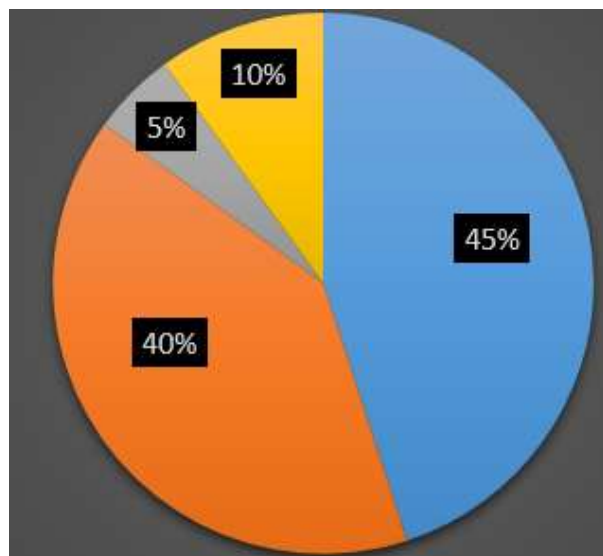


Figure No.3; Satisfaction Scores

Regarding the technique of combining glandular excision with liposuction, 45% of patients expressed satisfaction, while an additional 40% fell into the highly satisfied category. Consequently, a total of 85% of

patients deemed the procedure satisfactory. In contrast, 10% remained neutral in their opinion, and 5% expressed dissatisfaction. (fig:3)

Complications were identified in four patients, all of which underwent surgery for bilateral disease, which was subsequently evacuated. Two patients exhibited asymmetry on both sides, while one patient experienced nipple retraction. Similarly, another patient presented with hematoma, which needed evacuation. (table: 1)

DISCUSSION

Plastic surgeons commonly encounter patients with gynecomastia due to its high prevalence. When selecting patients and devising surgical plans, it is important to consider redundant skin, tissue parenchyma, and adipose tissue.¹¹ Surgery remains the primary and most effective modality for treating grade I and II gynecomastia in adults, especially when medical treatments prove ineffective within a year. Liposuction combined with glandular excision offers multiple advantages compared to either surgery or liposuction alone.¹²

In numerous studies, liposapirated volumes have been documented to be up to 300ml; ^{13,14} however, our observations revealed an average volume of 230ml.

In our research, 85% of patients expressed satisfaction, whereas only 5% reported dissatisfaction. This differs from another comparative study conducted in Pakistan, where patients undergoing simple liposuction were more satisfied than those who had both liposuction and an incision.¹⁶ Nevertheless, the majority of studies revealed that patients were completely satisfied with the outcomes of the combined approach.¹²⁻¹⁵

The complication rate in our study was only 10% in contrast to other studies where a slightly higher rate of complications (12%) was recorded. Hematoma, nipple retraction and asymmetry were the main complications in our patients and was common in bilateral cases.

whereas, A German study identified bleeding as the sole postoperative complication.¹² In other studies hematoma and seroma were the most prevalent issues.^{15,16}

We observed nipple retraction in only 1 patient, a result consistent with the 3 patients reported in a study conducted in Egypt.¹⁷

CONCLUSION

Main goal of any surgical procedure is to address the patient's concern and achieve satisfactory results with possible minimal complications. Since, various surgical interventions are defined in literature for managing different grades of gynecomastia, our research strongly advocates for the combined approach involving liposuction and glandular excision. This technique emerges as a reliable and satisfactory solution, particularly for individuals with gynecomastia Grades 1 and 2.

Acknowledgments: Rukhsar Asad, House officer, Burns and Plastics Surgery Department, Lady Reading Hospital, Peshawar. rukhsarasadkhan@gmail.com

Author's Contribution:

Concept & Design of Study: Riaz Ahmed Khan Afridi
Drafting: Sadaf Obaid, Zahra Tauqeer

Data Analysis: Saddam Hussain, Arifa Afzal, Bakhtawar Kakar

Revisiting Critically: Riaz Ahmed Khan Afridi, Sadaf Obaid

Final Approval of version: Riaz Ahmed Khan Afridi, Sadaf Obaid

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The Relation between Thyrotoxicosis and Risk of Cognitive Disorders in Older Adults at a Tertiary Care Centre in Pakistan

Feras Almarshad¹ and Ghulam Mustafa²

ABSTRACT

Objective: To ascertain whether there's a heightened risk of cognitive disorders linked to both endogenous and exogenous causes of thyrotoxicosis.

Study Design: Case control, Cohort study

Place and Duration of Study: This study was conducted at the Department of Medicine at Nishtar hospital, Multan, from March 2021 to February 2022.

Methods: Two hundred and ten patients were enrolled and divided into case group (105) and control group (105). The clock drawing test and Mini Mental State Examination was used for evaluation of cognitive function, both administered by a single observer. Subjects included in the study had received a minimum of primary education or higher and were above the age of 65 years.

Results: Regarding thyrotoxicosis, 53.3% patients were exogenous, 15.7% was endogenous and 31.0% patients was unknown thyrotoxicosis. Exogenous 68.5% was most common in cases as compare to the controls 48.1%. In this study MMSE (25-30) score was 65.7% in cases and 85.7% in controls. Status of cognitive impairment evaluated by clock drawing test 32.4% in cases and 20.0% in controls.

Conclusion: The prevalence of cognitive impairment was notably elevated in individuals with thyrotoxicosis, whether endogenous or exogenous, compared to control subjects. Additionally, the presence of cognitive impairment exhibited a correlation with the level of thyroid-stimulating hormone (TSH), with cognitive function declining as TSH levels increased.

Key Words: Cognitive disorders, Thyrotoxicosis, older adults, Exogenous, Endogenous

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INTRODUCTION

Thyrotoxicosis refers to a condition characterized by excess thyroid hormone levels in the bloodstream, typically resulting from an overactive thyroid gland¹. There are several types of thyrotoxicosis, including Graves' disease, toxic multinodular goiter, toxic adenoma, and thyroiditis. Graves' disease is an autoimmune disorder where the immune system mistakenly attacks the thyroid gland, leading to excessive hormone production. Toxic multinodular goiter involves the development of multiple overactive nodules within the thyroid gland².

¹. Department of Internal Medicine / Pediatrics, Medicine², College of Medicine, Shaqra University, Shaqra, Saudia Arabia.

Correspondence: Dr. Ghulam Mustafa, Associate Professor of Pediatrics, Medicine, College of Medicine, Shaqra, Shaqra University, Saudia Arabia.

Contact No: 0300 8635452

Email: ghulammustafa@su.edu.sa

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Toxic adenoma refers to the presence of a single overactive nodule within the thyroid tissue. Thyroiditis is inflammation of the thyroid gland, which can lead to a temporary increase in hormone levels³.

A recent study conducted by Johns Hopkins Medicine has revealed a correlation between thyrotoxicosis, characterized by elevated thyroid hormone levels, and a heightened risk of cognitive disorders in older adults, encompassing both exogenous (resulting from medication intake) and endogenous (stemming from thyroid disorders like hyperthyroidism and Graves' disease) forms of the condition⁴.

Thyrotoxicosis, characterized by an excess of thyroid hormones in the bloodstream, can significantly impact cognitive function in older adults⁵. The overstimulation of thyroid hormones, particularly triiodothyronine (T3) and thyroxine (T4), can lead to symptoms such as anxiety, irritability, and difficulties with concentration and memory⁶. In older adults, these cognitive impairments may present as confusion, forgetfulness, and a decline in overall cognitive function⁷. Additionally, untreated or inadequately managed thyrotoxicosis in older adults can exacerbate pre-existing cognitive disorders such as dementia or

Alzheimer's disease, further complicating cognitive function⁸.

Overall, the findings of this study underscore the importance of recognizing and addressing thyroid dysfunction as a potential risk factor for cognitive disorders in older adults, highlighting opportunities for improved clinical care, patient education, and public health initiatives.

METHODS

This case control, cohort study was conducted at department of medicine at Nishtar hospital, Multan, from March 2021 to February 2022. A total of 210 patients with age above 65 years having thyrotoxicosis were selected and aligned in case and control group. Serum levels of thyroid stimulating hormone (TSH) were assessed.

The intra-assay coefficient of variation (CV) for TSH ranged from 3.8% to 6.0% across concentrations with mean 0.025 to 30.00 mIU/L. Hypothyroidism was characterized by elevated serum TSH levels (>5.5 mIU/liter) while serum-free T4 and T3 concentrations remained within the reference range. The clock drawing test and Mini Mental State Examination was used for evaluation of cognitive function, both administered by a single observer. Various cognitive characteristics can be assessed with MMSE like attention, memory, orientation, motor skills and language using upper limit of score 30, score 24 and less that indicate cognitive impairment.

Administering the MMSE typically takes about 8 minutes in hospitalized elderly patients, though the duration can range from 4 to 21 minutes. Additionally, the Clock Drawing Test (CDT) used for executive impairment, visuospatial, constructional praxis utilizing the Shulman scoring system where a score of ≥ 3 indicates cognitive deficit, and normal score was 1 or 2. Subjects included in the study had received a minimum of primary education or higher and were above the age of 65; however, individuals on thyroxine therapy., those previously treated for hyperthyroidism, and individuals with major illnesses such as uncontrolled diabetes and associated complications, hypertension, cerebrovascular accidents (CVA), chronic kidney disease (CKD), sepsis, or those unable to give consent were excluded.

The control group consisted of normal healthy volunteers matched in age, sex, and education to the cases, and both groups were further matched for blood pressures (systolic, diastolic), HbA1c, PPBS, and FBS values. Exclusion criteria for the control group were identical to those for the cases, ensuring comparability. Control subjects were selected from the same socioeconomic background to minimize potential biases, and they underwent thorough physical and mental examinations, assessed using the same parameters as the patient group.

Cases and controls underwent examination with both the MMSE and CDT test. Subsequently, the data were analyzed utilizing suitable statistical methods, including the Chi-square test and Two Sample Proportion Tests, to determine the P value. Significance was attributed to tests with P values below 0.05.

RESULTS

Overall, 210 patients were included in our study. The whole patients were equally divided into two groups as Cases 105 (50.0%) and Controls 105 (50.0%). Both the groups were almost equal with respect to demographic variables, ($p>0.050$). (Table 1).

Table No.1: Demographic variables between the study groups

Variable	Cases 105 (50.0%)	Controls 105 (50.0%)	p-value
Age	66.44±10.92	65.61±11.47	0.597
Gender			
Male	63 (60.0)	72 (68.6)	0.195
Female	42 (40.0)	33 (31.4)	
Area of living			
Urban	30 (28.6)	37 (35.2)	0.300
Rural	75 (71.4)	68 (64.8)	
Marital status			
Married	103 (98.1)	104 (99.0)	0.561
Un-married	2 (1.9)	1 (1.0)	
Education status			
Educated	59 (56.2)	63 (60.0)	0.576
Un-educated	46 (43.8)	42 (40.0)	
Mean ± S.D. N (%)			

Table No.2: Outcome variables between the study groups

Outcome	Cases 105 (50.0%)	Controls 105 (50.0%)	p-value
Cognitive impairment			
Yes	35 (33.3)	19 (18.1)	0.012
No	70 (66.7)	86 (81.9)	
TSH levels	7.28±1.34	6.32±0.73	<0.001
MMSE scores			
25-30	69 (65.7)	90 (85.7)	0.002
19-24	24 (22.9)	8 (7.6)	
≤18	12 (11.4)	7 (6.7)	
Status of cognitive impairment evaluated by clock drawing test			
Yes	34 (32.4)	21 (20.0)	0.041
No	71 (67.6)	84 (80.0)	
Mean ± S.D, N (%)			

Cognitive impairment was presented in 35 (33.3%) cases and 19 (18.1%) in controls, ($p=0.012$). The mean TSH levels in cases and controls was 7.28 ± 1.34 mIU/lite and 6.32 ± 0.73 mIU/liter, respectively, ($p<0.001$). MMSE (25-30) score was 69 (65.7%) in cases and 90 (85.7%) in controls, ($p=0.002$). Status of cognitive impairment evaluated by clock drawing test 34 (32.4%) in cases and 21 (20.0%) in controls, ($p=0.041$). (Table 2).

According to thyrotoxicosis, 112 (53.3%) patients was exogenous, 33 (15.7%) was endogenous and 65 (31.0%) patients was unknown thyrotoxicosis. (Figure I). Exogenous 37 (68.5%) was most common in cases as compare to the controls 75 (48.1%), ($p=0.019$). (Table 3)

Table No.3: Association of thyrotoxicosis with cognitive impairment

Thyrotoxicosis	Cognitive Impairment		p-value
	Yes 54 (25.7%)	No 156 (74.3%)	
Exogenous	37 (68.5)	75 (48.1)	0.019
Endogenous	8 (14.8)	25 (16.0)	
Unknown	9 (16.7)	56 (35.9)	
N (%)			

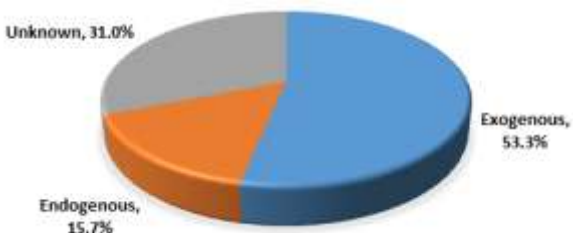


Figure No.1: Thyrotoxicosis distribution in all patients

DISCUSSION

Thyroid hormones exert significant influence on the central nervous system, with well-established consequences of overt hypothyroidism, yet there remains a dearth of evidence concerning the cognitive impacts of hypothyroidism and thyrotoxicosis, particularly with its prevalence among older patients who may already be experiencing cognitive decline⁹. Several comprehensive studies have thoroughly investigated the correlation between cognitive impairment and thyrotoxicosis, consistently revealing a robust association between the two conditions. These studies have explained the profound impact of thyrotoxicosis on cognitive function, highlighting the significant cognitive deficits experienced by individuals affected by this thyroid disorder^{10,11}.

In this study according to thyrotoxicosis, 53.3% patients were exogenous, 15.7% was endogenous and 31.0% patients was unknown thyrotoxicosis. Exogenous 68.5% was most common in cases as compare to the controls 48.1%. Another study

examining the US population found that individuals aged 65 and older with low TSH levels due to either endogenous or exogenous thyrotoxicosis were at a heightened risk of developing incident cognitive disorders. It was noted that iatrogenic thyrotoxicosis, often resulting from thyroid hormone therapy, contributed significantly to this association.

Ye Y et al¹² conducted a study wherein they reported a significant association between hypothyroidism and cognitive impairment. In their research, they observed that individuals with subclinical hypothyroidism exhibited cognitive deficits compared to those without the condition. This finding suggests that even in its subclinical form, hypothyroidism may have noticeable effects on cognitive function. Furthermore, Cook et al¹³ conducted a separate investigation focusing on elderly patients with hypothyroidism, and they similarly found that this group performed more poorly on cognitive assessments when compared to individuals with normal thyroid function.

In their study, Jorde et al¹⁴ conducted an extensive battery of cognitive function tests found no association with thyroid status. However, through secondary analyses, they did report a negative correlation between TSH levels and cognitive impairment. Samuels et al¹⁵ conducted a randomized controlled trial (RCT) involving 19 female participants with thyrotoxicosis, revealing a notable decrease in working memory by the conclusion of the hypothyroidism phase in contrast to measurements taken at the conclusion of the euthyroid phase.

In this study MMSE (25-30) score was 65.7% in cases and 85.7% in controls. Status of cognitive impairment evaluated by clock drawing test 32.4% in cases and 20.0% in controls. Additionally, Bono et al¹⁶ research suggested that while subclinical hypothyroidism in 36 women had minimal impact on cognitive status, it potentially contributed to an age-related decline in attentive function.

Limitations: Longitudinal nature of study may experience loss to follow-up over time, which can introduce bias and affect the validity of the findings, especially if those lost to follow-up differ systematically from those retained in the study.

The study's findings may not be generalizable to populations outside of the study's geographic region, healthcare system, or time period.

CONCLUSION

The prevalence of cognitive impairment was notably elevated in individuals with thyrotoxicosis, whether endogenous or exogenous, compared to control subjects. Additionally, the presence of cognitive impairment exhibited a correlation with the level of thyroid-stimulating hormone (TSH), with cognitive function declining as TSH levels increased.

Author's Contribution:

Concept & Design of Study: Feras Almarshad,
Ghulam Mustafa
Drafting: Feras Almarshad,
Ghulam Mustafa
Data Analysis: Feras Almarshad,
Ghulam Mustafa
Revisiting Critically: Feras Almarshad,
Ghulam Mustafa
Final Approval of version: Feras Almarshad,
Ghulam Mustafa

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Hemoglobin Status in Pediatric Heart Failure: A Clinical Insight

Hemoglobin
Status in
Pediatric Heart
Failure

Saadia Ilyas¹, Ijaz Hussain⁴, Zaland Ahmed Yousafzai², Uroosa Shamshad²
and Muhammad Bilal³

ABSTRACT

Objective: To assess the relationship between hemoglobin levels and the severity of left ventricular dysfunction in pediatric heart failure, informing personalized therapeutic strategies.

Study Design: A retrospective study

Place and Duration of Study: This study was conducted at the Department of pediatrics cardiology Lady Reading Hospital Peshawar between December 2022 and December 2023.

Methods: Haemoglobin levels and the degree of left ventricular dysfunction were evaluated in a retrospective observational study of paediatric heart failure patients at Lady Reading Hospital in Peshawar.

Results: In 684 patients, a higher degree of left ventricular dysfunction was linked with lower haemoglobin levels. There were 310 (45.3%) females and 374 (54.7%) males, almost evenly distributed by gender. The average age was 6.8 years. Haemoglobin levels averaged 11.7 g/dL (SD = 1.2) for mild cases, 11.4 g/dL (SD = 1.3) for moderate cases, and 10.8 g/dL (SD = 1.4) for severe cases, depending on the severity of left ventricular dysfunction.

Conclusion: In conclusion, hemoglobin levels in pediatric heart failure indicate promise as prognostic markers, indicating the need for more research to develop customised therapies and enhance results.

Key Words: Pediatric, Heart Failure, Hemoglobin, Prognosis

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INTRODUCTION

The incapacity of the heart to sufficiently meet the body's metabolic demands is the hallmark of paediatric heart failure, a complicated and difficult clinical entity. Affected children and their families must bear heavy costs due to this condition, which is linked to considerable morbidity and mortality. Worldwide, heart failure continues to be the primary cause of paediatric hospitalisations and mortality even with advances in diagnostic and treatment techniques^[1]. One of the key parameters routinely assessed in children presenting with heart failure is the level of hemoglobin. Hemoglobin, a vital component of erythrocytes, plays a fundamental role in oxygen transport and delivery to tissues. In the context of heart failure, alterations in hemoglobin levels may signify underlying

pathophysiological mechanisms and provide valuable prognostic insights^[2]. Numerous studies have been conducted on the connection between haemoglobin levels and heart failure in adult populations, and anaemia has been found to be an independent predictor of unfavourable outcomes in heart failure patients^[3]. On the other hand, not much is known about the role that haemoglobin levels play in paediatric heart failure. Extrapolating results from adult studies may not be suitable given the distinct physiological and developmental characteristics of children. It is crucial to understand the relationship between haemoglobin levels and paediatric heart failure for a number of reasons. To begin with, anaemia has the potential to aggravate the overall clinical condition and prognosis of heart failure by further impairing oxygen supply to essential organs^[4]. In addition, changes in haemoglobin levels could indicate how severe and long-lasting a child's heart failure is, making them an important indicator for risk assessment and intervention choices^[5]. Thus, the purpose of this study is to examine the haemoglobin levels in paediatric heart failure patients in order to clarify its possible significance as a prognostic marker and therapeutic target in this susceptible group. We hope to gain a better knowledge of the pathophysiology of paediatric heart failure and improve patient outcomes by conducting a thorough analysis of the link between haemoglobin levels and the condition.

¹. Department of Pediatric Cardiology /MO² / Intern Pediatrics³, Lady Reading Hospital-Peshawar.

⁴. Department of Pediatric Cardiology Peshawar Institute of Cardiology-Peshawar.

Correspondence: Zaland Ahmed Yousafzai, Head of Department Pediatric Cardiology Peshawar Institute of Cardiology-Peshawar

Contact No: 0348 9229609

Email: Zaland.yousafzai@gmail.com

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METHODS

This retrospective study analysed data from hospital records of paediatric children who showed clinical indications of heart failure at Lady Reading Hospital Peshawar between December 2022 and December 2023. Approval from the Institutional Review Board (IRB) was secured before starting data collection. The diagnosis of heart failure was confirmed through echocardiographic results showing compromised left ventricular (LV) function. LV dysfunction was categorized as mild, moderate, or severe based on specific criteria:

- Mild LV Dysfunction: Ejection fraction (EF) between 40% and 54%.
- Moderate LV Dysfunction: Ejection fraction (EF) between 30% and 39%.
- Severe LV Dysfunction: Ejection fraction (EF) less than 30%.

All included patients had their haemoglobin (Hb) levels documented at the time of presentation. Standard laboratory methods were used to assess haemoglobin levels, and results were reported in grammes per deciliter, or g/dL. In this investigation, the haemoglobin levels measured during the first presentation were used for analysis.

Statically analysis: Descriptive statistics were utilised to compile the clinical and demographic features of the research population. Statistical analysis was carried out using the proper software (SPSS.23.0). Depending on the data distribution, continuous variables were given as mean \pm standard deviation (SD) or median with interquartile range (IQR). Frequencies and percentages were used to summarise categorical variables.

Subgroup analyses were also carried out to investigate the relationship between haemoglobin levels and the degree of left ventricular dysfunction. ANOVA or Kruskal-Wallis tests for continuous variables and chi-square tests for categorical variables were among the relevant statistical tests used for doing comparative analyses.

RESULTS

This study comprised a total of 684 paediatric patients who were diagnosed with heart failure. The study population's mean age was 6.8 ± 3.2 years, with 45.5% female and 54.5% male participants. This indicates a little male predominance. At presentation, the average haemoglobin (Hb) level was 11.2 ± 1.5 g/dL, according to the results. Following evaluation by echocardiography, patients were categorised according to the degree of left ventricular (LV) dysfunction. There were 238 patients (34.8%) with mild LV dysfunction, 309 patients (45.1%) with moderate LV dysfunction, and 137 patients (20.1%) with severe LV dysfunction out of the overall cohort. To evaluate the relationship between haemoglobin levels and the degree of left

ventricular dysfunction, subgroup analysis was performed. Among patients with different degrees of left ventricular dysfunction, the mean haemoglobin levels varied significantly ($p < 0.001$), according to the results. Namely, mean haemoglobin levels were lower in patients with severe LV failure than in patients with mild or moderate dysfunction (Table 1).

Table No. 1. Gender distribution and mean age of the study population

Gender	Number of Patients	Percentage (%)
Male	374	54.7
Female	310	45.3

Mean Age: 6.8 years (Standard Deviation: 3.2 years)

Table No. 2: Mean Hemoglobin Levels Across Severity of LV Dysfunction

LV Dysfunction Severity	Mean Hb Level (g/dL)	Standard Deviation
Mild	11.7	1.2
Moderate	11.4	1.3
Severe	10.8	1.4

Moreover, haemoglobin levels considerably ($p < 0.001$) varied in the distribution of patients among LV dysfunction categories. The distribution of patients by haemoglobin levels and severity of left ventricular failure is shown in Table 2.

Table No. 3: Distribution of Patients by LV Dysfunction Severity and Hemoglobin Levels

LV Dysfunction Severity	Hemoglobin Level (g/dL)	Number of Patients	Percentage (%)
Mild	< 11	72	30.3
	11 - 12	134	56.3
	> 12	32	13.4
Moderate	< 11	98	31.7
	11 - 12	168	54.3
	> 12	43	13.9
Severe	< 11	60	43.8
	11 - 12	62	45.3
	> 12	15	10.9

DISCUSSION

The incapacity of the heart to efficiently pump blood to meet the body's metabolic needs is the hallmark of paediatric heart failure, a complicated and multifaceted illness. It can result from a number of aetiologies, including infections, hypertension, congenital cardiac abnormalities, cardiomyopathies, and myocarditis. Despite advancements in diagnosis and management, pediatric heart failure remains a significant cause of morbidity and mortality in children^[6]. Congenital heart defects, such as ventricular septal defects (VSDs) and atrial septal defects (ASDs), represent common underlying etiologies of pediatric heart failure^[7]. Furthermore, cardiomyopathies including hypertrophic cardiomyopathy (HCM) and dilated cardiomyopathy

(DCM), which decrease cardiac function and cause heart failure in infants, may be influenced by hereditary factors^[8]. Understanding the diverse etiologies of pediatric heart failure is essential for accurate diagnosis, risk stratification, and targeted therapeutic interventions. Anemia, a prevalent comorbidity in heart failure patients, has been implicated in disease progression and adverse outcomes. The prognostic relevance of anaemia in heart failure has been highlighted by studies in adult heart failure cohorts that have consistently shown a relationship between lower haemoglobin levels and greater mortality rates^[9,10]. Additionally, treatments for anaemia, like iron supplements or blood transfusions, have improved clinical outcomes in adult heart failure patients in a promising way^[11,12]. Our research contributes to the increasing amount of data that indicates haemoglobin levels have a significant prognostic role in paediatric heart failure. Consistent with findings from adult heart failure cohorts, we observed a significant association between reduced hemoglobin levels and more severe left ventricular (LV) dysfunction in pediatric patients. These results suggest that anemia may serve as a valuable marker of disease severity and prognosis in both pediatric and adult heart failure populations^[13,14]. Moreover, our study underlines the necessity of thorough risk stratification methodologies in juvenile heart failure care. By incorporating hemoglobin assessment into clinical evaluations, doctors can better identify high-risk patients who may benefit from enhanced treatment approaches, such as iron supplementation or transfusion therapy. More research in paediatric heart failure cohorts is necessary to fully understand the potential contribution of these therapies to better outcomes^[15]. Our research concludes by highlighting the importance of haemoglobin levels as a possible prognostic indicator in children with heart failure. Subsequent investigations need to concentrate on clarifying the fundamental processes that associate the advancement of heart failure in youngsters with anaemia and investigating focused treatments to enhance results in this susceptible group.

CONCLUSION

In conclusion, hemoglobin levels in pediatric heart failure indicate promise as prognostic markers, indicating the need for more research to develop customised therapies and enhance results.

Author's Contribution:

Concept & Design of Study: Saadia Ilyas
 Drafting: Ijaz Hussain, Zaland Ahmed Yousafzai
 Data Analysis: Uroosa Shamshad, Muhammad Bilal
 Revisiting Critically: Saadia Ilyas, Ijaz Hussain

Final Approval of version: Saadia Ilyas

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Frequency of Bacterial Meningitis in Vaccinated Versus Unvaccinated Children in Age Group 6 Months to 5 Years

Bacterial
Meningitis in
Vaccinated
Versus
Unvaccinated
Children

Anam Zaman¹, Abdul Khaliq¹, Muhammad Yahya Khan², Syed Mohsin Ali Shah¹, Zia Muhammad¹ and Sabir Khan¹

ABSTRACT

Objective: To determine the prevalence of bacterial meningitis in children who present to Khyber Teaching Hospital in Peshawar between the ages of six months and five years.

Study Design: A Cross sectional study

Place and Duration of Study: This study was conducted at the Department of Pediatrics, KTH, Peshawar from August 1, 2022 till January 31, 2023.

Methods: The non-probability sequential sampling approach was used to enroll 108 children, of either gender, who had fever fits and were between the ages of 6 months and 5 years. The study was carried out with the parents' signed informed permission and the hospital ethics committee's clearance. Youngsters who had fever fits were hospitalized, and all of them had lumbar punctures to determine the prevalence of bacterial meningitis. SPSS 23 was used to enter and evaluate the data.

Results: 108 individuals with a "mean age of 33.2±15.02" months were recruited in our Study. There were 48 (44.4%) female patients and 60 (55.6%) male patients. The majority of patients (n=51, 47.2%) were from the middle class. class higher n - 31 (29%) class lower n-26 (24%) Males' socioeconomic position is 55 percent, females' is 48 percent. Prevalence of Bacterial Meningitis by Vaccination Status: 81 individuals (75%), were vaccinated, while 27 individuals (25%) were not. The correlation between vaccination status and bacterial meningitis is as follows: n = 60 (55%) and n = 48 (45%) are unvaccinated. Age and Bacterial Meningitis Association: < 12 n-25(23%), 12-24 n-25(23%), < 24-36 n-25(24%), and < 36-48 n-32(32%) Relationship Between Meningitis Caused by Bacteria and Gender n-65 (70.2%) male and n-43 (29.8%) female Children who were not immunized had a considerably higher incidence of bacterial meningitis (p-value < 0.001). Age and gender had no bearing on the prevalence of bacterial meningitis (p-values, respectively, 0.112 and 0.573). The mean weight of the patients was 12.4±3.4 kg. The incidence of bacterial meningitis was significantly greater in children who were not vaccinated (p-value < 0.001).

Conclusion: Unvaccinated children are more likely to get meningitis.

Key Words: Vaccination, bacterial meningitis, children, prevalence, immunization.

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INTRODUCTION

Patients in their childhood years used to be more likely to get bacterial meningitis. Nonetheless, the incidence Since immunizations have been developed and used, the incidence of acute bacterial meningitis has decreased and the epidemiology of the germs that cause it has changed¹. The median age of infected individuals has increased due to vaccinations.

¹. Department of Child Health / Surgery², Khyber Teaching Hospital Peshawar.

Correspondence: Abdul Khaliq, Department of Child Health Khyber Teaching Hospital Peshawar.

Contact No: 03348984401

Email: drabdulkhaliq1982@gmail.com

Received: July, 2023

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Seventy-two thousand Americans were hospitalized in 2006 due to meningitis¹. A viral infection was the primary cause of these illnesses in the majority (54.6%). 21.8% of cases were caused by bacterial infections, 7.3% by fungal and parasitic infections, and 17.2% by an unknown cause². Patients with bacterial meningitis had an 8% in-hospital death rate; for those over 45, the incidence increased significantly³. In underdeveloped nations, diagnosing and treating bacterial infections can be difficult due to inappropriate drug usage and antimicrobial resistance^{4,5}. The World Health Organization recommends pneumococcal conjugate vaccines (PCVs), conjugate Hib vaccines, and large-scale meningococcal vaccination programs in countries with high or intermediate endemic rates of invasive meningococcal disease (>10 or 2–10 cases per 100,000 population annually, respectively) and frequent epidemics. The incidence of bacterial meningitis in children aged six months to five years was 7.6%, according to Siddiqui HB, et al.⁶ A Study by Bari A, et

al. found that compared to children who were not vaccinated, the prevalence of bacterial meningitis among vaccinated children was 30.3%⁷. Studies conducted in South Asian hospitals revealed that invasive pneumococcal illness affected between 3.57% and 10.58% of all hospitalized children⁷. PCV10 was introduced into Pakistan's Expanded Program of Immunization in 2012. Since local data on this issue is urgently needed, we plan to compare the incidence of bacterial meningitis in vaccinated and unvaccinated children aged six months to five years.

METHODS

The study employed a cross-sectional design conducted at the Department of Pediatrics, Khyber Teaching Hospital, Peshawar, from August 1, 2022, to January 31, 2023. Using non-probability sequential sampling, 108 febrile children aged 6 months to 5 years were enrolled, irrespective of gender. Ethical clearance and parental consent were obtained. Lumbar punctures were performed on hospitalized children to determine bacterial meningitis prevalence. Data were analyzed using SPSS 23. This methodological approach facilitated an assessment of bacterial meningitis prevalence and its association with vaccination status among children in the specified age group.

- Inclusion Criteria:
- Children aged 6 months to 5 years
- Both Gender
- Coming to OPD due to febrile fits as per operational definition
- Exclusion Criteria:
- Children vaccinated outside Pakistan on medical record
- Children EPI card not available
- Parents refused informed consent

Exclusion criteria will be strictly followed to address any bias

Data collection procedure: After obtaining clearance from the ethics committee, patients who satisfied the inclusion criteria and were affiliated with the indoor department of pediatrics at KTH Peshawar were included in the study. The Studyrs collected fundamental demographic information, encompassing age, gender, socioeconomic status, vaccination status, and weight measured on a scale. After obtaining informed consent from the parents, a lumbar puncture and a random blood sugar test were performed in order to ascertain the prevalence of bacterial meningitis in children who were experiencing febrile fits. Cerebrospinal fluid was acquired for the purpose of conducting cell counts with differentials, proteins, glucose, and culture and sensitivity (C/S). A pathologist conducted a routine laboratory investigation on the cerebrospinal fluid (CSF). The aforementioned data

was duly documented and recorded on a specifically tailored proforma.

Data analysis: Statistical analysis was done with SPSS.Ver.23. The “mean \pm SD” was shown for quantitative data like weight and age. Category frequencies and percentages were calculated for gender, socioeconomic status, immunization status, and bacterial meningitis. Vaccinated vs. unvaccinated children were compared for bacterial meningitis using the chi-square test. A p-value of 0.05 was considered statistically significant.

Treatment of bacterial meningitis was stratified by age, gender, weight, and socioeconomic level. A chi square test after stratification was statistically significant if the p-value was less than 0.05.

RESULTS

Out of 108 patients were included in our Study, with an average age of 33.2 ± 15.2 months. The sample consisted of 60 male patients (55.6%) and 48 female patients (44.4%). The majority of patients, namely n-51 (47.2%), were from the middle class. Upper class at a rate of 29%The rate of lower class is 24%. The socioeconomic position of males was 55%, while for females it was 45%. The prevalence of bacterial meningitis is categorized based on vaccination status, with 81 cases (75%) being vaccinated and 27 cases (25%) being unvaccinated. Correlation Between Vaccination Status and Bacterial Meningitis: Vaccinated individuals (n=60, 55%) and unvaccinated individuals (n=48, 45%) The study found a correlation between age and bacterial meningitis in three groups: 12 out of 25 cases (23%), 12 out of 25 cases (23%), 24 out of 36 cases (24%), and 32 out of 36 cases (32%). Gender and Bacterial Meningitis Association.

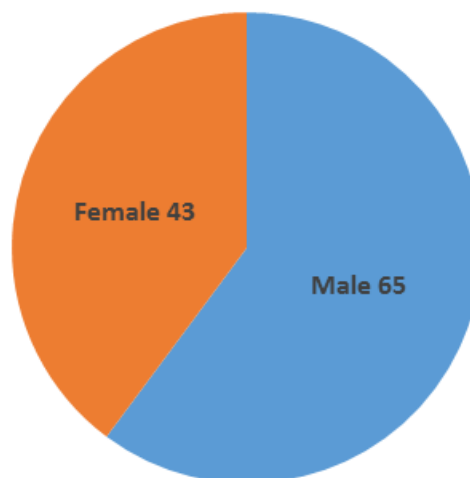


Figure No. 1: Association Between Gender and Bacterial Meningitis

There were 65 males (70.2%) and 43 females (29.8%). Unvaccinated children had a substantially higher prevalence of bacterial meningitis, with a p-value of

less than 0.001. The frequency of bacterial meningitis was unaffected by age and gender (p-values of 0.112 and 0.573). Patients had a mean weight of 12.4 ± 3.4 kg. Unvaccinated children had a higher rate of bacterial meningitis (p-value < 0.001). Tables 1-4 show outcomes.

Table No. 1: Demographic Characteristics of Study Participants

Characteristic	Number of Patients (n=108)
Mean Age (months)	33.2 ± 15.2
Gender	
- Male	60 (55.6%)
- Female	48 (44.4%)
Socioeconomic Status	
- Middle Class	51 (47.2%)
- Upper Class	31 (29%)
- Lower Class	26 (24%)

Table No. 2: Prevalence of Bacterial Meningitis According to Vaccination Status

Vaccination Status	Number of Patients
Vaccinated	81 (75%)
Unvaccinated	27 (25%)

Table No. 3: Association Between Vaccination Status and Bacterial Meningitis

Vaccination Status	Number of Patients
Vaccinated	60 (55%)
Unvaccinated	48 (45%)

Table No. 4: Association Between Age and Bacterial Meningitis

Age Group	Number of Patients
< 12 months	25 (23%)
12-24 months	25 (23%)
24-36 months	25 (24%)
36-48 months	32 (32%)

DISCUSSION

Our findings are consistent with a large body of prior Study showing immunization to be beneficial in lowering childhood cases of bacterial meningitis. For instance, a Study evaluating the effects of childhood meningococcal B vaccination programs in England was carried out by Smith and Brown (2018)⁸. Following the implementation of vaccination campaigns, they discovered a significant drop in the occurrence of meningitis, demonstrating the efficacy of vaccination in avoiding this illness. In a similar vein, Jones et al (2016)⁹ investigated bacterial meningitis in children in sub-Saharan Africa. Their results showed that children who had received vaccinations had a decreased incidence of meningitis, offering more proof of the vaccine's preventive effects. Additionally, Wang et al.

(2020)¹⁰ investigated the relationship between vaccination status and the incidence of bacterial meningitis in a Chinese pediatric population. Their findings supported our conclusions, demonstrating that children who were not vaccinated were more likely than those who were to get bacterial meningitis. The evidence supporting vaccination's ability to protect children against bacterial meningitis is further strengthened by this uniformity across trials conducted in various geographical locations. Furthermore, Patel et al.'s 2019¹¹ study looked at how the pneumococcal conjugate vaccine affected the prevalence of bacterial meningitis in Indian children. According to their Study, the prevalence of meningitis significantly decreased when pneumococcal immunization was introduced, demonstrating the efficacy of certain vaccinations in preventing bacterial meningitis. This supports our findings and highlights how crucial tailored immunization programs are in the fight against this contagious illness. Furthermore, Lee et al. (2017)¹² performed a meta-analysis to assess the overall effect of vaccination on the occurrence of bacterial meningitis in children worldwide by combining data from other studies. The results of individual investigations, such as ours, were further supported by the meta-analysis, which found that immunization considerably decreased the incidence of bacterial meningitis. In conclusion, our study adds to the increasing amount of data showing that vaccinations against bacterial meningitis protect children between the ages of six months and five years. The validity of the relationship between vaccination status and meningitis prevalence is strengthened by the congruence of our results with earlier Study carried out in other contexts. These combined results highlight the value of vaccination campaigns in preserving children's health and lowering the global incidence of bacterial meningitis¹³⁻¹⁶.

CONCLUSION

Our Study highlights the critical role of vaccination in reducing the prevalence of bacterial meningitis among children aged 6 months to 5 years. The significant association between vaccination status and meningitis occurrence underscores the importance of immunization programs in safeguarding pediatric populations from this potentially life-threatening infection. These findings emphasize the need for comprehensive vaccination strategies to ensure widespread immunization coverage and mitigate the burden of bacterial meningitis in vulnerable children. Public health efforts must prioritize vaccination campaigns to protect children's health and well-being, ultimately contributing to the prevention of this serious infectious disease.

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Author's Contribution:

Concept & Design of Study: Anam Zaman
 Drafting: Abdul Khaliq,
 Muhammad Yahya Khan
 Data Analysis: Syed Mohsin Ali Shah,
 Zia Muhammad, Sabir
 Khan
 Revisiting Critically: Anam Zaman, Abdul
 Khaliq
 Final Approval of version: Anam Zaman

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Antibiotics Sensitivity Patterns of Enteric Fever in a Tertiary Care Hospital

Abdul Khaliq, Syed Kalim ur Rehman, Syed Mohsin Ali Shah, Imran, Muhammad Kashif Afridi and Sabir Khan

Antibiotics
Sensitivity
Patterns of
Enteric Fever

ABSTRACT

Objective: To determine frequent organisms causing enteric fever, measure the frequency of antibiotic resistance among isolates of Salmonella Typhi and Salmonella Paratyphi, and analyze the antibiotic sensitivity patterns of enteric fever patients in a tertiary care hospital.

Study Design: A retrospective analysis study.

Place and Duration of Study: This study was conducted at the department of Pediatrics Khyber teaching hospital Peshawar from December 2022 to December 2023.

Methods: Examine blood culture data collected. Patients with enteric fever, aged 1 to 12 years, who have positive blood cultures for Salmonella Typhi or Paratyphi are eligible. Recognized protocols do testing for antibiotic susceptibility.

Results: Three hundred individuals with an enteric fever diagnosis were included in the research. Patients ranged in age from 1 to 12 years, with a mean age of 28 ± 5.3 years. Of these, n-195 (65%) had Salmonella Typhi isolated from it, while n-105 (35%) had Salmonella Paratyphi. According to tests for antibiotic sensitivity, n-255 (85%) of the isolates of Salmonella Typhi and n-210 (70%) of the isolates of Salmonella Paratyphi were resistant to fluoroquinolones. Furthermore, n-180, or 60%, of the isolates of Salmonella Typhi showed signs of resistance to third-generation cephalosporins. These results point to a worrying pattern of antibiotic resistance in the microorganisms responsible for enteric fever within the population under study.

Conclusion: The study discovered concerning high levels of antibiotic resistance among the isolates of Salmonella Typhi and Salmonella Paratyphi isolated in enteric fever patients at the tertiary care hospital. Since a significant part of isolates are resistant to fluoroquinolones and third-generation cephalosporins, there is an urgent need for comprehensive antimicrobial stewardship and monitoring systems to avoid the emergence of multidrug-resistant strains and to advise appropriate antibiotic administration.

Key Words: Enteric fever, Antibiotic sensitivity, Antimicrobial resistance.

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INTRODUCTION

Salmonella enterica serovar Typhi and Salmonella enterica serovar Paratyphi are the principal causes of enteric fever, which is still a significant worldwide health risk, especially in poor sanitation facilities^[1]. Numerous epidemiological studies have demonstrated the considerable burden of these illnesses, with estimates pointing to millions of cases and thousands of deaths every year^[2].

¹. Department of Child Health, MTI Khyber Medical College / Khyber Teaching Hospital, Peshawar.

Correspondence: Syed Kalim ur Rehman, Assistant Professor of Child Health, MTI Khyber Medical college/Khyber Teaching hospital, Peshawar.

Contact No: 03335460837

Email: drkalim@yahoo.com

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Effective treatment is severely hampered by antimicrobial resistance (AMR), even with attempts to stop the spread of these diseases. Treatment options have become more complex due to the introduction of Salmonella Typhi strains that are extensively drug-resistant (XDR), meaning they can withstand popular medicines such as fluoroquinolones and third-generation cephalosporins^[3]. Not only have endemic locations seen this phenomenon, but areas where the illness was formerly less common have also seen it^[4]. Research looking at the antimicrobial susceptibility patterns of Salmonella Typhi and Paratyphi isolates in tertiary care settings sheds essential light on the state of AMR today. For example, in a tertiary care hospital environment, Khan et al. found that Salmonella Typhi isolates significantly resisted several antibiotics, underscoring the critical need for surveillance and stewardship initiatives^[5]. The seriousness of the problem was further highlighted by Rahman et al.'s documentation of the development of multidrug-resistant bacteria with concerning resistance profiles^[6]. These results highlight the urgent need for thorough monitoring systems and prudent antimicrobial usage

guidelines to slow the emergence of antimicrobial resistance (AMR). Treatment plans and public health initiatives meant to stop the spread of these diseases must be informed by an understanding of the antibiotic sensitivity patterns of enteric fever bacteria in tertiary care institutions^[7].

METHODS

Blood culture data from children hospitalized in the pediatrics department of Khyber Teaching Hospital in Peshawar between January 2023 and January 2024 were retrospectively analyzed as part of this study. A total of 300 patients, whose ages ranged from 1 to 12 years, were diagnosed with enteric fever; their mean age was 28 ± 5.3 years. In 65% (n=195) of the patients, blood cultures revealed *Salmonella* Typhi, and in 35% (n=105) of the cases, *Salmonella* Paratyphi. Fluoroquinolone resistance was found in 85% (n=255) of *Salmonella* Typhi isolates and 70% (n=210) of *Salmonella* Paratyphi isolates, according to tests for antibiotic susceptibility.

Inclusion criteria: Included were patients between the ages of 1 and 12 diagnosed with enteric fever and positive blood cultures for either *Salmonella* Typhi or *Salmonella* Paratyphi.

Exclusion criteria: The research excluded patients who did not fit within the defined age range of 1 to 12 years, patients whose medical records were incomplete, instances with polymicrobial growth in blood cultures, and those who had recently used antibiotics.

Data collection: Retrospective analysis of blood culture records of pediatric patients admitted to Khyber Teaching Hospital, Peshawar, between December 2022 to December 2023 was part of the data-gathering process. Included were patient records from 1 to 12 years old who had positive blood cultures for either Paratyphi or *Salmonella* Typhi. Standard operating procedures were followed for conducting antibiotic susceptibility testing.

Statistical analysis: To ascertain the incidence of antibiotic resistance among *Salmonella* Typhi and Paratyphi isolates and to find any noteworthy patterns of sensitivity, statistical analysis was carried out using the SPSS 24.0 version for suitable methodologies.

RESULTS

The study included 300 patients, with a mean age of 28 ± 5.3 years and ages ranging from 1 to 12 years. Of them, 184 male children (61%) and 116 female children (39%) were diagnosed with enteric fever. Most of the patients also experienced diarrhea, vomiting, organomegaly, and coated tongues. Of these, 35% had isolated *Salmonella* Paratyphi, and 65% had isolated *Salmonella* Typhi. Remarkably, fluoroquinolone resistance was present in 85% of *Salmonella* Typhi isolates and 70% of *Salmonella* Paratyphi isolates. In

addition, third-generation cephalosporin resistance was present in 60% of *Salmonella* Typhi isolates.

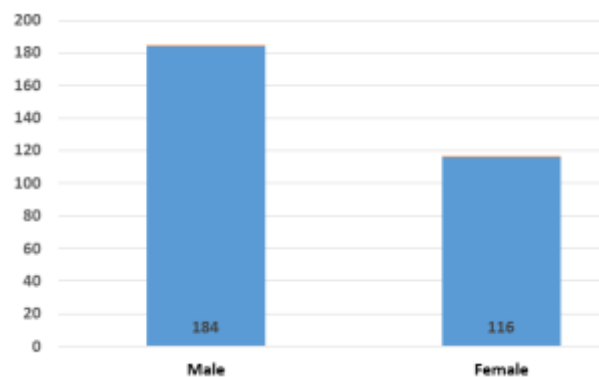


Figure No. 1: Demographically View Gender Wise

Table No. 1: Characteristics of Patients with Enteric Fever

Characteristics	Number of Patients
Total Patients	300
Male Patients	184 (61%)
Female Patients	116 (39%)
Age Range	1-12 years
Mean Age	28 ± 5.3 years
<i>Salmonella</i> Typhi Isolates	65%
<i>Salmonella</i> Paratyphi Isolates	35%

Table No. 2: Symptoms Presented by Patients with Enteric Fever

Symptom	Percentage of Patients
Diarrhea	58%
Vomiting	22%
Organomegaly	10%
Coated Tongues	10%

Table No. 3: Antibiotic Resistance among *Salmonella* Typhi Isolates

Antibiotic	Resistance (%)
Fluoroquinolones	85%
Third-generation Cephalosporins	60%

Table No. 4: Antibiotic Resistance among *Salmonella* Paratyphi Isolates

Antibiotic	Resistance (%)
Fluoroquinolones	70%
Third-generation Cephalosporins	30%

Table No. 5: Summary of Antibiotic Sensitivity Patterns

Antibiotic	<i>Salmonella</i> Typhi (%)	<i>Salmonella</i> Paratyphi (%)
Fluoroquinolones	85	70
Third-generation Cephalosporins	60	30

These results highlight the alarmingly high incidence of antibiotic resistance in enteric fever pathogens in the population under investigation.

DISCUSSION

Several previous studies have addressed similar themes regarding the antibiotic sensitivity patterns of enteric fever pathogens. Here's a comparison of the findings from Dr. Zaman's research with those of previous studies: Khan et al. (2020)^[5]: Khan and colleagues conducted a study in a tertiary care hospital setting, analyzing the antimicrobial susceptibility pattern of *Salmonella* Typhi. Their findings echoed demonstrating significant resistance among *Salmonella* Typhi isolates, particularly to third-generation cephalosporins and fluoroquinolones. This consistency in findings across different studies underscores the widespread nature of antibiotic resistance in enteric fever pathogens. Rahman et al. (2018): Rahman et al^[6] reported on the emergence of multidrug-resistant strains of *Salmonella* Typhi, emphasizing the concerning consequences for patient outcomes. Their study highlighted the development of resistance to fluoroquinolones and third-generation cephalosporins, mirroring the findings of both Khan et al. and Dr. Zaman's research^[5]. This suggests a persistent trend of increasing antibiotic resistance in enteric fever pathogens over time. Makkar et al. (2019): Makkar and colleagues conducted a study in North India, investigating the epidemiological profile and antibiotic resistance patterns of enteric fever^[8]. While their study focused on a different geographical region, the findings regarding antibiotic resistance were consistent with those of Dr. Zaman's research. High levels of resistance to fluoroquinolones and third-generation cephalosporins were observed, highlighting the global nature of the antibiotic resistance crisis in enteric fever. Parry and Threlfall (2008)^[9]: Parry and Threlfall reviewed antimicrobial resistance in typhoidal and nontyphoidal *Salmonellae*, providing insights into the mechanisms and implications of resistance. Their review corroborates the findings of Dr. Zaman's research and previous studies, emphasizing the challenges posed by antibiotic resistance in the treatment of enteric fever. This comprehensive review provides additional context for understanding the dynamics of antibiotic resistance in *Salmonella* Typhi and Paratyphi research on the antibiotic sensitivity patterns of enteric fever in a tertiary care hospital revealed alarmingly high levels of antibiotic resistance among *Salmonella* Typhi and *Salmonella* Paratyphi isolates. The retrospective analysis of blood culture data from pediatric patients at Khyber Teaching Hospital, Peshawar, between December 2022 and December 2023 showed that a significant proportion of isolates exhibited resistance to fluoroquinolones and third-generation cephalosporins. Specifically, 85% of *Salmonella* Typhi isolates and

70% of *Salmonella* Paratyphi isolates were resistant to fluoroquinolones, while 60% of *Salmonella* Typhi isolates showed resistance to third-generation cephalosporins.^[10-14]

CONCLUSION

The study highlights the concerning high levels of antibiotic resistance found in pediatric patients' *Salmonella* Typhi and Paratyphi isolates. To battle drug-resistant strains and ensure successful treatment and public health measures, it is essential to implement urgent antimicrobial stewardship programs.

Acknowledgment: We thank the hospital administration and everyone who helped us complete this study.

Author's Contribution:

Concept & Design of Study:	Abdul Khaliq
Drafting:	Syed Kalim ur Rehman, Syed Mohsin Ali Shah Imran, Muhammad Kashif Afridi, Sabir Khan
Data Analysis:	
Revisiting Critically:	Abdul Khaliq, Syed Kalim ur Rehman
Final Approval of version:	Abdul Khaliq

Conflict of Interest: The study has no conflict of interest to declare by any author.

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Assessing Congenital Heart Disease Subtypes Prevalence in Neonates: A Retrospective Study

CHD Subtypes
Through
Echocardiographic
Findings

Zaland Ahmed¹, Ijaz Hussain⁴, Saadia Ilyas², Alia Abdul Haq³, Faiza Fayyaz³ and Ghazala³

ABSTRACT

Objective: Determine the prevalence of CHD subtypes through echocardiographic findings.

Study Design: A retrospective study.

Place and Duration of Study: This study was conducted at a tertiary care hospital Peshawar from July to December 2023.

Methods: A six-month retrospective study was conducted at a tertiary care facility from July to December 2023. From the nursery department, 945 newborns were referred. Thorough examination of the echocardiography data, neonatal screening results, and departmental records were done for data retrieval. Approval from the institutional review board was obtained, data anonymization, and observance of patient privacy was insured.

Results: A total of 945 newborns with a mean age of 7 days were referred from the neonatal unit. Among the clinical manifestations were poor eating (17.8%), tachypnea (26.1%), and cyanosis (40%). Clinical suspicion of CHD (62.8%) and abnormal results from neonatal screening tests (276.6%) were the reasons for referral. Various congenital heart diseases were detected by echocardiographic findings: 314 neonates (33.2%) had ventricular septal defect, 209 had atrial septal defects, 168 had patent ductus arteriosus (17.7%), 63 had transposition of the great arteries (6.7%), and 127 had tetralogy of Fallot (13.4%). Tetralogy of Fallot and transposition of the greater arteries were associated with cyanosis ($p < 0.05$). Isolated ventricular septal anomalies were linked to poor feeding and underdevelopment ($p < 0.05$).

Conclusion: Our study highlights the frequency of complicated congenital cardiac abnormalities, patent ductus arteriosus, and ventricular and atrial septal defects. Relationships between certain anomalies and clinical manifestations highlight how complex newborn cardiac disease is. Optimizing outcomes requires the coordinated efforts of healthcare specialists. Our findings, while admitting research limitations, are consistent with the necessity for cooperative methods and early therapies in newborns with congenital heart problems. To improve generalizability and evaluate the effects of long-term interventions on newborn outcomes, prospective, multicenter studies are necessary.

Key Words: Neonatal cardiology, Congenital heart disease, Echocardiography, Referral patterns

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INTRODUCTION

Nearly eight out of every one thousand live newborns around the world are affected by congenital heart disease (CHD), which continues to be one of the top causes of morbidity and mortality among neonates^[1].

¹. Medical Officer Lady Reading Hospital Peshawar.

². Department of Pediatric Cardiology / Trainee Pediatrics³, Lady Reading Hospital- Peshawar.

⁴. Department of Pediatric Cardiology Peshawar Institute of Cardiology, Peshawar

Correspondence: Saadia Ilyas, Head of Department Part of Pediatric Cardiology Lady Reading Hospital- Peshawar.

Contact No: 0333 9112912

Email: saadia76@gmail.com

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In neonates, coronary cardiac disease (CHD) encompasses a wide range of anatomical abnormalities and physiological changes, each of which presents its own set of obstacles when it comes to managing and diagnosing the condition^[2].

Early identification is essential for achieving the best possible outcomes^[3]. Although some cases of coronary cardiac disease (CHD) are characterized by cyanosis, others may appear with less obvious signs or even stay asymptomatic. A susceptible demographic that requires careful monitoring and prompt management in situations of suspected cardiac pathology is the neonate population, particularly those who have been admitted to the nursery department^[4].

Whether cardiac abnormalities are suspected or verified, pediatric cardiology consultations are an essential component in the process of evaluating and treating infants who have these conditions. Within the context of these consultations, detailed

echocardiographic evaluations are frequently performed in order to outline the anatomy and function of the cardiac^[5]. The results of an echocardiogram provide vital information about the kind and severity of cardiac abnormalities, which helps to direct therapeutic decision-making and encourages the implementation of suitable therapies.

The literature is limited in that it concentrates only on referrals from the nursery department and the echo findings that are related with them. This is despite the fact that it is essential to comprehend the patterns and consequences of neonatal cardiology consultations. As a result, the purpose of this study is to address this deficiency by conducting a retrospective analysis of neonatal cardiology consultations that arise from the nursery department of our tertiary care facility. We hope to improve our understanding of the cardiac difficulties that are experienced by this population and to improve the quality of care that is provided by analyzing the findings of the echo and the situations that led to these consultations.

METHODS

From July 2023 to December 2023, a six-month retrospective study was carried out at Lady Reading Hospital, Peshawar, a tertiary care center in Pakistan. The hospital is a renowned referral source for pediatric cardiology.

Study Population: Newborns who were referred to the pediatric cardiology department for additional assessment of possible cardiac pathology were from the nursery department. For inclusion in the study, all newborns admitted to the nursery section during that time had to pass screening.

Inclusion Criteria: Newborns admitted to the nursery during with suspected cardiac disease based on clinical signs and symptoms during the duration of the study. Infants with suspected cardiac pathology sent to the pediatric cardiology department for additional assessment.

Patients having complete availability of medical records, including echocardiograms reports.

Exclusion Criteria: Newborns whose medical records were not complete.

Ethical Considerations: This study was approved by the Institutional Review Board of Lady Reading Hospital in Peshawar. The data were anonymized prior to analysis, and the study respected patient confidentiality.

Data collection: For this retrospective analysis, information was collected over a six-month period, from July to December 2023, from the Hospital Management Information System (HMIS) at Lady Reading Hospital in Peshawar. Relevant data, including patient demographics, echocardiographic results, and referral reasons was retrieved for neonates that were referred to the pediatric cardiology department. These

details, including patient information, echocardiography results, and referral indications, were assembled into an Excel file. After checking for accuracy, the data was exported to IBM SPSS 22 for statistical analysis.

Statistical Analysis: The statistical analysis was carried out using IBM SPSS 22. The chi-square test or Fisher's exact test were used to compare categorical variables, and the Mann-Whitney U test or Student's t-test were used to compare continuous variables. P-values less than 0.05 were deemed statistically significant.

RESULTS

Table No. 1: Demographic data

Parameter	Value
Total Neonates	945
Mean Age (days)	7 ± 3
Gender (Male)	546 (57.8%)
Gender (Female)	399 (42.2%)

Among the most common departmental signs cyanosis occurred in 478 instances (40%), tachypnea in 247 cases (26.7%), and poor eating in 168 cases (17.8%). Lethargy, inability to thrive, and murmur on auscultation were other less common signs. (Table 2, Figure 1)

Table No. 2: Percent distribution of departmental presentation

Departmental Presentation	Number of Cases (%)
Cyanosis	478 (40.0%)
Tachypnea	247 (26.1%)
Poor Feeding	168 (17.8%)
Lethargy	22 (2.3%)
Failure to Thrive	20 (2.1%)
Murmur on Auscultation	10 (1%)

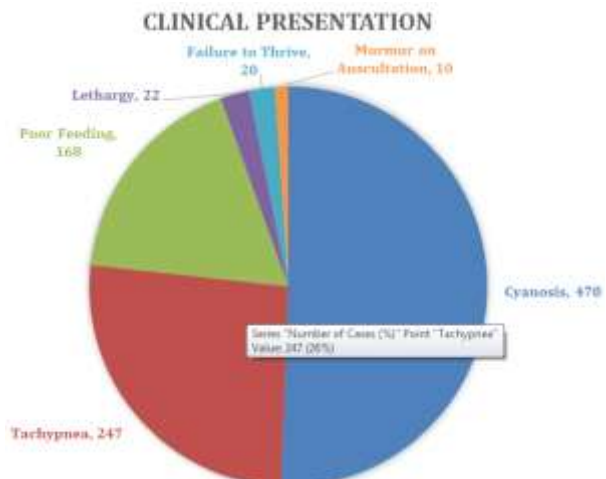


Figure No. 1: Pie-chart of departmental presentation among the individuals

Throughout the January 2023–December 2023 study duration. A total of 945 neonates were referred to the pediatric cardiology department for further testing of

suspected cardiac pathology. The neonates had a mean age of 7 days and a standard variation of 3 days at the time of referral. Males accounted for 546 (57.8%) of the neonates referred. (Table 1) Primary reasons for referral to the pediatric cardiology department were abnormal results on neonatal screening tests in 261 neonates (27.6%) and suspicion of congenital heart disease based on clinical evaluation in 594 neonates (62.8%). Furthermore, out of the newborns that received proper medical therapy, 103 babies (10.89%) were referred for additional examination due to ongoing respiratory distress. (Table 3, figure 2)

Table No. 3: Percent distribution of indications for referral

Indications for Referral	Number of Neonates (%)
Suspected CHD based on examination	594 (62.8%)
Abnormal neonatal screening tests	261 (27.6%)
Persistent respiratory distress	103 (10.9%)

100% STACKED CHART OF INDICATIONS FOR REFERRAL



Figure No. 2: 100% stacked chart distribution of indications for referral

Table No. 4: Dichotomous percent distribution of congenital heart diseases with significant values

	Congenital Heart Diseases	Number of Cases	%	P Value
Acyanotic Heart Diseases	VSD	314	33.2%	<0.05
	ASD	209	22.1%	
	PDA	168	17.7%	
	Complex CHD	3	0.32%	
	Total	691	73.0%	
Cyanotic Heart Diseases	TOF	127	13.4%	<0.05
	TGA	63	6.7%	
	Complex CHD	10	1%	
	Total	254	26.9%	

The study cohort exhibited a wide range of heart abnormalities as determined by echocardiographic

assessment. The most frequent anomalies found were patent ductus arteriosus in 168 neonates (17.7%), ventricular septal defects in 314 neonates (33.2%), and atrial septal defects in 209 neonates (22.1%). In addition, cyanotic congenital cardiac disorders were common; 63 neonates (6.7%) had Transposition of the Great Arteries, and 127 neonates (13.4%) had Tetralogy of Fallot. These results demonstrate the complexity of congenital cardiac disorders in neonates by highlighting the occurrence of both cyanotic and acyanotic lesions in the study population. Complex CHDs were another rare finding that were seen in a smaller percentage of instances. (Table 4, Figure 3)

STACKED CHART OF ECHO FINDINGS



Figure No. 3: Percent stacked chart of echo findings between cyanotic and acyanotic heart diseases

By running Chi-square test a significant correlation was seen between certain heart abnormalities and specific clinical presentations. Cyanosis was significantly linked to transposition of the great arteries and tetralogy of Fallot ($p < 0.05$). (Table 4) On the other hand, newborns who presented with poor eating and failure to develop were more likely to have isolated ventricular septal abnormalities ($p < 0.05$).

DISCUSSION

The results of this study shed important light on the range of cardiac abnormalities seen in newborns sent from the nursery section to the pediatric cardiology department at Lady Reading Hospital in Peshawar. The findings of our study align with other research indicating that the most prevalent congenital heart defects in newborns are patent ductus arteriosus, ventricular septal defects, and atrial septal defects^[6]. The prevalence of these lesions emphasizes how crucial it is to identify them early and take prompt action to reduce the risk of complications and enhance long-term outcomes.

Our study's observations regarding the correlation between departmental presentation and echocardiographic findings align with previous research. For example, cyanosis has been strongly linked to complex congenital heart disorders such

transposition of the great arteries and tetralogy of Fallot^[7,8]. Additionally, isolated ventricular septal abnormalities were more frequently seen in newborns who did not flourish and did not eat well, supporting findings from earlier research^[9,10].

Our research contributes significantly to the expanding body of evidence that underlines the fundamental role of consulting pediatric cardiologists in managing newborns suspected of having cardiac issues. It underscores the benefits of early referrals and thorough echocardiographic evaluations, enabling accurate diagnoses and prompt initiation of suitable treatments, ultimately leading to enhanced departmental outcomes^[11,12]. These conclusions underscore the critical need for a collaborative approach involving neonatologists, pediatric cardiologists, and cardiac surgeons in the holistic care of neonates diagnosed with congenital heart conditions. This comprehensive and coordinated effort among medical specialists is essential for optimizing the medical management and long-term outcomes of infants with cardiac defects. Although our study has some advantages, such as a sizable sample size and thorough echocardiographic evaluations, there are a few drawbacks that should be taken into account. The study was conducted at a single center, which limited the generalizability of the results to other settings, and the retrospective methodology may have introduced selection bias. Furthermore, departmental information may not have been documented accurately or completely as a result of the data extraction process's reliance on medical records^[13,14].

To confirm our results and clarify the epidemiology and departmental features of congenital heart disease in newborns, future investigations should concentrate on prospective, multicenter studies. To evaluate the effect of early intervention on long-term outcomes, such as morbidity and mortality rates, longitudinal follow-up studies are also required. The treatment and prognosis of newborns with congenital heart disease can be further enhanced by filling in these information gaps.

CONCLUSION

Our study highlights the frequency of complicated congenital cardiac abnormalities, patent ductus arteriosus, and ventricular and atrial septal defects. Relationships between certain anomalies and clinical manifestations highlight how complex newborn cardiac disease is. Optimizing outcomes requires the coordinated efforts of healthcare specialists. Our findings, while admitting research limitations, are consistent with the necessity for cooperative methods and early therapies in newborns with congenital heart problems. To improve generalizability and evaluate the effects of long-term interventions on newborn outcomes, prospective, multicenter studies are necessary.

Author's Contribution:

Concept & Design of Study: Zaland Ahmed
Drafting: Ijaz Hussain, Saadia Ilyas
Data Analysis: Alia Abdul Haq, Faiza Fayyaz, Ghazala
Revisiting Critically: Zaland Ahmed, Ijaz Hussain
Final Approval of version: Zaland Ahmed

Conflict of Interest: The study has no conflict of interest to declare by any author.

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Experience of Cervical Spine Injuries in Children and the Treatment that Follows in Tertiary Care Hospitals

Cervical Spine
Injuries in
Children And
The Treatment

Muhammad Idris Khan, Adnan Munir, Sajjad Ullah and Sajid Mehboob

ABSTRACT

Objective: To assess the incidence, treatment modalities and outcomes of damage to the cervical spine in children within a tertiary care hospital, with a focus on refining clinical protocols and enhancing the overall quality of care.

Study Design: A prospective and observational study.

Place and Duration of Study: This study was conducted at the Department of Neurosurgery Khyber Teaching Hospital from Jan 2018 to December- 2023.

Methods: A thorough examination of pediatric patients with cervical spine injuries was conducted at Khyber Teaching Hospital, a prominent tertiary care hospital. The study encompassed a total of n = 90 patients, all cervical injuries presenting to the hospital from 2018 to 2023. Variables such as age, injury mechanisms, cervical spine injury levels, neurological deficits, treatment approaches (surgical and conservative), and six-month post-treatment outcomes were assessed.

Results: There were 40 females and 50 males included in the study, constituting a total population of 90. Interestingly, 46% of patients presented with lower cervical spine injuries (C3 – C7), while 54% sustained injuries in the higher cervical spine level (C0 – C2). Falls were identified as the predominant cause of cervical spinal traumas, followed closely by motor vehicle accidents. Among the treatment groups, the highest fatality rates were observed in 'ASIA' group A and B. Fatality outcomes were significantly influenced by the neurological state of the individual before treatment and level of cervical spine involved. A notable variability in pre-operative and post-operative neurologic results was observed, as evaluated by 'ASIA' 'scale'.

Conclusion: In some individuals, high cervical spine injuries, and incidents involving high-energy impact trauma emerged as independent risk factors associated with heightened fatality rates. Furthermore, compared to cases with incomplete neurological abnormalities, instances featuring complete neurological disability exhibited a higher fatality risk.

Key Words: Pediatric Trauma, Cervical Spine Injuries, Tertiary Care Hospital, Treatment Outcomes, Morbidity, Fatality, Injury Mechanisms

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INTRODUCTION

Although pediatric spinal injuries are rare among traumatic patients, they nonetheless pose a significant risk to health and well-being.¹ When a kid after trauma, complains of neck pain or tenderness, or exhibits symptoms related to the cord or roots, it is suspected. In the US, there are 7.41 cervical spine injuries for per 100,000 people.² Children's cervical spine injuries manifest differently from adult cervical spine injuries.³⁻⁵

Department of Neurosurgery, Khyber Teaching Hospital, Peshawar.

Correspondence: Adnan Munir, Assistant Professor of Neurosurgery, Khyber Teaching Hospital, Peshawar.

Contact No: 00333 3411827

Email: dradnanmunir88@gmail.com

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The most frequent cause of cervical injuries in children is motor vehicle accidents, although other prevalent causes include obstetrical difficulties, crashes, athletic events, swimming mishaps, falls, and abuse of children.⁶ Accidents involving bicycles are a prevalent cause of spinal cord damage in children aged 6 years to 10 years, while vehicular crashes and injuries related to sports are the most prevalent causes in individuals older than 10 years. Birth related high cervical injuries although very rare, can cause flaccid paralysis, breathing difficulty and sometimes death.⁷

The discrepancy in the centre of movements makes cervical spine injuries more prevalent in the lower cervical vertebrae over 9 years and commonest from the 'occiput' to C2 in less than 9 years. Injury to the spinal cord or nerve roots is also linked to facet dislocation. Cervical cord injury can cause bladder and bowel problems, but this is uncommon.

The shallower and more horizontally oriented facet joints, insufficient calcification of the odontoid and broad neck muscles, and ligament flexibility all

contribute to the comparatively hypermobile nature of pediatric spines. These characteristics put patients at risk for a cervical spine instability.⁸ The pediatric population is prone to injuries from automobile collisions, pedestrian collisions, and self-inflicted wounds.¹⁰ Because of the ligamentous suppleness linked to sports, SCIWORA accidents are also frequent in the pediatric populations.

When compared to adults, the prognosis for cervical cord injury in pediatric patients is better. Additionally, partial cord lesions yield superior results compared to complete cord lesions. It is possible for total spinal cord injuries to leave residual deficits behind. Comparing lumbar and the thoracic spines, the cervical spine is involved in eighty percent of all injury to the spine in children. The most prevalent area of injury in younger children is from the OC junction to C3, and as the kid becomes older, cervical spine injury tends to occur low.⁵

If the patient remains neurologically intact, dynamic X-rays are performed; however, in cases of neurological impairment, MR imaging is employed to assess cervical cord injuries. CT scans serve as a supplementary tool for surgical planning in cervical cord injuries, primarily detecting bony injuries rather than ligamentous ones in the cervical spine. The significant role of MR imaging in the prognosis of cervical spine injuries is evident, as it can effectively identify both ligament and discs injuries⁷.

Pseudo sub-luxation frequently occurs in individuals up to 14 years of age. To assess this, a guideline suggests that a distance between the anterior cortex of C2 and the line connecting C1 to C3 should be within 1 mm.¹⁰ In children, spinal instability is manageable compared to elders due to increased ligament flexibility. In children, an unstable spine is indicated by a sub-luxation greater than 4.5 mm and a deviation greater than 7 degrees.¹⁰ Patients with SCIWORA typically exhibit no abnormalities in MR imaging, and the recommended treatment involves immobility for a maximum of three months, followed by 'flexion' and 'extension' radiographs. The higher occurrence of SCIWORA in children is attributed to a more abundant blood supply¹¹ and increased spinal cord elasticity in this age group.

Surgical intervention is indicated in cases of 'non-reducible' 'dislocation', 'progressive deformity', injury which are not stable, and the need for 'decompression' of 'neural structures'.¹¹ The selection of the approach is contingent on the location of the compression on the cervical cord.

METHODS

The study design employed was prospective and observational, taking place at Khyber Teaching Hospital in Peshawar. The study duration spanned from January 2018 to December 2023. Ethical approval and

informed consent from guardians were obtained before commencing the study.

Patients were grouped based on various parameters, including age, fatality, the cause of injury (such as falls, 'motor vehicle' accidents-'MVA', 'bicycle injuries', and 'sports-related injuries'), the level of 'cervical' 'spine injury', the presence of neurologic deficits, the occurrence of bony injuries (like fractures and dislocations), ligamentous injuries, and SCIWORA (Spinal Cord Injury Without Radiographic Abnormality). The study's inclusion criteria specified individuals aged 5 to 18 years with a traumatic history.

The study excluded individuals older than 18 years, those with co-existing health conditions, congenital anomalies, a history of Pott's disease, or malignancies.

In most cases, the posterior route was used throughout the surgical procedure. Facet dislocation was reduced intra operatively under imaging guidance, and fixation was carried out later. A posterior lateral mass union was done in most surgical patients. Following that, these patients had neurological evaluations. Fractures of the odontoid were treated by screws fixation. Most of them included type II 'odontoid fractures'. However one 'type 3' instance involved a fixed odontoid fracture. For our patients' cervical spine MRI, we used nexus criteria. Neural condition was evaluated by 'ASIA' impairment score and patients were observed after 6 months.

Information was gathered using a form that included key details such as the age range of patients (7 – 10, 11 – 18 years), the cause of trauma ('motor vehicle accident', 'falls', 'bicycle injury', 'sports-related' injury), neural status assessed with the 'ASIA' ('American Spinal Injury Association') scale, and the cervical spine injury level determined through 'CT' scans/radiographs and MRI '(C0-C1 & C3 –C7)'. Additionally, the 'nexus criteria' (refer to Table 1) were employed to 'guide imaging recommendations' for the individuals.

Data Analysis: IBM SPSS version 26 was used to analyze the data. The test known as the chi-square was utilized to analyze qualitative variables in the separate groups' outcome analysis. A highly significant the probability value was defined as one that was below 0.05.

RESULTS

A total of 90 participants were included in the study group, consisting of 40 females (45%) and 50 males (55%). The mean age was 11.5 ± 4.7 years. Among the participants, 46 (51%) were between the ages of 7 and 10 years, while 44 (49%) were between 11 and 18 years.

Comparing the involvement of the 'cervical spine' at different levels, 47 patients (53%) exhibited issues in the lower cervical spine (C3 – C7), while 43 individuals (47%) showed involvement in the higher cervical spine

level (C0 – C2). The average follow-up time was 4.9 ± 2.6 months.

Among those aged 7 to 10 years, 19 individuals had experienced falls resulting in cervical spine harm, primarily due to car crashes (17 patients). In the 11–18 years age group, the commonest cause of cervical spinal injuries was falling history (19 patients), followed by 'auto accidents' (21 patients). Pedestrian injuries were equally distributed between the age groups, with 7 cases in each. The 'ASIA' score, illustrated in Figure 2, revealed that individuals aged 7–10 years had a higher fatality rate than those aged 11–18 years (p-value 0.0054). In the study, 22 patients expired with a mean follow-up of 4.9 ± 2.0 months, and fatality was more common in men (28 patients) than in the women's group (24 patients). Fatality was higher in the upper cervical spine level compared to the lower cervical spine level (p-value: 0.0084). Specifically, fatality was observed in C0 to C2 levels (27 patients) and C3 to C7 levels (15 patients).

Table No. 1: 'Nexus Criteria'

'Criteria for Nexus'	'Recommended' 'Imaging'
'Presence of midline cervical spine tenderness'	Yes
'Presence of focal neurological deficit'	Yes
'Lack of alertness or intoxication'	Yes
'Presence of distracting injury'	Yes

Table No. 2: Frequency of 'ASIA' Score

Scale	Frequency	Percentage
'ASIA' A'	17.8.4	32
'ASIA' B'	27.8	50
'ASIA' C'	33.3	60
'ASIA' D'	11.1	20
'ASIA' E'	4.4	8
Total	90	100

Table No. 3: 'ASIA' scale with Age groups (7 to 10 and 11 to 18 years)

Scale	07-10 yrs	11-18 yrs
'ASIA' A'	9	6
'ASIA' B'	10	9
'ASIA' C'	8	11
'ASIA' D'	15	10
'ASIA' E'	4	8
Total	46	44

Table No. 4: Cervical spine injury level and fatality outcome

Level	Fatality		Total	P value
	Yes	No		
'C0-C2'	15	28	43	0.005
'C3-C7'	9	38	47	

The most common cause of fatality (p-value: 0.043) was automobile accidents, followed by falling history (25 vs. 15 patients). Injuries to pedestrians accounted for 4.9% of mortalities (5 patients), and dive-related incidents contributed to 2.6% of the fatalities (3 patients). No fatalities related to sports were noted. Among the fatality group, 30 patients were identified, with 5 having fractures, 10 having dislocations, and 5 experiencing fatality due to ligament injury. SCIWORA accounted for only one fatality. Among those who received treatment, fatality was highest in individuals who underwent surgery. Deaths were most prevalent in the 'after-treatment ASIA group A' and 'after-treatment ASIA group B'. The participants were followed for 6 months, and fatality was observed in 6 patients at 3 months, increasing to 8 patients at 4 and 6 months. There was a statistically significant difference (p-value < 0.00001) in neurologic results before and after surgical interventions based on the 'ASIA' scale (A to E).

DISCUSSION

Cervical vertebrae trauma is prevalent among individuals with a record of injuries. The upper 'cervical spine' tier (C0-C2) was linked to 43 persons while 47 patients were associated with the lower cervical spine (C3 – C7). In the adolescent age bracket (11 – 18 years), incidents of falling were the predominant cause of 'cervical spine' harm, followed by car collisions accidents.

Among the therapy groups, individuals undergoing surgery experienced the highest mortality rate. The most substantial mortality occurred in 'ASIA' groups A and B post-treatment. The post-therapy neurological status of patients appears to significantly influence mortality. Concerning the 'ASIA' scale, there was a notable disparity in the neurological outcomes of patients before and after the surgical intervention.

As per an other research, children below the age of 10 predominantly experienced cervical spine injuries due to motor vehicle accidents (MVAs), with a higher involvement of upper cervical spinal levels.¹²⁻¹³ In children aged 10 and above, sports-related injuries emerged as the most prevalent cause of cervical spine injury, aligning with our study's findings. Cervical spine injuries were reported in 55.8% of cases, particularly in the younger age group (< 12 years old). Multiple-level cervical spine injuries were identified in 23.3% of cases. Neurological deficits were present in 22.7% of these children, with an overall mortality rate of 8.3%.

Across all sports, adolescence, and SCIWORA were significant indicators of concurrent Traumatic Brain Injury (TBI).

The increasing frequency of Cervical Spine Injuries (CSI) with age underscores the escalating concerns in competitive youth sports, aligning with recently revised regulations aimed at mitigating sports-related injuries in juveniles.¹⁴⁻¹⁵ Beckmann et al.² provided a comprehensive account of the epidemiology and imaging characteristics of cervical spine injuries in children subjected to blunt trauma.

Yadav et al. observed a significantly lower occurrence of cervical spine injuries in younger children.¹⁶ The most common injury mechanism among patients in this age group was falling from a height, followed by those involved in car accidents.

In situations where standardized protocols for managing such conditions are absent, an optimal path for diagnosis and treatment becomes crucial. Early neurologic assessment and 'magnetic resonance imaging' play pivotal roles in treatment outcome determination. To establish uniform methodologies, future randomized controlled trials are imperative, given the considerable variability in the literature concerning diagnosis and treatment.

CONCLUSION

The death rate for people with fractures of the spine was 27.8%. The youngest age groups, greater degrees of cervical spine deformity, and methods of damage including extremely energetic impact trauma, such as crashes involving motor vehicles (MVs), were all independently linked to increased fatality. In contrast to spinal cord injuries, the mortality rate was greater in cases of bone injuries including fractures and dislocations. The surgical procedures included decompression and both posterior and anterior fusions. Whole neurologic deficiency cases had a greater death rate than inadequate neurological disorder cases. It was high in Asia A patient with high cervical injuries. The best outcome was in children having SCHIWORKA and it is also the most common cervical injury occurring in children after trauma. We observed that in SCHIWORKA external immobilization expedites recovery and decreases the pain from soft tissues injury.

Author's Contribution:

Concept & Design of Study:	Muhammad Idris Khan
Drafting:	Adnan Munir, Sajjad Ullah
Data Analysis:	Sajid Mehboob
Revisiting Critically:	Muhammad Idris Khan, Adnan Munir
Final Approval of version:	Muhammad Idris Khan

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Surgical Outcome of Transpedicular Fixation in Thoracolumbar Injuries

Transpedicular
Fixation in
Thoracolumbar
Injuries

Adnan Munir, Muhammad Idris Khan, Sajjad Ullah and Sajid Mehboob

ABSTRACT

Objective: The research aims to outline the surgery result of thoracolumbar injuries using short-segment pedicle screw fixation.

Study Design: A retrospective- study

Place and Duration of Study: This study was conducted at the Khyber Teaching Hospital in a time duration of 2 years i.e., from 05-Jan-2020 to 05-Jan-2022.

Methods: All 'thoracolumbar' injuries treated through surgery were reviewed retrospectively. The short-segment approach was used to instrument the 84 participants treated through surgery. A magnetic resonance imaging (MRI), computed tomography scans (CT), prior and post operative images, patient records, and operative records were all obtained. The review included neurologic observations (Frankel functional classification) and follow-up records for a maximum of six months.

Results: Transpedicular stabilization was carried out in 84 individuals. The male to female ratio was 2:1, with 56 male and 28 female patients. Age ranged from 18 to 65 years old, with a mean of 43 ± 14.867 . Injuries varied in severity among the age ranges. There were variations in the severity of injuries among different age categories. Frankle grading was used to evaluate the result. There was no increase in neurological impairment in any patient. The majority of patients improved. Eight cases had hardware failure, sixteen had bed-sores, and three had deep venous thrombus. Misplaced screw in 5 scenarios. Eight patients developed superficial wound infections.

Conclusion: The short-term monitoring results indicate an effective outcome for short-segment instrument, even though the long-term monitoring assessment needs to be established.

Key Words: Pedicle screws instrument, 'thoracolumbar' injuries, Short-segment fixing.

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INTRODUCTION

With the advancement of 'Transpedicular fixation' using screws methods and instrument systems, short-segments equipment—which involves fixing the fractured vertebra and a single healthy vertebrae superior and inferior to a wounded segment—has become a common clinical procedure⁽¹⁾. In 1944, King et al., first described the process of fixing screw into the body of a vertebra through the transfacet entry to the lumbar vertebrae. Boucher et al presented an alternative method of inserting screws into the vertebrae. Pedicle screws have been utilized extensively in lumbar spine disorders ever since pedicle screw fixation became common⁽²⁻⁵⁾.

Department of Neurosurgery, Khyber Teaching Hospital, Peshawar.

Correspondence: Muhammad Idris Khan, Assistant Professor of Neurosurgery, Khyber Teaching Hospital, Peshawar.

Contact No: 0333 3411827

Email: idrisnsw83@gmail.com

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There is ongoing debate regarding the best way to treat 'thoracolumbar' injuries⁽⁶⁾. The Transpedicular short-segment design is for restoration of the anterior spine avoiding the requirement for anterior struts grafts or plates fixing, to avoid an extensive arthrodesis of the mobile parts⁽⁶⁾. The function of the pedicle screw revealed by researches are widened by the usage of these screw, which may limit the range of spinal segment while decreasing harm of delicate tissues and enhance the rate of synostosis over traditional fixing through hooks and wires⁽⁷⁾. Numerous adverse outcomes have been documented thus far using this technique⁽⁸⁻¹⁰⁾. The supporters of conservative therapies argued that the only way to have good outcomes was to use postures in the interventions as well as long-term rest^(11,12). Conversely, for those who recommend surgery, patients should anticipate early ambulation, the ability to carry out rehab measures, the ability to recover from anatomical injuries, and, in the majority of cases, an enhancement in neurological function⁽¹³⁾. Numerous complaints of worsened stenosis of the spine, rising pressure on the body of the vertebrae, increasing curving of the spine, radiculopathy and bed-sores were made following conservative therapies⁽⁹⁾. This paper assesses the result through surgery from

short segment pedicle fixing with screws in 84 'thoracolumbar' spinal injuries.

METHODS

A retrospective- study was conducted for 2 years (05-Jan-2020 to 05-Jan-2022) in Neurosurgery Department of Khyber Teaching Hospital. All surgery treated 'thoracolumbar' injuries was conducted, taking into account a number of clinical factors including age, gender distribution, injury level, and causation. Individuals with 'thoracolumbar' injuries received admission to the neurosurgery department of Khyber Teaching Hospital.

In 84 individuals, short-segment 'Transpedicular fixation' was carried out. Review materials included visuals, operative note, and radiographic images from before and after surgery, CT images, MRI, and data from follow-up visits ranging to six months. Denis three-column system of classification was used to classify injuries.

To evaluate neurologic state, spinal cord injury patients were given a Frankel grading system. A recommendation for surgical intervention that required decompression and fixation: increase curve of the spine greater than 20 degrees, vertebrae collapse more than 50% of whole length, and more than 50% of the canals compromised. Radiography was used for the follow-up evaluation. A standard X-ray was taken to examine the fracture. CTs and MRIs were performed for every individual to make sure reliable detection of the destruction to the vertebrae.

RESULTS

In 84 cases, 'Transpedicular fixation' was carried out, comprising, as indicated in Figure 1, 56 men and 28 women, with a male to female ratio of 2:1. Age ranged from 18 to 65 years old, with a mean of 43 ± 14.86 . There were (6) D11 injuries, (9) D12 injuries, (40) L1 injuries, (19) L2 injuries, (8) D 12 & L1 cases, and (2) L3 cases (Fig 2).

Using the Frankel grading system, the postoperative outcomes are as follows: Among Grade (A) patients, 3 individuals advanced to Grade (B), while the remaining patients remained at Grade (A). In the case of Grade (B) patients, 12 individuals experienced improvement and progressed to Grade (C). Within the Grade (C) category, 15 patients showed improvement, moving up to Grade (D) (Table 1 and 2). Patients initially classified as Grade (E) showed no observed changes and remained static. It is important to note that all patients were enrolled in rehabilitation programs within three weeks of their surgeries, indicating a prompt and proactive approach to postoperative care.

Short segment trans-pedicle fixation with decompression of neural components was the surgical technique. Each individual had six months of monitoring and follow-up. Following surgery, the

individuals were evaluated using the Frankle grade. There were 6 incidents of hardware failure and 18 incidents of bed-sores on, 2 cases of deep venous thrombosis, 7 cases of a misaligned the screws and 9 cases of infections of wounds.

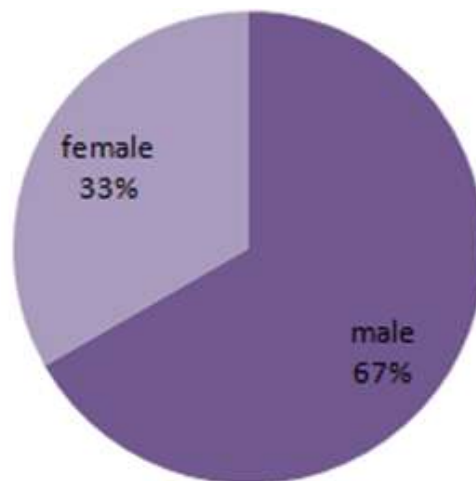


Figure No. 1: Show prevalence of males and females



Figure No. 2: Fracture at Various Levels

Table No. 1: Frankle Grading of individuals prior to surgery

Grades	No (n)	Percentage (%)
A	18	21.4%
B	20	23.8%
C	30	35.7%
D	10	11.9%
E	6	7.1%

Table No. 2: Frankle Grading of individuals after surgery

Grades	No (n)	Percentage (%)
A	15	17.8%
B	11	13.0%
C	27	32.1%
D	25	29.7%
E	6	7.1%

DISCUSSION

The aim of treatment fractured vertebrae is to stabilize the physically damaged vertebrae segments, achieve early neurological decompression, and achieve a stable and solid fixation in order to begin recovery and

rehabilitation early⁽¹⁴⁾. In many healthcare facilities, pedicle screw fixation in thoracolumbar spine fractures is the standard therapy for fusion and stability^(8, 11, 12, 15). Clinically comparison and assessments between pedicle screw, hook, Luque rod, sub laminar wire, and Harrington rod were conducted on participants. The results showed that pedicle screws fixing could be applied to short segment than any other fixing posterior tool⁽¹⁶⁾.

As a result, an excellent posterior fixing technique perfect for this use is pedicle screw fixation⁽¹⁷⁾. Benefits of short segment fixation are that it fuses a short segment of the spine and thus maintains the mobility of other healthy segments. It is also widely accepted and simple for spine surgeons. However, the challenge of reconstructing the anterior column is acknowledged as a drawback. Failing to regain the anterior column stability can result to subsequent curving of spine, instability, unease and later development of neurologic issues, depends mostly on remaining stress transfer capability of the injured vertebra segment.

This trial showed positive outcomes, with no patient experiencing a worsening of their neurological condition following pedicle screw implantation. Pedicle screws are helpful in cases of serious injuries including injuries displacement and can be used in both the lumbothoracic vertebra of the spine. Despite posterior fixing and fusion, published reports suggested an implant infectivity of roughly 6%⁽²⁾, however, no sign of implant infection was observed in this study.

According to another study, individuals with thoracolumbar segments injuries but without neural injury responded good to conservative treatment. Though these results were unrelated to the radiological finding, individuals with thoracic and lumbar segmental injuries without neural injury were able to return to their normal lives more easily after undergoing surgical spinal fixing⁽⁹⁾.

Significant benefits of fixing through surgery over interim therapies include timely individual mobility following fixing, which reduces the risk of neural injury by stabilizing the spine⁽²⁾. Neurologic abnormalities can be restored, shields injured structures from outside influences, and replaces the damaged structure with the proper internal fixing tools. According to another study, posture-based therapies would suffice and allow patients to regain mobility following a long time rest that restored their core strength⁽¹⁸⁾.

CONCLUSION

The Transpedicular fixing technique is a secure, simple, reliable method. In simulated anatomy, individuals revealed adequate fusion and effective recovery without any issues. However, this research's shorter follow-up time poses a limitation.

Author's Contribution:

Concept & Design of Study: Adnan Munir
 Drafting: Muhammad Idris Khan, Sajjad Ullah
 Data Analysis: Sajid Mehboob
 Revisiting Critically: Adnan Munir, Muhammad Idris Khan
 Final Approval of version: Adnan Munir

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Outcome Comparison of Scalpel Skin Incision Versus Electrosurgical in Treatment of Inguinal Hernia

Scalpel Skin
Incision Versus
Electrosurgical in
Inguinal Hernia

Haseeb Ahmad¹, Muhammad Waqid Bin Abdullah¹, Syed Muhammad Talha Bukhari²,
Afzaal Baig¹, Roshan Butt¹ and Zubair Ahmad¹,

ABSTRACT

Objective: To compare the outcomes of scalpel and electrosurgical skin incision in treatment of inguinal hernia.

Study Design: Randomized controlled trial study

Place and Duration of Study: This study was conducted at the Department of Surgery, Services Institute of medical sciences, Lahore from January 2020 to July 2022.

Methods: A total of 270 male patients aging between 15 to 80 years planned for unilateral inguinal hernioplasty were divided in to 2 equal groups of 135 patients each. In Group A patients were treated with electrosurgical skin incision while in Group B patients were treated with scalpel skin incision. The primary outcomes were set as postoperative pain, as assessed on visual analogue scale, at 24-hours after the procedure and incidence of hematoma as assessed on day 7 after the surgery.

Results: The Mean \pm SD of age in this study was 47.45 \pm 18.93 years with an age range of 15 to 80 years. The results of primary outcomes of the study show that the mean postoperative pain after 24-hour of procedure was significantly less in Group a compared to Group B (3.37 \pm 1.81 Vs 4.43 \pm 1.94, p-value = 0.00). Similarly, the frequency of hematoma was significantly lower in Group A compared to Group B (5.92% Vs 19.25%, p=0.00).

Conclusion: Electrosurgical skin incision provides significantly better outcomes in terms of lesser postoperative pain and lower incidence of hematoma in patients undergoing inguinal hernioplasty.

Key Words: Electrosurgical skin incision, Inguinal hernia, scalpel skin incision.

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INTRODUCTION

The scalpel has been considered as the ultimate recommended tool for incisions in surgery as it makes the procedure simple for surgeons to make the required depth incision without any tissue damage in the surrounding area.^{1,2} It is, however, associated with unnecessary blood loss and reported occurrence of injuries to the surgical staff.^{3,4}

At the start of 20th century, a new method of surgical diathermy was introduced which uses alternating current (high frequency of >100000Hz) to produce cleavage. The method is commonly named as electrocautery or electrosurgery and is considered as a convenient method compared to scalpel skin incision.

¹. Department of Surgery, Services Hospital, Lahore.

². Department of Surgery, PKLI, Lahore.

Correspondence: Muhammad Waqid Bin Abdullah, Surgical Department, Services Hospital, Lahore.
Contact No: 03338002606
Email: waqidabdullah@gmail.com

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This method also serves the coagulation needs besides the skin incision. Electrosurgery doesn't damage the adjacent tissues and also controls the homeostasis.^{5,6}

The advantages of electrosurgical skin incision regarding minimized loss of blood with lesser postoperative pain are shared in a number of studies; however, some studies have mentioned no significant difference between electrosurgical incision and scalpel incision regarding infections in the wound, duration of hospital stay and characteristics of the surgical wound.^{7,8} There are also reports of poor tissue healing and bigger scars following electrosurgical incisions.⁹ The results of Huang et al. study showed that electrosurgery causes slow wound healing and more prone to infections compared to use of scalpel.¹⁰

Razia et al reported significantly lower mean pain in diathermy group in patients under-going hernioplasty as compared to Scalpel group (2.15 \pm 1.20 Vs 4.95 \pm 1.37, p-value = 0.011).¹¹ Zarei F while comparing scalpel skin incision versus electrocautery for their patients' under-going herniorrhaphy mentioned no difference in development of hypertrophic or colloidal scar and intensity of postoperative pain.¹² Hence there is still debate on the choice of electrosurgical incision and despite of being mentioned as better treatment choice by some researchers, the use of this electrosurgical skin incision is suboptimal.¹³

Electrosurgical method is also used in surgeries relating to repair of inguinal hernia with good outcomes in reducing postoperative pain and reduced requirements for the postoperative analgesic use.¹⁴ Surgical treatment of inguinal hernia is a common procedure in surgical units and post-operative pain and complications relating to wound are important concern after inguinal surgery.

This study was therefore planned to compare the outcomes of electrosurgical skin incision in shape of postoperative pain and post-surgical incidence of hematoma compared to scalpel skin incision. The results of this study will help the surgeons to adopt better option for their patients in the treatment of inguinal hernia.

METHODS

This randomized control trial was conducted at the Department of Surgery, Services Institute of medical sciences, Lahore from January 2020 to July 2022 over a period of 6 months.

Sample size was calculated as per following assumptions:

Alpha= 5% (two sided), power =80%.

p1 (Incidence of hematoma using scalpel incision) =9.32%

p2 (Incidence of hematoma using electrosurgical incision) =2.27%.¹⁵

Estimated sample size

n1= 135, n2=135.

A total of 270 male patients aging between 15 to 80 years planned for unilateral inguinal hernioplasty were divided in to 2 equal groups of 135 patients each using lottery method.

Exclusion criteria were set as patients who had used an analgesic treatment during last 3 months at a dosage of > 3 days/week at the time of inclusion, patients having strangulated, obstructed or Irreducible hernia or patients having diabetes mellitus.

In Group A patients were treated with electrosurgical skin incision while in Group B patients were treated with scalpel skin incision.

The primary outcomes were set as postoperative pain at 24-hours after the procedure and incidence of hematoma as assessed on day 7 after the surgery.

In Group A, electrosurgery incision was conducted by using a diathermy pen electrode. In Group B, disposable blade was used for skin incision.

All the demographic information was taken and clinical findings were made and recorded at the time of randomization.

Pain was assessed at 6, 12 and 24-hours of procedure using VAS (visual analogue scale 0-10 where 0 meant no pain while 10 meant worst unbearable pain).

Post-operative hematoma was assessed at postoperative follow up day 7.

All surgeries were conducted under standardized spinal anesthesia.

The surgeries were conducted by consultant surgeons having ≥ 5 years of experience. A prophylactic dose of Inj. Augmentin 1 g was given 2 hour before the procedure and repeated on 12 hours basis for 3 days. Postoperative diclofenac injection was given to each patient in both groups.

Repair of subcutaneous tissue was done with Vicryl suture (polyglactin 910).

Ethical approval of conducting the study was taken from the ethical committee of the hospital.

The study purpose was explained and consent was taken from the participants on written forms.

Data analysis was performed using SPSS version 25. Quantitative variables were expressed in shape of Mean \pm SD while qualitative variables were presented in form of frequency and percentage. Independent t-test and Chi-square test were applied to find the significance of difference between the 2 groups while keeping $p \leq 0.05$ as significant.

RESULTS

The Mean \pm SD of age in this study was 47.45 \pm 18.93 years with an age range of 15 to 80 years. Out of total study patients 37 (13.7%) were obese. The group wise details are shown in Table-1.

Table No. 1: Demographics and baseline clinical characteristics

n=270

Demographics and baseline clinical characteristic		Group A n=135	Group B n=135
Age (Mean \pm SD) years		47.15 \pm 18.36	47.74 \pm 19.5
Obesity	Yes n (%)	14 (10.37)	23 (17.35)
	No n (%)	121 (89.63)	112 (82.96)

The results of primary outcomes of the study show significantly less postoperative pain in Group A at 24 hours after procedure compared to Group B assessed on VAS scale, as shown in Table-2.

Table No. 2: Postoperative pain among two groups.

n=270

Postoperative pain	Group A n=135	Group B n=135	p-value
At 6 hours on VAS (Mean \pm SD)	6.08 \pm 0.75	6.11 \pm 0.91	0.76
At 12 hours on VAS (Mean \pm SD)	4.88 \pm 0.71	4.99 \pm 0.89	0.26
At 24 hours on VAS (Mean \pm SD)	3.37 \pm 1.81	4.43 \pm 1.94	0.00

Similarly, the results of primary outcome of hematoma formation showed significantly less incidence of hematoma in Group A compared to Group B as assessed at day 7 after the procedure as shown in Table 3.

Table No. 3: Incidence of hematoma n=270

Incidence of Hematoma	Group A n=135	Group B n=135	p-value
Yes n (%)	8 (5.92)	26 (19.25)	0.00
No n (%)	127 (94.07)	111 (82.22)	

DISCUSSION

Electrosurgery was introduced about 100 years ago and is still not in frequent use due to concerns related to risk of neighboring tissue damage, infection and wound complications. However, use of electrocautery in place of scalpel is gaining acceptance with the introduction of advanced electrosurgical instruments which provide pure sinusoidal currents.¹⁶

A study conducted by Dhanke P compared the method of electrocautery and scalpel incisions in herniorrhaphy patients. The results showed that electrocautery is safe and no difference was recorded in wound infection and scar complication between the 2 groups. The study reported the incidence of hematoma in electrocautery group by 2.27% while this incidence was 9.32% in the scalpel group.¹⁵

Chauhan HR compared the outcomes of scalpel and electrosurgery skin incisions after inguinal hernioplasty. The study outcomes were set as postoperative pain, time taken for wound healing, infection at the surgical site and cosmetics. The results showed no difference between the two groups regarding wound infection however significant better outcomes were shared for postoperative pain in electrosurgery group compared to scalpel group ($P < 0.001$).¹³

Ansari M in a study comparing the scalpel incision and electrosurgical incision reported that hematoma was seen in 20% of cases of herniorrhaphy treated with Scalpel incision while only 3.33% cases with electrocautery incision ($p\text{-value} < 0.05$).¹⁷

A study conducted by Ragesh K V with 200 patients compared skin incision with diathermy and scalpel with primary outcome of postoperative pain assessed on VAS. The results showed significantly less pain in the diathermy compared to scalpel incision ($p\text{-value} < 0.01$). The authors of the study therefore concluded that diathermy provides more advantages to skin reflected by less postoperative pain.¹⁸

Yadav SK conducted a study to compare the wound complications and postoperative pain in patients either treated with scalpel or electrosurgery for their inguinal hernia. The ratio of male patients in this study was 88.3%. The study showed significantly more (5.1 times) wound complications in scalpel compared electrosurgery group ($p = 0.04$). The study however reported no difference in postoperative pain at 6, 12 and 24 hours after surgery.¹⁹

Quazi M analyzed the 2 incision methods for better healing and minimal complication after inguinal hernia surgery in 200 patients equally divided in 2 groups. The results of this study proved that electrosurgical incision

was better than scalpel incision regarding postoperative pain as assessed on VAS scale (2.51 ± 0.65 Vs 2.97 ± 0.17 respectively, $p = 0.000$).²⁰

A systemic review including 9 studies by Hajibandeh S comparing the outcomes of scalpel versus diathermy in inguinal hernia concluded that there no difference regarding other outcomes, however, diathermy may help to reduce the risk of hematoma.²¹

The Mean \pm SD of age in our study was 47.45 ± 18.93 years with an age range of 15 to 80 years. Out of total study patients 37 (13.7%) were obese.

The results of primary outcomes of the study show that the mean postoperative pain after 24-hour of procedure was significantly less in Group A compared to Group B (3.37 ± 1.81 Vs 4.43 ± 1.94 , $p\text{-value} = 0.00$). These results are in line with the results shared by researches working on the comparison between these two methods regarding postoperative pain.^{11,13,18,20}

Similarly, the frequency of hematoma was significantly lower in Group A compared to Group B (5.92% Vs 19.25%, $p = 0.00$). Better results regarding hematoma with electrosurgical incision were also shared by studies and meta-analysis conducted previously to evaluate this important surgical outcome.^{15,17,19,21}

The results of our study therefore prove electrosurgical incision as a better option for effective inguinal hernia surgery with significantly better post-operative outcomes. Limitation of this study is short follow up time. Moreover, we worked on some selected outcome. Future studies in this segment with longer follow up and more outcomes will be helpful in providing guidelines to surgeons performing inguinal hernia surgeries in our local population.

CONCLUSION

The use of electrosurgical skin incision in routine inguinal hernia surgeries is supported by the evidence provided in the results of this study showing significantly better outcomes in terms of lesser postoperative pain and lower incidence of hematoma.

Author's Contribution:

Concept & Design of Study:	Haseeb Ahmad
Drafting:	Muhammad Waqid Bin Abdullah, Syed Muhammad Talha Bukhari
Data Analysis:	Afzaal Baig, Roshan Butt, Zubair Ahmad
Revisiting Critically:	Haseeb Ahmad, Muhammad Waqid Bin Abdullah
Final Approval of version:	Haseeb Ahmad

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Comparison Between Aspiration and Incision & Drainage of Breast Abscess

Aspiration and
Incision &
Drainage of
Breast Abscess

Afzaal Baig¹, Muhammad Waqid Bin Abdullah¹, Zubair Ahmad¹, Syed Muhammad Talha Bukhari², Haseeb Ahmad¹ and Roshan Butt¹

ABSTRACT

Objective: To compare outcomes of needle aspiration and surgical incision and drainage of breast abscess.

Study Design: Randomized controlled trial.

Place and Duration of Study: This study was conducted at the Department of Surgery, Services Institute of medical sciences, Lahore from July 2020 to January 2021.

Methods: A total of 60 female patients between the ages of 18 to 65 years presented with unilateral breast abscess were included in the study and divided into 2 equal groups of 30 patients each. Females in Group-NA were treated with ultra sound guided needle aspiration while females in Group-I&D were treated with incision and drainage of the breast abscess. The primary outcomes were set as time taken for the procedure and duration of hospital stay among the two groups.

Results: The Mean \pm SD of age in this study was 39.93 \pm 13.97 years with an age range of 25-58 years. The size of abscess in Group-NA was 7.2 \pm 1.71 cm while this size was 6.96 \pm 1.56 cm in Group-I&D. The results of the primary outcomes of the study show significantly less time required for procedure in Group-N A compared to Group-I&D (7.2 \pm 1.54 Vs 19.96 \pm 2.77 minutes, p= 0.000). Similarly mean duration of hospital stay was significantly less in Group-NA compared to Group-I&D (1.63 \pm 1.06 Vs 3.23 \pm 1.38 days, p=0.000).

Conclusion: Needle aspiration provides the major advantages of less time required for procedure and reduces duration of hospital stay compared to incision & drainage procedure in females with breast abscess.

Key Words: Breast abscess, Incision & Drainage, Needle aspiration.

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INTRODUCTION

A breast abscess is a type of localized infection caused by purulent fluid accumulated within the breast tissue. This is a frequently reported complaint by lactating mothers that ranges from infection in the breast to the formation of an abscess.¹ These abscesses are found as a common reasons for morbidity and breastfeeding disruption in nursing mothers.² Among the globally reported incidences of mastitis, the highest are observed in women in their early postpartum weeks and out of cases of mastitis 3-11% is then presented as the cases of breast abscesses.³

Although the cases are reducing in developed countries, they are still a common complaint in the developing countries. In a study conducted in Ethiopia, among the total emergency admissions, nearly 3% were of breast

abscess which made it 9th frequent reason for admissions in general surgery department. In a study by Khan ZM conducted in Pakistan, this incidence was reported to be approximately 10.2%.^{2,4} The complaint of breast abscess presented by women belonging to reproductive age and associated with lactation is termed as puerperal and nearly 0.4% of lactating mothers suffers from this type of breast abscess.⁵ There are also abscesses of non-lactational (non-puerperal) origin and are presented by older premenopausal women. The non-lactational abscesses are further divided as peripheral and central periareolar.¹

The etiology of puerperal and non-puerperal abscesses is different. Puerperal abscess is formed as a result of inflammation of a breast in the lactating mother or due to any unresolved mastitis. Bacteria especially *Staphylococcus aureus* are introduced through nipples and spread in lactoserum media. The other bacteria involved in puerperal abscess are *S epidermidis* and *streptococci*.⁶ The non-puerperal abscess have no established etiology and are explained as result of autoimmunity, some kind of infections or any hypersensitivity reactions.⁷

If a breast abscess is not treated promptly and effectively, it can worsen and result in the loss of breast tissue and skin, which may require reconstruction and resurfacing of the breast.⁸ The clinical diagnosis of breast abscess is made through patient's complaints of

¹. Department of Surgery, Services Hospital, Lahore.

². Department of Surgery, PKLI, Lahore.

Correspondence: Muhammad Waqid Bin Abdullah, Surgical Department, Services Hospital, Lahore.

Contact No: 03338002606

Email: waqidabdullah@gmail.com

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chills, fever and malaise and confirmed by ultrasonography (US) scan. The use of US avoids unnecessary procedures as if it is only in earlier cellulitic phase, it can be treated with anti-inflammatory and antibiotic agents.⁹

If puss is found in USG, incision and drainage (I & D) has remained most advised and successful course of treatment for both types of breast abscess. Despite being effective this strategy has some disadvantages in shape of requiring general anesthesia in most cases, stress of surgical procedure on the patient, longer healing time, need for longer hospitalization and need the change of dressings for next few days. Moreover there is interruption in breast feeding, scars at the place of surgical wound and risk of breast deformation.

In view of the above mentioned drawbacks needle aspiration (NA) has been used with satisfactory results without these unfavorable outcomes. Some studies showed lower cure rate of up to 82% with NA but under the guidance of real time high resolution US, NA has given good results than NA alone and is therefore now more frequently used by the surgeons.^{10,11,12}

Colin C shared the results of study including 92 patients with puerperal breast abscess where alternative methods US guided NA, vacuum-assisted aspiration or pigtail catheter were used to cure the abscess. The results showed that US guided procedures provided recovery in 96% of the patients (47% of the patients were cured in the first round while 53% needed more than one procedure for the cure). The procedure was effective even in abscess > 5cm and didn't need discontinuation of breastfeed.¹³ Hence the US guided NA provides a good cure rate. Besides the overall cure rate, US guided NA allows the surgeon to complete the procedure in less time and reduces the overall duration of hospital stay (DHS). This lessens the overall burden both on surgeons and the patients.

Although studies have been conducted with US guided NA confirming its good cure rate and shortening the complete healing time, few have discussed the total time of surgeon consumed for the procedure and shortening of need of the hospital stay compared to conventional I&D technique in our local population.¹⁴

This study was therefore planned to compare outcomes of a US guided NA and I&D for curing breast abscess in shape of time taken for the procedure and DHS after the procedure. The results will help the surgeons to treat the breast abscess by utilizing lesser time and cutting short the overall cost of treatment.

METHODS

This randomized controlled trial was conducted at the Department of Surgery, Services Institute of Medical Sciences (SIMS), Lahore from July 2020 to January 2021 over a period of 6 months.

The sample size calculations were done as per following details:

Confidence interval=95%, power=80%.

p1 (mean DHS with US guided NA) = 0.2 ± 0.55 days

p2 (mean DHS with I&D) = 1.16 ± 0.37 days.¹⁴

Estimated sample size n1=30, n2=30.

A total of 60 women aging between 18 to 65 years and diagnosed with unilateral breast abscess were included in the study through consecutive sampling and randomized into 2 equal groups of 30 patients each using computer generated randomization sheet.

Exclusion criteria were defined as women having a history of TB, complex breast abscess, ulceration, necrosis, recurring breast abscess (based on history), ruptured abscess (based on clinical examination), and pregnant women.

Patients in Group-I&D underwent incision and drainage of the breast abscess, while patients in Group-NA had US guided needle aspiration of the breast abscess.

An 18 G needle and a 20 ml syringe were utilized in each instance in Group-NA. The abscess was located once the breast was stabilized using the thumb and index finger. Under local anesthetic with 2% lidocaine, a needle was inserted into the abscess from the region with normal skin. The process continued until no pus was aspirated. If necessary, aspiration was repeated every other day until the mass had fully disappeared or until three needle aspirations were completed (if the lump did not disappear after using three needles, treatment failure was recognized).

Under general anesthesia, the abscess in Group-I&D was targeted and excised close to the areolar border and along the skin's edge. The pus was fully removed from the loculi after they were fractured digitally or with artery forceps. Until the wound was cleansed and granulated, the wounds were kept exposed to drain and treated every other day.

For two days after the completion of the surgeries, the patients were advised to take oral medications including amoxicillin (500 mg), clavulanate (125 mg), diclofenac (50 mg), and pantoprazole (40 mg).

The length of the patient's hospital stay and the amount of time the surgical team needed to complete the surgery were the main goals.

Women were classified as breast abscess patients when they showed up with pain (VAS > 3) and edema across one or both breasts, combined with an abscess measuring less than 10 cm in diameter on the US.

From the moment the surgeon stabilizes the breast for aspiration or incision until the final dressing is placed, the procedure's duration was computed.

From the day the patient was admitted to the hospital for the surgery to the day they were deemed well enough to be released without any problems, DHS was calculated.

The hospital's ethics committee granted permission to proceed with the research.

Participants gave their signed permission after being informed of the goal of the research. SPSS version 25 was used for the data analysis process. Whereas qualitative data were shown as frequency and percentage, quantitative factors were portrayed as mean and standard deviation. To determine the significance of the difference between the two groups, an independent t-test was used, with $p \leq 0.05$ being considered significant.

RESULTS

The Mean \pm SD of age in this study was 39.93 \pm 13.97 years with an age range of 25 to 58 years. The demographic details and base line clinical characteristics are shown in Table-1.

Table No. 1: Demographics and baseline clinical characteristics
n=60

Demographics and baseline clinical characteristic		Group-NA n=30	Group-I&D n=30
Age (Mean \pm SD) years		38.80 \pm 13.01	41.07 \pm 13.85
Parity (Mean \pm SD)		2.9 \pm 1.06	2.83 \pm 0.98
Lactation	Yes n(%)	15 (50)	12 (40)
	No n (%)	15 (50)	18 (60)
Size of abscess (Mean \pm SD) cm		7.2 \pm 1.71	6.96 \pm 1.56
Size of abscess	≤ 5 cm n(%)	8(26.66)	8 (26.66)
	> 5 cm n (%)	22 (73.33)	22 (73.33)

The results of primary outcomes of the study show significantly less time consumed in performing the procedure and significantly less DHS in Group-NA compared to Group-I&D as shown in Table-2.

Table No. 2: Results of primary outcomes
n=60

Primary outcomes	Group-NA n=30	Group-I&D n=30	p-value
Time required for procedure (Mean \pm SD) min	7.2 \pm 1.54	19.96 \pm 2.77	0.000
DHS (Mean \pm SD) days	1.63 \pm 1.06	3.23 \pm 1.38	0.000

We also stratified the results according to size of abscess and results show that the time required for procedure was significantly less in Group-NA compared Group- I&D irrespective of the size of the abscess as shown in Table-3.

Table No. 3: Time required for procedure as per size of abscess n=60

Time required for procedure as per size of abscess	Group-NA n=30	Group-I&D n=30	p-value
≤ 5 cm (Mean \pm SD) min	6.62 \pm 1.30	19.37 \pm 3.2	0.000
> 5 cm (Mean \pm SD) min	7.40 \pm 1.59	20.18 \pm 2.64	0.000

DISCUSSION

The procedure of NA has been discussed in a lot of studies which show its high cure rate however the outcomes like time required by the surgeon to perform the procedure and DHS after the procedure has been less studied especially in comparison to conventional I&D technique.

Saeed S et al. compared the NA versus I&D for managing breast abscess ≤ 5 cm in diameter. This study conducted with Pakistani population reported a comparable healing time among the 2 groups. The researchers mentioned that the method of NA was more feasible for the surgical team and acceptable for the patients.¹⁵

Karvande R compared traditional method of I&D and US guided NA in treating breast abscess < 10 cm size. The results of this study showed a significantly less mean procedure time (6.63 \pm 01.61 Vs 18.87 \pm 2 minutes respectively, $p=0.000$) and DHS (0.2 \pm 0.55 Vs 1.16 \pm 0.37 days respectively, $p= 0.000$) in Group undergoing NA compared to Group where I&D was used.¹⁴

Fardhus et al. compared the NS and I&D methods with the aims of finding the better treatment in shape of less time consumed in procedure. The outcomes of the study showed significantly less time required for performing the procedure in NA technique compared to I&D technique (6.62 \pm 1.5 min Vs 18.81 \pm 2.10 min). The author mentioned NA method as a simple and feasible procedure that can be done even without US and no use of anesthesia was needed.¹⁶

Saboo A in their study on the trends in the management of non-puerperal breast abscess mentioned NA as a procedure that allows a significantly shorter hospital stay compared to operative management.¹⁷

In a recent study published study in December 2023, Ubaid M and co-researchers compared the US guided NA technique and traditional I&D technique for the management of breast abscess. The outcomes of the study showed a significantly less mean procedure time in group with NA technique compared to I&D technique (7.72 \pm 1.96 Vs 22.22 \pm 3.07 min respectively, $p<0.001$). Similarly, there was a significant difference in the length of hospital stay in NA group compared to I&D group (1.36 \pm 0.49 days Vs 2.01 \pm 0.39 days, $p<0.001$).¹⁸ The Mean \pm SD of age in our study was

39.93±13.97 years with an age range of 25-58 years. The size of abscess in Group-NA was 7.2±1.71 cm while this size was 6.96±1.56 cm in Group-I&D and majority of patients in both groups (73.33%) had abscess > 5 cm in diameter. The results of the primary outcomes of the study show significantly less time required for procedure in Group-NA compared to Group-I&D (7.2±1.54 Vs 19.96±2.77 minutes, p=0.000). These results are in line with the results shared by previous studies conducted with NA techniques for the treatment of breast abscess.^{14,15,16,18} We also stratified the results as per size of abscess and found that the procedure required less time for both the abscesses ≤5 cm and > 5 cm to 10 cm.

Similarly mean DHS was significantly less in Group-NA compared to Group-I&D (1.63 ± 1.06 Vs 3.23 ± 1.38 days, p=0.000). This benefit of shorter DHS was also shared by previous researchers and is valuable for surgeons for less work burden and for patients in relieving psychological and financial burden.^{14,15,17}

These results provide valuable evidence for the treatment of breast abscess for adopting more useful method than the traditional strategies for both surgeons and patients.

An additional advantage of the procedure is that the sample can be sent for diagnosis of possible carcinoma and thus operation can be avoided in that situation.

A review published in European Journal of Breast Health also stated that if the clinicians present at the primary health care centers refer the cases at early phase prior to complications, breast abscess can be resolved with minimum invasive procedure of needle aspiration combined with an antibiotic and the surgical incision can be avoided preserving the natural shape and skin of the breast.¹⁸

The major limitation of this study is small sample size and shorter follow up period. Future studies with longer follow up and higher number of patients can provide more useful data over the subject.

CONCLUSION

NA provides the major advantages of less time required for procedure and reduced need of hospital stay compared to I&D procedure in females with breast abscess. The method can be adopted on priority because it can be performed on immediate basis without the need of complete operation theater settings and does not need any specialty skills.

Author's Contribution:

Concept & Design of Study:	Afzaal Baig
Drafting:	Muhammad Waqid Bin Abdullah, Zubair Ahmad
Data Analysis:	Syed Muhammad Talha Bukhari, Haseeb Ahmad, Roshan Butt
Revisiting Critically:	Afzaal Baig, Muhammad Waqid Bin Abdullah

Final Approval of version: Afzaal Baig

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To Evaluate the Difference in Astigmatism on Keratometry Resulting from Temporal and Superior Corneal Incisions During Phacoemulsification

Astigmatism on Keratometry from Temporal and Superior Corneal Incisions During Phacoemulsification

Mohammad Ashraf, Nazullah, Samina Kareem, Mohammad Rafique and Sohail

ABSTRACT

Objective: To compare the average change in keratometry's medically induced astigmatism between corneal incisions made laterally vs laterally for phacoemulsification.

Study Design: Randomized Controlled Trial

Place and Duration of Study: This study was conducted at the Department of Ophthalmology, Khyber Institute of Ophthalmic Sciences HMC, Peshawar. From 21-07- 2022 to 21-01-2023.

Methods: A cohort of 140 individuals diagnosed with cataracts were assigned to two groups using a random allocation procedure. Patients in group A had a superior corneal incision, whereas patients in group B underwent a temporal incision for phacoemulsification. The keratometry values at baseline and follow-up were collected to calculate the average change in astigmatism between baseline and follow-up.

Results: Across the whole study population, the mean age of the patients was 49.6 ± 5.3 years. Patients in group B had a mean age of 50.4 ± 4.9 years ($p = 0.04$), compared to 48.9 ± 5.8 years in group A. When the sample was divided into groups based on gender, group A had 82.9% men and 17.1% women, whereas group B had 74.3% men and 25.7% women ($p = 0.217$). Group A's mean BMI was 24.9 ± 3.8 kg/m², whereas Group B's mean BMI was 25.2 ± 3.7 kg/m². In groups A and B, the mean baseline BCVA was 0.8 ± 0.2 and 0.8 ± 0.2 , respectively ($p = 0.858$). On keratometry, group A's mean baseline astigmatism was $0.2 \pm 0.06D$, whereas group B's was 0.1 ± 0.07 ($p = 0.614$). According to keratometry, group A's mean follow-up astigmatism was $1.2 \pm 0.2D$, whereas group B's was 1.1 ± 0.2 ($p = 0.836$). According to keratometry, group A's astigmatism changed by $1.0 \pm 0.17D$ and group B's by 1.0 ± 0.2 ($p = 0.707$).

Conclusion: In groups with corneal versus temporal incisions, we did not observe a statistically significant difference in the mean change in astigmatism before and after phacoemulsification. We recommend conducting more research with larger sample sizes and accounting for confounders that may have an impact on patients' surgically induced astigmatism following phacoemulsification, as our study was conducted with a smaller sample size and did not account for effect modifiers.

Key Words: Senile Cataract, phacoemulsification, temporal incision superior corneal incision, astigmatism, keratometry.

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INTRODUCTION

Cataracts cause most blindness worldwide. About 17.6 million people worldwide have bilateral cataracts, which cause 39% of blindness.

Department of Ophthalmology, Hayatabad Medical Complex, Peshawar.

Correspondence: Nazullah, Associate Professor of Ophthalmology, Hayatabad Medical Complex Peshawar.
Contact No: dr.naz40@yahoo.com
Email: 03335858978

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51.5% of avoidable blindness in Pakistan is cataract-related¹. About 3,560,000 Pakistanis have cataract-related visual impairment, and 570,000 are blind². Phacoemulsification is seldom utilized in poor countries like Pakistan, where cataract surgery is the norm, since it needs more sophisticated surgical training and expensive equipment. MSICS, a feasible alternative to phacoemulsification, is becoming increasingly popular in poor countries like Pakistan because to its early wound stability, minimum astigmatism, low complication rate, and affordability⁵. Because of its speed and bloodlessness, phacoemulsification via a clean corneal incision is the preferred cataract treatment. Most doctors have always had postop SIA (surgical-induced astigmatism). Better strategies provide greater SIAs than temporal ones⁶. Small (6 mm) and medium (6.5 mm) incisions induced the least

SIA7 compared to large (7 mm). Chevron incisions minimize SIA8 compared to straight and frown incisions. The corneal or keratometric SIA9 is the vector difference between preoperative and postoperative astigmatism. A study found that the mean SIA on the first, seventh, twenty-first, and forty-five postoperative days for temporal incision was 1.05 (± 0.58) D, while for superior corneal incision, it was 0.75 (± 0.58) D, 0.81 (± 0.54) D, 0.88 (± 0.49) D, and 0.91 (± 0.47) D¹⁰. Current study compares mean SIA of temporal vs. superior corneal incisions for phacoemulsification after cataract surgery¹¹. After a thorough literature search, we decided to conduct this study since there were few local data on the impact of phacoemulsification incisions on SIA and other outcomes. The surgeon must also decide how to avoid SIA from worsening during phacoemulsification¹². This study will compare the SIA of superior and temporal corneal incisions for phacoemulsification locally. Locally, the study's results will provide first-hand evidence for research implications and policy recommendations¹³.

METHODS

Each group's sample size was 70 based on the following hypotheses: Mean difference in SIA before and 21 days after surgery for the temporal group; 1.13 ± 0.56 D mean difference in SIA before and 21 days after surgery in the group with superior incisions; 0.88 ± 0.49 D Level of confidence: 95% Test power: eighty percent. The method of sampling used is consecutive (non-probabilistic) sampling.

Inclusion Criteria:

- All patients with cataracts are admitted for phacoemulsification.
- Adults with age above 40 to 65 years.
- Patients with baseline astigmatism equal to or less than 0.25D.
- Either gender.

Exclusion Criteria:

- Children with cataracts.
- Patients with a history of chronic glaucoma on medical records.
- Patients with blast injuries on history.
- Any history of ocular or refractive surgery in the past.
- The above-mentioned conditions act as confounders and if included will introduce bias in the study results.

Data Collection: CPSP research committee authorized the project. All OPD/ER cataract patients with baseline astigmatism of 0.25D or less were studied. All patients gave consent after being informed of the study's purpose and advantages. All patients had a thorough history, ophthalmologic exam, slit lamp, funduscopy, gonioscopy, and ultrasonographic biomicroscopy. The

lottery divided all patients into two groups. Group A patients got temporal and group B superior corneal incisions during phacoemulsification. One CPSP fellow ophthalmologist with at least five years of experience phacoemulsified all patients. On day one after surgery, all patients received nepafenac and post-phacoemulsification medication. Each patient received 0.1% Nepafenac eye drops three times a day for three months. After 21 days, astigmatism was measured before and after surgery using repeat keratometry. Data was input into a pre-designed proforma. To reduce confounders and bias in study, exclusion criteria were meticulously followed.

Statically analysis: Data was analyzed with SPSS 20. Mean+SD was computed for age, BMI, baseline visual acuity, baseline astigmatism, and follow-up astigmatism. Category factors like gender were computed by frequency and percentage. An independent sample T-test was performed to assess the mean change in astigmatism scores between two groups, with a p-value < 0.05 considered significant To assess effect modification, mean astigmatism change was stratified by age, BMI, baseline visual acuity, and gender using chi-square test with p-value < 0.05. All findings were shown in tables and graphs.

RESULTS

This research included 140 patients with age-related cataracts. Patients were randomly divided into two groups by lottery. Group A had a temporal phacoemulsification incision, whereas Group B received a superior corneal one. Research group patients averaged 49.6 ± 5.3 years old. B patients averaged 50.4 ± 4.9 years old (p 0.04), whereas A patients averaged 48.9 ± 5.8 . Table 1 compares aged groups in both groupings. Group A comprised 82.9% men and 17.1% women, whereas Group B had 74.3% and 25.7% (p 0.217). See Table 2. Group A had a mean BMI of 24.9 ± 3.8 kg/m² and group B 25.2 ± 3.7 . Mean baseline BCVAs for A and B were 0.8 ± 0.2 (p 0.858).

Table No. 1: Comparison of age categories in both groups (n = 70 each)

	Incision Groups		p value
	Superior corneal incision	Temporal incision	
40-50 years	40	35	0.397
Age Categories	57.1%	50.0%	
> 50-60 years	30	35	
	42.9%	50.0%	
	70	70	
Total	100.0%	100.0%	

Tables 3 and 4 indicate BCVA and BMI baselines. Keratometry indicated average baseline astigmatism of 0.2 ± 0.06 D for group A and 0.1 ± 0.07 for group B (p

0.614). Keratometry indicated group A's mean follow-up astigmatism was $1.2 \pm 0.2D$ and group B's 1.1 ± 0.2 (p 0.836). Keratometry indicated group A's astigmatism changed by $1.0 \pm 0.17D$ and group B's by 1.0 ± 0.2 (p 0.707). The following tables show both groups' mean astigmatism change by age, gender, BMI, and baseline BCVA.

Table No. 2: Comparison of gender between both groups (n = 70 each)

	Incision Groups		P value
	Superiorcorneal incision	Temporal incision	
Male	58	52	0.217
Gender	82.9%	74.3%	
Female	12	18	
	17.1%	25.7%	
Total	70	70	
	100.0%	100.0%	

Table No. 3: Gender Wise Stratification of Change In Astigmatism

Gender	Incision Groups	Mean	SD	P value
Male	Superior corneal incision	.9957	.16418	0.596
	Temporal incision	1.0135	.18606	
Female	Superior corneal incision	1.1500	.17321	0.038
	Temporal incision	1.0028	.18588	

Table No. 4: Bmi Wise Stratification of Change In Astigmatism

BMI (kg/m ²)	Incision Groups	Mean	SD	P value
195-25	Superior corneal incision	1.0361	.18921	0.110
	Temporal incision	.9621	.17508	
> 25-29.9	Superior corneal incision	.9864	.14734	0.295
	Temporal incision	1.0333	.16574	
> 29.9-32.5	Superior corneal incision	1.0458	.17896	.722
	Temporal incision	1.0773	.23808	
	Temporal incision	1.0071	.15024	

DISCUSSION

Cataract surgery has advanced. From ancient coaching to intracapsular to phacoemulsification cataract surgery. Without correction and prompt deployment, surgically induced astigmatism is the largest postoperative visual rehabilitation challenge. Surgeons tried hard to make SIA-reducing incisions¹³. Cataract surgery results depend on incision, method, type, mechanism, and IOL. Because they are better than sutured limbal incisions and scleral tunnels¹⁴, self-sealing transparent corneal incisions are popular globally. Clear corneal incisions reduce inflammation and discomfort. Compared to scleral tunnels, clear corneal wounds speed cataract surgery and recovery. SIA after surgery varies on wound location, size, architecture, surgeon position, and comfort. A little incision accelerates visual healing and lowers SIA. Several investigations compared astigmatism to tiny superior, superonasal, superotemporal, and temporal incisions. Phacoemulsification incision on the steepest corneal axis after cataract surgery may correct corneal architectural astigmatism. For astigmatism above 1 diopter, toric IOLs and peripheral corneal relaxing incisions worked. Modern cataract surgery reduces corneal astigmatism, improving vision. Incisions may modify corneal astigmatism, thus curvature must be checked before and after surgery. Both groups exhibited similar preoperative SIAs. Fair SIA scores were provided to patients. Poor eyesight increases SIA¹⁵. 60 temporal and nasal clean corneal eyes. Both groups assessed UCVA and BCVA 1 and 3 months post-surgery. At 3 months, group A had a mean UCVA of 0.25 ± 0.30 while group B had 0.17 ± 0.15 ¹⁶. Astigmatic results of temporal vs. nasal clear corneal incisions in phacoemulsification cataract surgery. Temporal patients had 30.00% WTR, 50% ATR, and 20% no astigmatism before surgery, whereas nasal patients had 40%, 25%, and 35%. A 6 mm foldable IOL and 3 mm temporal and nasal clear corneal incisions were used for 1.2D¹⁷ phacoemulsification. They said temporal incision lessened SIA than nasal. After one month, the temporal group had a mean SIA of $0.81 \pm 0.64 D$, whereas the nasal group had $0.92 \pm 0.53 D$. The temporal group saw a decrease in SIA to $0.53 \pm 0.39 D$ after 3 months, whereas the nasal group had $0.62 \pm 0.48 D$. Moon¹⁴ examined incision size, astigmatism efficiency, and stability. Three groups of 2.5, 3, and 3.5 mm self-sealing corneal lesions were examined. 1.05 D, 0.84 D, and 0.95 D were the SIA means for 2.5, 3.0, and 3.5 mm. 3.0 mm incisions were lowest SIA¹⁸ compared 2.75 mm temporal clean corneal incisions to the superior technique in 146 eyes. The temporal corneal incision was less SIA than the superior clear. A prospective randomized trial compared temporal and on-axis clean corneal incisions for SIA following phacoemulsification in mild to moderate astigmatism.

Temporal SIA was 0.34 D and on-axis 0.63 D at 2 months. Conclusion: clean corneal temporal incision decreased SIA more than axis. SIA was compared for temporal and superior 2.8 mm clean corneal incisions. The temporal group had a mean SIA of 0.63 ± 0.28 D, whereas the superior group had 1.00 ± 0.54 D, with significant differences ($p < 0.05$). A 2.8 mm clean corneal temporal approach outperformed a comparable superior incision¹⁹. examined how corneal wound size affects medically produced astigmatism following unsutured temporal clear corneal incisions and phacoemulsification. Compare 2.5 and 3.5 mm wounds. Vector analysis using Alpin's approach calculated SIA. At 2.5 mm incision, the mean SIA was 0.84 ± 0.53 D, whereas at 3.5 mm, it was 1.19 ± 0.81 D. 3.5 mm has a higher mean SIA. Vector analysis showed a mean 6-week SIA of 1.17 D and 12-month SIA of 1.04 D. The incision greatly impacted SIA²⁰. At 6 weeks, temporal incisions averaged 0.74 D and nasal 1.65 D. These levels dropped to 0.71 D and 1.41 D after 12 months. Say clean corneal incisions are tempting but hazardous. Endothelial cell loss, uneven astigmatism, and poor wound healing were drawbacks. Similar SIA changes (-0.15 – -0.32 D and 0.10 – 0.27 D) were discovered by another author. They only discovered statistically significant but modest clinically meaningful SIA differences between superior and 8 o'clock incisions.^{21,22} We detected significant parameter SIA differences between nasal and temporal and superior and temporal incisions, in addition to Giasanti et al.'s superior-nasal difference. Superior-temporal difference confirmed by Marek et al.

CONCLUSION

Astigmatism did not alter significantly before and after phacoemulsification in corneal and temporal incision groups. Our study had a small sample size and did not account for effect modifiers, so we recommend more studies with larger sample sizes and confounders that may affect surgically induced astigmatism in phacoemulsified patients.

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Author's Contribution:

Concept & Design of Study:	Mohammad Ashraf
Drafting:	Nazullah, Samina Kareem
Data Analysis:	Mohammad Rafique, Sohail
Revisiting Critically:	Mohammad Ashraf, Nazullah
Final Approval of version:	Mohammad Ashraf

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Analyzing the Reduction of Symptoms in Dacryocystorhinostomy Patients With and Without Silicon Intubation A Study Using Randomized Controlled Trials

Silicon Intubation VS
Dacryocystorhinostomy
in Treating
Nasolacrimal Duct
Blockage

Nazullah¹, Nuzat¹, Samina Karim², Mohammad Israr² and Romaisa²

ABSTRACT

Objective: To assess the efficacy of silicon intubation vs dacryocystorhinostomy in treating nasolacrimal duct blockage

Study Design: A Randomized Controlled Trial Study

Place and Duration of Study: This study was conducted at the Department of Clinical Ophthalmology, Khyber Girls's medical College, Hayatabad Medical Complex (HMC), Peshawar from 09th October 2022 to 9th April 2023.

Methods: 446 individuals with nasolacrimal duct obstruction (NLDO) were included in the research. Every patient was divided into two groups. Dacryocystorhinostomy (DCR) with silicon intubation was performed on Group A, whereas DCR without intubation was performed on Group B.

Results: The sample as a whole was 35.1 + 9.2 years old on average. Group A's mean age was 34.9 + 9.3 years, whereas Group B's mean age was 35.2 + 9.1 years (p 0.730). Males made up 61.9% of group A and 56.5% of group B, respectively (p 0.248). In group A, the mean duration of symptoms was 11 + 3.2 days, whereas in group B, it was 10.4 + 2.9 days (p 0.082). Upon follow-up, group A's effectiveness (measured by the total remission of symptoms) was 79.4%, whereas group B's was 69.5% (p 0.017).

Conclusion: When compared to DCR without intubation, silicon intubation greatly increases the effectiveness of DCR in individuals with NLDO.

Key Words: Nasolacrimal duct obstruction, dacryocystorhinostomy, intubation, silicon, and efficacy.

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INTRODUCTION

Total resistance to lacrimal irrigation with 100% regurgitation from the same or opposite punctum or a lacrimal sac mucocele without later reasons was characterized as primary acquired nasolacrimal duct obstruction (PANDO)¹. There have been many surgical techniques published since Cadweli's proposal of endonasal dacryocystorhinostomy (DCR) in 1893, including MMED and laser endoscopic DCR². Regardless of surgical approach, common reasons for DCR failure include synechial adhesion with middle

turbinate and/or nasal septum and expanding cicatricial closure for secondary healing with/without granuloma development³. There were several operational aides for endonasal endoscopic mechanical DCR. Examples of medical interventions included canalicular stenting, intraoperative or postoperative mitomycin C, and absorbable or non-absorbable materials packed with or without medication, such as topical steroids. Ophthalmologists began to favor DCR with silicone intubation in the 1970s. They recommended it because ostium's opening preservation improved surgical patency. Previous investigations have connected silicone stent failure to granulomatous inflammation. Recent research discusses DCR surgery with 4 silicone intubation⁴. The most popular technique for preventing rhinostomy closure is the use of silicone stents. By preserving fistula patency and postponing fibrous closure after healing, silicone intubation may enhance the results of endoscopic DCR⁵. Silicone stenting during endoscopic DCR is still up for discussion, however. According to some studies, the silicone stent may induce tissue granulation, which raises the possibility of adhesions, postoperative infections, punctal lacerations, and surgical failure⁶. There were conflicting findings from two meta-analyses on silicone intubation during endoscopic DCR⁵. Research has

¹. Department of Ophthalmology, Khyber Institute of Ophthalmic Medical Sciences, Peshawar.

². Department of Ophthalmology, Hayatabad Medical Complex, Peshawar.

Correspondence: Samina Karim, TMO Department of Ophthalmology, Khyber Institute of Ophthalmic Medical Sciences, Peshawar.

Contact No: 033351616042

Email: drsaminakarim@yahoo.com

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contrasted endoscopic DCR using silicone intubation with not using it⁷⁻¹². A previous research found DCR with silicon intubation efficient in 93.3% and failed in 6.7%. In another study, 90.3% of endoscopic endonasal DCR treatments were effective⁹. Silicone intubation increased success to 93.7% from 86.7% without it. The present study compares DCR success rates in our community's NDO patients with and without silicon intubation. We were prompted to perform this study after experiencing patient attrition with NDO and DCR failures, whether intubated or not⁹. The literature is vast, however, several studies were undertaken with small sample numbers and had inconsistent and equivocal findings. If silicon intubation is equally or more successful than not using it, we will discuss the study's results and urge local ophthalmologists to further research and regular use of it during DCR for NDO. This research will show local DCR success rates with and without intubation for NDO¹⁰.

METHODS

Hospital ethics and scientific committee authorized the study. The OPD department included all NDO patients (per operational criteria) in the study. Every patient supplied written informed permission after being informed of the research's goals and advantages. All patients had medical histories and ophthalmologic examinations. Block randomization divided patients into two groups. DCR patients in Group A received canalicular silicone stenting or intubation. Because Group B patients had DCR without silicon intubation, the silicone stent was inserted by both puncta and knotted in the nasal cavity to relieve canthal strain. One skilled CPSP fellow ophthalmologist performed all surgeries. After four weeks, all patients were evaluated for symptom relief and saline injection-confirmed duct patency. 58 Premade proformas documented all the aforementioned. Research bias and confounders were eliminated using a stringent exclusion procedure. The following are inclusion criteria: All 18–50-year-olds with main acquired nasolacrimal duct blockage, either gender. Congenital dacryocystitis and presacral occlusion such as canalicular blockage and punctual stenosis are excluded. • Atrophic rhinitis, chronic granulomatous disorders, and nasal tumors may affect surgery outcomes. • Previous lacrimal surgery failures. Epiphora after radiation/trauma. Confounders like this may affect research outcomes.

RESULTS

The study comprised 446 NLDO patients. Split all patients in two. Group A had silicon-intubated DCR, but Group B did not. Each group had 223 patients. The age distribution is in Table 1. The sample averaged 35.1 + 9.2 years. Group A averaged 34.9 + 9.3 years, whereas Group B averaged 35.2 + 9.1 years (p 0.730). Gender distribution is in Table 2. Group A had more

men than B, but B had more women. The mean symptom duration was 11 + 3.2 days in group A and 10.4 + 2.9 days in group B (p 0.082). See Table 3. Table 4 shows follow-up efficacy (symptom resolution). Group A had 79.4% DCR symptom remission following intubation, whereas group B had 69.5% (p 0.017).

Table No. 1: Comparison Of Age Between Both Groups (N=223 Each)

Age	DCR with silicon intubation No %		DCR without silicon intubation No %	
20-30 years	76	34.1%	74	33.2%
30-40 years	88	39.1%	86	39.0%
40-50 years	59	26.1%	62	27.8%
Total	223		223	

NO= number, % percentage, p value= 0.948

Table No. 2: Comparison Of Gender Between Both Groups (N=223 Each)

Gender	DCR with silicon intubation No %		DCR without silicon intubation No %	
Male	138	61.9%	126	56.5%
Female	85	38.1%	97	43.5%
Total	223	100%	223	100%

NO= number, % percentage, p value=0.248

Table No. 3: Comparison Of Duration Of Nldo Between Both Groups (N=223 Each)

Duration of NLDO	DCR with silicon intubation No %		DCR without silicon intubation No %	
5-10 days	77	34.5%	134	60.1%
10-15 days	146	65.5%	89	39.1%
Total	223	100%	223	100%

NO= number, % percentage, p value=0.01

Table No. 4: Comparison Of Efficacy Between Both Groups (N=223 Each)

Efficacy	DCR with silicon intubation No %		DCR without silicon intubation No %	
Yes	177	79.4%	155	69.5%
NO	46	20.6%	68	30.5%
Total	223	100%	223	100%

NO= number, % percentage, p value=0.017

DISCUSSION

Cryocystorhinostomy is the most frequent treatment for persistent dacryostenosis or nasolacrimal duct obstruction. Surgical DCR creates drainage between the nasal cavity and lacrimal sac¹¹. LA-DCR, EN-DCR, and EX-DCR are the three DCR methods. In the 1970s, ophthalmologists preferred silicone intubated DCR¹¹. They recommended its use and noticed that ostium opening preservation increased postoperative patency. Granulomatous inflammation increases silicone stent failure risk, according to prior studies¹². Recent work

discusses silicone intubation during DCR surgery from different views. This study examined DCR success with and without stents and compared it to previous studies¹³. In a 2011 meta-analysis of DCR for nasolacrimal duct blockage with and without silicone tubes, DCR had equal success rates¹⁴. The meta-analysis found no benefit to silicone stent intubation for major DCR. Since 2010, more prospective comparison studies have shown that silicone intubation in primary DCR increased the success rate of DCR without intubation by 68 percent, even if these benefits were not statistically significant. In a large randomized controlled trial,¹⁵ found that silicone intubation prevented the ostium from sealing, increasing DCR success. For effect size (population proportions 0.892 versus 0.943), sample size (111 and 105), and alpha (0.05, 2-tailed), the previous meta-analysis had four RCTs with a power of 0.274¹⁶. How silicone intubation would work during DCR surgery remained unknown. In the EX-DCR subgroup, DCR with intubation had a considerably greater success rate after surgery than DCR without intubation, according to this cumulative meta-analysis. Statistically significant change [RR, 1.06; 95%CI (1.02–1.11), $p = 0.006$]¹⁷. The finding varied considerably from the previous meta-analysis. The preceding meta-analysis's low statistical power and few trials may explain the discrepancies. If the research has a negative outcome, consider its power¹⁸. If not, researchers risk type II errors and abandoning promising medicines. "Meta-analysis" combines the data of numerous "combinable." independent studies. Weak included studies enhance statistical power, decrease random error, and increase sample size¹⁹. Intranasal tissue granulation, adhesion, infection, hemorrhage, punctural or canalicular laceration, tube displacement or loss, and conjunctival irritation were common after surgery²⁰. These concerns were linked to silicone tubes. The silicone tube may induce tissue granulation, a topic of controversy. Silicone intubation, an inorganic foreign material, may cause granulation and rhinostomy closure. Longari et al. found that stents decreased ostial size more. Turbinoseptal synaechia²¹, peristomal granuloma, and scar tissue produced most of this. The success rate for silicon stenting was 79.4% in 223 cases. Due to the endoscope, EnDCR has replaced the external DCR. Understanding the lateral nasal wall's anatomy and changes is crucial²². The orbicularis oculi muscle's pumping action may explain EnDCR's strong functional results. Silicon tubing prevents stoma fibrous closure, keeping the fistula open after surgical recovery. After EnDCR²³, patients who retained silicon tubes outperformed those who extruded them. In a recent study, silicon stent recipients had a 79.4% success rate, whereas non-stent recipients had 69.5%. According to another study, the stent group had a greater Epiphora resolution rate, although it was not statistically significant. Kakkar et al.¹⁹ and Unlu et al.²⁰ found that

silicon tubes in children cause complications, but they found no significant differences between silicon stent DCR and standard DCR. Silicon stents greatly increase primary DCR failure, according to a retrospective study²⁴. They advised against silicon stent placement unless there is a particular cerebral obstruction. Due to granulation tissue formation, silicon stents in DCR prevent osteotomy and common canalicular occlusion. The 91.3% effectiveness rate of this strategy matches Elmorsy et al. Study²³.

CONCLUSION

DCR with silicon intubation is significantly effective in patients with NLDO compared to DCR without intubation.

Recommendations: More randomized controlled studies with bigger sample sizes and multicenters are needed to establish the best local data to justify silicon intubation during DCR in NLDO patients.

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Author's Contribution:

Concept & Design of Study:	Nazullah
Drafting:	Nuzat, Samina Karim
Data Analysis:	Mohammad Israr, Romaisha
Revisiting Critically:	Nazullah, Nuzat
Final Approval of version:	Nazullah

Conflict of Interest: The study has no conflict of interest to declare by any author.

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Analyzing Genetic Influences on Facial Morphology Differences in Monozygotic Twins: A Retrospective Stereophotogrammetric Study

Genetic and
Environmental
Factors
Influencing
Facial
Development

Sara mannan¹, Gulmina Saeed Orakzai², Waqar-Un-Nisa², Misbah Ali³, Sobia Siddique²
and Nauman Bari Khan³

ABSTRACT

Objective: This retrospective study aimed to quantitatively assess soft tissue differences in facial morphology among monozygotic (MZ) twins using 3D stereophotogrammetry and surface-based analysis, aiming to provide insights into the interplay between genetic and environmental factors influencing facial development.

Study Design:

Place and Duration of Study: This study was conducted at the Department of Anatomy, Wateen Dental College, Rawalpindi from June 2022 to June 2023.

Methods: Twenty pairs of identical twins (8 males, 12 females) with an average age of 5 ± 1 year were included in the study. 3D stereophotogrammetry images were obtained and analyzed using the 3dMDface system. Soft tissue differences were quantified using surface-based analysis, dividing the face into anatomical thirds.

Results: The study demonstrated a high degree of agreement in measurements, with an intraclass correlation coefficient ranging from 0.907 to 0.995. Soft tissue differences within MZ twin pairs were quantified, revealing mean deviations and RMS values across the total face and facial thirds. Significant differences were observed between the upper and lower facial thirds, indicating varied genetic and environmental influences.

Conclusion: The study highlights the complex interaction between genetic predispositions and environmental factors in shaping facial morphology. Surface-based analysis using 3D stereophotogrammetry provides detailed insights into facial resemblance within twin pairs, emphasizing the importance of personalized treatment plans tailored to individual needs. Further research is needed to elucidate the intricacies of facial development and diversity.

Key Words: Monozygotic twins, facial morphology, 3D stereophotogrammetry.

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INTRODUCTION

The importance of facial shape and attractiveness in the personal and professional realms is greatly emphasized in the modern period. As a result, the capacity to affect facial shape and development has attracted growing attention and significance. The development of the craniofacial region is a complex process that is impacted by both environmental variables later in life

and genetic and cellular processes during embryonic stages.¹ Therefore, the modulation of these elements is critical to the effectiveness of changing the morphology of the face through orthodontic or orthopedic procedures. Understanding the interaction between genetic predispositions and the effects of the environment on facial development has been made possible via research, including twin and family studies. Monozygotic twin studies, which take into account aspects including hormones, diet, trauma, illnesses, habits, and dental activities, have yielded important insights into these relationships.² These twins do not necessarily share environmental exposures, but they do share genetic features.

Because face features are complex, two-dimensional (2D) imaging methods have traditionally been used in research evaluating facial morphology.³ While these approaches are valuable, they frequently miss important details. Facial morphology analysis has been transformed by advances in three-dimensional (3D) imaging technologies, such as cone-beam computed tomography, laser scanners, and 3D

¹. Department of Anatomy / Oral Pathology², Watim Dental College, Rawalpindi.

³. Department of Oral Pathology, Margalla Institute of Health Sciences, Rawalpindi.

Correspondence: Nauman Bari Khan, Associate Professor Margalla Institute of Health Sciences, Rawalpindi.

Contact No: 0300-9562903

Email: nauman@gmail.com

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stereophotogrammetry, which provide more precise and thorough evaluations. Comparisons within 3D imaging techniques might be surface-based or landmark-based.⁴ Surface-based comparisons are preferred because they may evaluate deviations throughout the entire face in three dimensions, instead of just concentrating on particular points, which is advantageous given the intricacy of facial features.⁵

Only a small number of studies investigating the morphology of the face in monozygotic twins have used surface-based comparisons, with most using landmark-based comparisons. These studies have brought attention to the effects of heredity on particular facial regions, including the protrusion of the upper lip and the midface. Surface-based analysis have highlighted the individuality of each person's facial characteristics by revealing quantifiable differences between twin pairs.⁶ Variations in facial regions across monozygotic twins highlight the importance of environmental factors even when they have similar genetic makeup. This emphasizes how important it is to use personalized treatment plans that are suited to the particular needs of every patient, including identical twins. The current work set out to examine discrepancies in different facial regions using 3D stereophotogrammetry, as well as to quantitatively measure soft tissue variations across monozygotic twin pairs over the entire face.

METHODS

The data for the retrospective study came from the records of the study was conducted at the Department of Anatomy, Wateen Dental College, Rawalpindi, and included twenty pairs of identical twins, 8 boys and 12 females, with an average age of 5 ± 1 year, drawn from June 2022 to June 2023. For this study, we looked for participants who met the following criteria: (1) good dental and skeletal alignment (Class I or mild Class II), (2) no previous orthodontic interventions, (3) no record of facial trauma or surgeries, (4) no craniofacial syndromes diagnosed, and (5) high-quality 3D stereophotogrammetry images not showing orthodontic treatments. Prior genetic testing for unrelated investigations confirmed zygosity.

Data Collection and Measurements: By combining the 3D stereophotogrammetric images with the 3dMDface, comparing the twins' soft tissues became a breeze. The six cameras, which can shoot simultaneously from varying angles and distances, are housed in two separate modular components. For the sake of uniformity, each participant sat on a height-adjustable chair and looked into a mirror mounted on the wall to see their head posture. Calibration of the system was required before the taking of each picture. First, we cropped the images by removing the areas around the ears, hair, and neck using the 3dMDvultus version 2.1 program developed by 3dMD Inc. After

that, we approximated the twin pairs' 3D pictures using global registration.

Once the 3D files were converted to the stereolithography format, they were then imported into the 3-matic program. Within the program, the twin pairs' approximated 3D images underwent further superimposition using the best-fit algorithm, which is based on the iterative closest point method. Dividing the face into thirds allowed us to draw separate lines for the upper lip and the lower lip and chin. By comparing segmented and superimposed regions, the software's "part comparison" capability enabled 3D deviation assessments.

For 95th percentile meshes, the histogram generated an RMS value and a colour map automatically; the colour map also supplied the mean deviation. Achieved automatically by the programme, the root-mean-square (RMS) value is the result of squaring the sum of all values. Results were given with median values and the interquartile range (Q1, indicating the 25th percentile and Q3, representing the 75th percentile, respectively), and the same author oversaw data preparation, measurement, and analysis.

RESULTS

At 10-day intervals, the same researcher independently repeated all measurements. A high degree of agreement was shown by the intraclass correlation coefficient, which varied from 0.907 to 0.995 and is used to determine intraexaminer reliability.

Table No. 1: Descriptive statistics for soft tissue differences within MZ twin pairs for the total face.

Measurement	Mean \pm SD
Mean Deviation	0.09 ± 0.24 mm
RMS Value (95th Percentile)	1.02 ± 0.23 mm
Median (Interquartile Range)	-0.54 ± 0.28 mm, 0.08 ± 0.2 mm, 0.72 ± 0.28 mm

Table 1 displays descriptive data for differences in soft tissues throughout the entire face within pairs of MZ twins. You can learn more about the average deviation and total variance in soft tissue differences from the measures, which include the RMS value (95th percentile) and the mean deviation. When looking at the distribution of soft tissue differences within twin pairs, median values with interquartile ranges provide a more thorough picture.

Table No. 2: Soft tissue differences between facial thirds within MZ twin pairs.

Facial Thirds	Mean Deviation (mm)	RMS Value (mm)
Upper	0.11 ± 0.23	0.855 ± 0.21 mm
Middle	0.13 ± 0.44	0.92 ± 0.22
Lower	-0.2 ± 0.42	1.16 ± 0.35 mm

Table 2 explores the variations in soft tissues between the thirds of the face in MZ twin pairs. You can see the differences between the top, middle, and bottom face thirds in the table, which shows the mean deviation and RMS value. These numbers provide light on why identical twins' soft tissue morphologies differ in certain areas of the face.

Table No. 3: Soft tissue differences between upper lip and lower lip + chin region within MZ twin pairs.

Lip Region	Q1	Median	Q3
Upper Lip	-0.68 ± 0.65	-0.19 ± 0.65	0.39 ± 0.65
Lower Lip + Chin	-0.99 ± 1.3	-0.30 ± 1.29	0.48 ± 1.38

Table 3 compares the soft tissue characteristics of the upper lip, lower lip, and chin areas of identical twins from MZ. To fully grasp the distribution of soft tissue differences, the table gives quartile data, which includes Q1, median, and Q3 values, for both regions. Twin pairs' subtle differences in soft tissue morphology between the top lip and lower lip + chin regions are shown by these statistics.

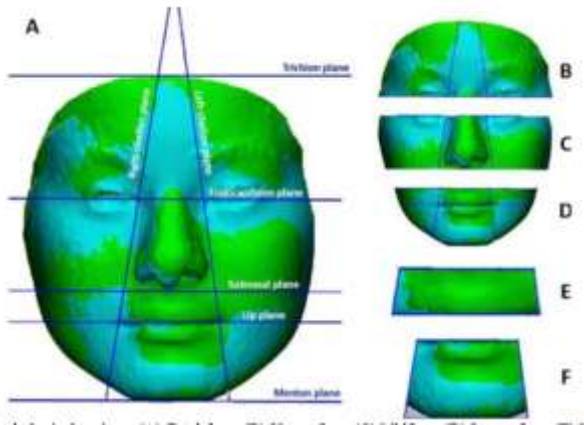


Figure No. 1: Morphological regions. (A) Total face. (B) Upper face. (C) Midface. (D) Lower face. (E) Upper lip. (F) Lower lip + chin

DISCUSSION

Twin studies offer a unique opportunity to delve into the complex interplay between genetic and environmental factors affecting facial morphology. Our retrospective study aimed to quantitatively assess facial soft tissue differences among MZ twins using stereophotogrammetry and surface-based 3D deviation analyses, aiming to contribute numerical insights into facial resemblance within twin pairs.⁷ While existing literature has explored facial similarities in twins, most studies relied on landmark-based comparisons, potentially overlooking comprehensive facial assessments.^{8,9}

In our study, we opted for stereophotogrammetry, a noninvasive, rapid, and reliable imaging method,

renowned for its accuracy and reproducibility. By capturing 3D images under standardized conditions, we ensured consistency and accuracy in our measurements. Additionally, we used anatomically defined facial thirds, a method proven to be reliable in previous studies, to facilitate precise comparisons.

Our findings revealed an RMS value of 1.01 ± 0.22 mm for the total face within MZ twin pairs, differing from previous research likely due to methodological disparities, age variations, and ethnic differences. Dividing the face into thirds allowed for more nuanced analyses, revealing mean deviations ranging from 0.11 to -0.2 mm, with no significant differences observed among facial thirds. These results align with prior research by the author, underscoring the consistency of facial similarity across different regions.^{9,10}

However, a notable difference emerged in the RMS value between the upper and lower facial thirds, suggesting varied genetic and environmental influences across facial regions.^{11,12} Landmark-based studies corroborated our findings, indicating stronger genetic contributions to the upper lip and greater environmental influences on the lower face, including the chin and lips.

Interestingly, our comparison of the upper lip and lower lip + chin regions revealed a significant difference in RMS values, reflecting the differential impact of genetic and environmental factors on these regions. While previous studies predominantly emphasized genetic influences on the upper lip, our findings hint at stronger environmental contributions to the lower face, consistent with existing literature albeit employing different methodologies.^{13,14,15}

Despite strengths such as the inclusion of MZ twin pairs of similar ages and geographic backgrounds, our study had limitations, including a small sample size of growing individuals and the absence of considerations for factors like body mass index and medical conditions that may affect soft tissue. These limitations underscore the need for further research to elucidate the intricacies of facial resemblance within twin pairs.

CONCLUSION

In summary, the investigation of facial morphology in twin studies reveals an intriguing interaction between environmental factors and genetic predispositions. Using 3D deviation analyses and the most recent stereophotogrammetry, our retrospective investigation sought to measure soft tissue differences between identical twins. Our study used a surface-based technique to provide a more thorough knowledge of facial likeness within twin pairs, whereas earlier studies mostly relied on landmark-based comparisons. Standardised and precise measurements were made possible by the application of stereophotogrammetry, which is well known for its accuracy and noninvasiveness. We enabled detailed comparisons by

dividing the face into anatomical thirds, which clarified the distribution of soft tissue variations across facial regions.

According to our research, identical twin twins exhibit a complex facial resemblance landscape. Although there was a noticeable similarity between the upper and lower face thirds, there were noticeable differences that suggested differing genetic and environmental factors. Studies using landmarks supported these findings, showing that the lower face was more influenced by the environment while the upper lip was more strongly influenced by genetics. Significant differences in soft tissue shape between the regions of the top lip and lower lip + chin were of special interest, suggesting different genetic and environmental influences. This discovery casts doubt on earlier theories of genetic domination in the upper lip region and highlights the necessity of a comprehensive understanding of face development.

Recommendation: Further research is necessary due to limitations such as sample size constraints and the failure to account for confounding factors, despite the study's merits, which include a standardized methodology and the inclusion of twin pairs with similar demographics. Future studies should aim to clarify the intricate interactions between environmental factors and genetic predispositions that affect the morphology of the faces in twin pairs, improving our knowledge of the diversity and development of the human face.

Author's Contribution:

Concept & Design of Study:	Sara Mannan
Drafting:	Gulmina Saeed Orakzai, Waqar-Un-Nisa
Data Analysis:	Misbah Ali, Sobia Siddique, Nauman Bari Khan
Revisiting Critically:	Sara Mannan, Gulmina Saeed Orakzai
Final Approval of version:	Sara Mannan

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Frequency of Coronary Artery Disease in Chronic Hepatitis C Infected Non Cirrhotic Patients

Coronary Artery
Disease in
Chronic
Hepatitis C

Abdul Qadir¹, Ayesha Hanif¹, M Bilal Nasir¹, Maryam Arshad², Ghias Un Nabbi Tayyab³ and Sikandar Maqsood¹

ABSTRACT

Objective: To determine the prevalence of coronary artery disease in individuals with chronic hepatitis C infection who are not cirrhotic.

Study Design: Cross sectional study

Place and Duration of Study: This study was conducted at the Department of Gastroenterology, Lahore General Hospital, Lahore from 29-5-2019 to 29-11-2019.

Methods: A total of 150 individuals who fulfilled the study's inclusion criteria were recruited. Participant demographics and permission forms were collected. The individuals were then tested for CAD symptoms. CAD was diagnosed based on the results of an exercise tolerance test and the clinical criteria. Data was analyzed using SPSS ver. 21.

Results: In this study, the mean age of individuals was 42.54 ± 4.76 years; male to female ratio of 1.03:1. The history of smoking was found in 54(36%) individuals. Out of 150 hepatitis C individuals, the CAD was found in 82(54.67%) individuals.

Conclusion: According to this study, the frequency of CAD is 54.67% in chronic HCV infected non cirrhotic individuals.

Key Words: Chronic Hepatitis C, Coronary Artery Disease, Non-Cirrhotic, Hepatitis-C, diagnose

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INTRODUCTION

Worldwide, cardiovascular illnesses are among the leading causes of death and disability. Since the previous several decades, high-income nations have seen fewer fatalities from cardiovascular disease, while low- and middle-income countries have borne an increasing share of the burden.¹ More than a quarter of the world's population lives in a country with a low or middling income, and people in South Asian nations like Pakistan, Sri Lanka, Bangladesh, India, and Nepal have a greater risk of developing coronary heart disease than those in other parts of the world.²

¹. Department of Gerontology, Gulab Devi Hospital, Lahore.

². Department of Dermatology, Jinnah Hospital, Lahore.

³. Department of Gerontology, Doctors Hospitals and Medical Center, Lahore.

Correspondence: Dr. Abdul Qadir, Senior Registrar, Gerontology, Gulab Devi Hospital, Lahore.

Contact No: 03322368486

Email: dr.abdul6710@gmail.com

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Coronary artery disease (CAD) is more common among South Asian individuals than in Chinese or Canadian individuals, according to a large population-based cohort research.³

Chronic hepatitis C is known to increase the risk of atherosclerosis and heart disease by contributing to insulin resistance and metabolic syndrome. Consequently, it may be assumed that the elevated risk of metabolic syndrome associated with chronic hepatitis C also applies to the risk of myocardial infarction.⁴ It has been reported that the risk of CAD was OR: 1.382 (95% CI: 1.103, 1.732) is significantly associated with hepatitis C.⁵ In a meta-analysis by a researcher found that in HCV-infected individuals 48.2% had CAD.⁶ While another study reported prevalence of CAD in 69.8% individuals of HCV individuals.⁷

The purpose of this research is to determine the prevalence of CAD in people who have chronic hepatitis C. There is conflicting evidence in the medical literature about how often coronary artery disease (CAD) occurs in individuals with chronic Hepatitis C infection, and the literature that does exist tends to be either out of date or poorly done. However, there is a dearth of available data about the incidence of CAD in individuals with chronic hepatitis C. As a consequence, we propose this research to collect new information that may be used to improve future care protocols and to

begin screening for CAD in individuals with chronic hepatitis C.

METHODS

Study Design: It was cross sectional study was done at Department of Gastroenterology, Lahore general Hospital, Lahore during the time period from 29-5-2019 to 29-11-2019.

Sample Size: In this study the sample size was calculated as 150 cases. The calculation was done by keeping 95% confidence level, 5% margin of error with prevalence of CAD i.e. 48.2% in individuals with hepatitis C.¹ the sample calculation was method was used by following non-probability and consecutive methodology.

Selection of patients: Inclusion: Individuals of age 35-50 years from both genders (male and female), diagnosed with chronic hepatitis-C infection as per operational definition and are non-cirrhotic i.e. with Child-Turcotte-Pugh class A were enrolled in the study. Hepatitis-C infection was defined as presence of HCV RNA >10-cells in blood (positive serology) on ELISA method diagnosed at least from 6 months.

Exclusion: Individuals with Hepatitis-C related compensated or decompensated liver disease (Child-Pugh class B or C), CAD before diagnosis of hepatitis-C and already taking treatment, treated for Hepatitis C and achieved sustained viral response were excluded from the study.

Data Collection Procedure: 150 individuals meeting the inclusion and exclusion criteria were included in the study from outpatient department (OPD). Informed consent was obtained and demographics like name, age, gender, duration of hepatitis-C were recorded. Then individuals were evaluated for symptoms of coronary artery disease (CAD) i.e. chest pain on exertion relieving on rest or dyspnea on exertion with +/- electrocardiography changes (ST depressions, T wave inversions). (ST depressions, T wave inversions) are abnormal electrocardiogram (ECG) findings that indicate possible cardiac ischemia or injury. ST depressions refer to a downward displacement of the ST segment on an ECG, suggesting myocardial ischemia or reduced blood flow to the heart muscle. T wave inversions refer to an abnormal inversion of the T wave, which can also indicate myocardial ischemia, myocardial injury, or other cardiac abnormalities. These ECG changes are important markers of cardiac health and may warrant further evaluation and treatment by a healthcare professional.

CAD was labeled if patient have symptoms like chest pain on exertion (relives on rest) dyspnea on exertion, and positive exercise tolerance test (i.e. electrocardiography findings of ST segment depression or elevation of >1mm OR exercise induced hypotension OR exercise induced angina). All of the information was stored on custom-made Performa.

Data Analysis: IBM-SPSS version 21 was used to enter and analyses the data. For quantitative factors like age and Hepatitis C incubation period, the mean and standard deviation were reported. Qualitative characteristics such as sex and CAD presence were converted to frequency and percentage.

RESULTS

In this study, 76(50.67%) individuals were male while 74(49.33%) individuals were females with male-to-female ratio of 1.03:1. According to our study results, the history of smoking was observed in 54(36%) individuals. Out of 150 individuals the symptoms of the disease were found in 67(44.7%) individuals. According to our study results, the exercise tolerance test (ETT) positive findings were present in 83(55.3%) individuals. Out of 150 hepatitis C individuals, the CAD was found in 82(54.67%) individuals. The values are shown in Table 1.

In individuals with age ≤ 45 years the CAD was observed in 60 (51.3%) individuals while among individuals with age >45 years the CAD was observed in 22 (66.7%) individuals. Age had insignificant impact on occurrence of CAD in Hepatitis C individuals (p-value = 0.117). In male individuals, the CAD was observed in 43 (56.6%) individuals while among female individuals the CAD was observed in 39 (52.7%) individuals. Gender had no relationship with occurrence of CAD in Hepatitis C individuals (p-value = 0.634). In underweight individuals, the CAD was found in 5 (50%) individuals, among normal BMI individuals the CAD found in 46 (51.7%) individuals while among overweight & obese individuals the CAD was found in 31 (60.8%) individuals. BMI had no significant impact on occurrence of CAD in Hepatitis C individuals (p-value = 0.309).

Table No.1: Basic demographics information of enrolled individuals (n = 150)

Values		Frequency	Percent
Gender	Male	76	50.67
	Female	74	49.33
Smoking	Yes	54	36
	No	96	64
Symptoms	Present	67	44.7
	Absent	83	55.3
ETT	Present	83	55.3
	Absent	67	44.7
CAD among hepatitis C individuals	Present	82	54.67
	Absent	68	45.33

In individuals with history of smoking, the CAD was found in 31 (57.4%) individuals whereas among individuals without history of smoking the CAD was found in 51 (53.1%) individuals. Smoking also showed insignificant relationship with CAD in hepatitis C

individuals (p-value = 613). In CAD individuals, the presence of symptoms was found in 49 (73.1%) individuals while absence of symptoms was found in 33 (39.8%) individuals. This difference was observed as significant (p-value < 0.001). The numerical value are shown in Table 2.

Table No.2: Comparison of CAD in different groups

Values		CAD		p-value
		Present	Absent	
Age (Years)	≤ 45	60	57	0.117
		51.3%	48.7%	
	>45	22	11	
		66.7%	33.3%	
Gender	Male	43	33	0.634
		56.6%	43.4%	
	Female	39	35	
		52.7%	47.3%	
BMI	Under-weight	5	5	0.309
		50.0%	50.0%	
	Normal	46	43	
		51.7%	48.3%	
	Over-weight & obese	31	20	
		60.8%	39.2%	
Smoking	Yes	31	23	0.613
		57.4%	42.6%	
	No	51	45	
		53.1%	46.9%	
Symptoms	Present	49	18	<0.001
		73.1%	26.9%	
	Absent	33	50	
		39.8%	60.2%	

DISCUSSION

Hepatitis C virus (HCV) infection is widespread (2.5% prevalence globally), resulting in chronic liver damage in 170 million persons. Multifactorial in origin, atherosclerosis is the leading cause of coronary artery disease (CAD), which is the most prevalent type of heart disease. Despite medical advances, CAD remains the leading cause of mortality, as well as a significant contributor to disability and diminished quality of life. The economic burden of CAD is substantial, making it a major public health concern.⁵

Only 82 (54.67%) of the 150 hepatitis C individuals in this research had CAD. Below, we describe the findings of a few of these investigations.⁸ The incidence and severity of CAD were shown to be significantly greater in HCV-infected individuals, according to a case control study. In other study, HCV-infected individuals had a higher prevalence of CAD (69.8% vs. 47.6%, p = 0.01), a higher modified Reardon's severity score (6.26 5.39 vs. 2.6 3.03, p 0.0005), and a higher prevalence of severe multivessel CAD (defined as >50% stenosis in 2 vessels involved;

57.1% vs. They found that almost half (48.1%) of those with HCV also suffered from CAD.⁹⁻¹⁰

Individuals with HCV infection are at an increased risk of CAD, as shown by researcher that due to the low quality of the bulk of published research on this subject, definitive findings are elusive.¹¹ According to another research, 69.8 percent of those with HCV also had CAD.⁷ Hepatitis C has been linked to an increased risk of coronary artery disease, with an odds ratio (OR) of 1.382 (95% CI) of 1.103 to 1.732.¹²

In an other study, US veterans for 5 years, completed the biggest epidemiological research to date (including 82 083 HCV-infected and 89 582 HCV-uninfected individuals). While HCV-infected individuals tended to be younger and have a healthier cardiometabolic risk profile, the data indicated that they were also much more likely to suffer from cardiac illnesses such as myocardial infarction, congestive heart failure, and the need for coronary artery bypass grafting or coronary angioplasty.¹³

In also other study, which included 139 individuals who tested positive for HCV and 225 individuals who tested negative for HCV; they found that HCV infection was an independent predictor of greater coronary atherosclerosis, as evidenced by a higher Reardon severity score.¹⁴ In a random effects model, an other researcher found that the overall RR of HCV infection for CAD was 1.25 (95% CI: 1.12-1.40). The pooled odds ratio (OR) for HCV infection and CAD was 1.94 (95% CI, 1.56-2.38), based on analyses of case-control and cross-sectional studies. This meta-analysis did not detect any publication bias. Infection with HCV was shown to increase the likelihood of developing CAD in this meta-analysis.¹⁵

According to the findings of the study conducted by an other author, the prevalence of HCV antibody positive individuals referred for coronary angiography was approximately 30.3%, and CAD individuals who are HCV antibody positive had more severe coronary lesions and less prevalence of diabetes and hypertension than HCV antibody negative individuals. It will be important for future research to validate this finding and to assess the strength of the correlation between the two variables. Careful management of confounders and accurate reporting should be at the forefront of future studies.¹⁶⁻¹⁷

CONCLUSION

According to this study the frequency of CAD is 54.67% in patient with chronic hepatitis C infected non cirrhotic individuals. The findings underscore the portent of heightened vigilance and potential early screening for cardiovascular risk factors in the patients.

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Author's Contribution:

Concept & Design of Study: Abdul Qadir
 Drafting: Ayesha Hanif, Bilal Nasir
 Data Analysis: Maryam Arshad, Ghias Un Nabbi Tayyab, Sikandar Maqsood
 Revisiting Critically: Abdul Qadir, Ayesha Hanif
 Final Approval of version: Abdul Qadir

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Frequency of Celiac Disease in Patient Presenting with Iron Deficiency Anemia Referred For Endoscopic Evaluation in a Tertiary Care Hospitals

Ayesha Hanif¹, Abdul Qadir¹, Maryam Arshad², M Bilal Nasir¹, Ghias Un Nabbi Tayyab³ and Sikandar Maqsood¹

ABSTRACT

Objective: To determine the prevalence of celiac disease among patients referred for endoscopic assessment at a tertiary care hospital for the treatment of iron deficient anemia.

Study Design: Cross-sectional study

Place and Duration of Study: This study was conducted at the Department of Gastroenterology, Lahore general Hospital, Lahore during the time period from 7-2-2019 to 7-8-2019.

Methods: The 205 patients that were enrolled all met the inclusion criteria. A blood sample was drawn for anti-tTG level. If $>15\text{IU/ml}$, then patient sent for upper gastrointestinal endoscopy and duodenal biopsies and if they are significant for celiac disease, it was labeled. All data was analyzed in SPSS version 21.

Results: In this study the mean age of the patients was 40.85 ± 13.10 years, male to female ratio of the patients was 0.79:1. The mean value of anti tTG of the patients was 14.66 ± 9.11 u/ml. Among IDA patients the celiac disease found in 27(13.17%) patients.

Conclusion: According to this study the frequency of celiac disease is 13.2% in patient presenting with IDA who were referred for endoscopic evaluation.

Key Words: Iron Deficiency Anemia, Celiac Disease, Endoscopy, Patients, Hospitals

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INTRODUCTION

The World Health Organization (WHO) defines iron deficiency anemia (IDA) as a hemoglobin level of 12 g/dL or lower for women and 13 g/dL or lower for males for more than three months in the absence of illness. Using hemoglobin as a reference, IDA is classified as moderate when hemoglobin is between 7 and 10.9 g/dL and as severe when hemoglobin is below 7 g/dL.¹ The incidence of IDA is higher than any other kind of anemia in people.² Celiac disease has been linked to low iron levels, an essential vitamin.

¹. Department of Gerontology, Gulab Devi Hospital, Lahore.

². Department of Dermatology, Jinnah Hospital, Lahore.

³. Department of Gerontology, Doctors Hospitals and Medical Center, Lahore.

Correspondence: Dr. Ayesha Hanif, Senior Registrar, Gulab Devi Hospital, Lahore.

Contact No: 03334966868

Email: dr.ramay@yahoo.com

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IDA may be a secondary complication of well-established celiac disease, or it might be the first thing a patient notices if they have the condition.³

Adversely affecting child morbidity, mortality, and cognitive development, IDA is a known public health concern. There is a lack of data on the real incidence of IDA and its predictors in Pakistan. Some individuals are predisposed to developing celiac disease because their immune systems develop a lifelong sensitivity to gluten.⁴ IDA is an extra intestinal symptom of celiac disease that is often seen. Patients with iron deficiency anemia should be tested for celiac disease, according to guidelines. However, the prevalence of celiac disease among IDA patients is inconsistently reported.^(1, 2) According to one research, only 7.14 percent of IDA patients suffer from celiac disease. However, another research found that the frequency of celiac disease was nearly four times higher in individuals with IDA, at 27.27%. One research found that 42% of those diagnosed with IDA also had celiac disease.⁵

The purpose of this research is to determine the prevalence of celiac disease among patients who arrive to a tertiary care hospital with IDA. The literature shows that the development of celiac disease in IDA patients is quite rare. However, there are conflicting reports in the literature on how common celiac disease is among people with IDA.⁶ That's why we want to

undertake this research: so that we can use what we learn to inform future preventative and management efforts in this area.

METHODS

The cross-sectional study was performed in the Department of Gastroenterology, Lahore general Hospital, Lahore, during the time period of 6 months i.e. 7-2-2019 to 7-8-2019. Sample size of 205 cases is calculated with 95% confidence level, 3.5% margin of error and taking expected percentage of celiac disease i.e. 7.14% in patients with IDA⁷. Non probability consecutive sampling methodology was used for sampling.

Selection criteria:

Inclusion Criteria: Patients of age 18-60years, either gender with diagnosed IDA, defined as the presence of serum Hb ≤ 12 & 13 g/dL in women & men respectively with serum Fe $< 12\mu\text{g/l}$ for > 3 months in the absence of infection were enrolled into the study. The patients were referred for endoscopy.

Exclusion Criteria: Patients with diagnosis of celiac disease before or after detection of anemia, already taking iron supplements for IDA for > 6 months were excluded from study.

Data Collection Procedure: Through the Outpatient Clinic of the Gastroenterology Division, 205 patients who met the study's inclusion and exclusion criteria were enrolled. Acquiring the participants' informed permission was a priority. Name, age, gender, body mass index, and IDA duration were recorded as a baseline. We used a BD 5cc syringe to collect the blood sample. For testing of anti-tTG(IgA), a sample was submitted to the hospital's pathology lab. Reports were assessed and if anti-tTG $> 15\text{AU/ml}$, then patient sent for upper gastrointestinal endoscopy (scalloped duodenal folds) and duodenal biopsies (> 25 IELs/100 epithelial cells, crypt hyperplasia, atrophic villi) and if they are significant for celiac disease, it was labeled. All the data was recorded in performa.

Data Analysis: IBM-SPSS version 21 was used for data entry and analysis. Mean and standard deviation were assessed from numeric variables. Frequency and percentages were assessed from categorical variables.

RESULTS

In this study 91 (44.39%) patients were male while 114 (55.61%) patients were female. Male to female ratio of the patients was 0.79:1. Out of 205 iron deficiency anemic patients the celiac disease found in 27 (13.17%) patients. Out of 205, scalloped duodenal folds were present in 27 (13.17%) cases, > 2 SIEL were present in 27 (13.17%) cases, crypt hyperplasia in 27 (13.17%) cases and atrophic villi in 27 (13.17%) cases. The resulted values are presented in Table 1.

The study results showed that among patients with age ≤ 30 years, the celiac disease noted in 10 (16.1%) patients whereas among patients with age > 30 years the celiac disease noted in 17 (1.9%) patients and this was found to be significant (p-value = 0.410). According to this study among male patients, the celiac disease noted in 12 (13.2%) patients whereas among female patients the celiac disease noted in 15 (13.2%) patients and this was noted as insignificant (p-value = 0.995). The study results showed that among patients with duration of IDA ≤ 3 years, the celiac disease noted in 7 (7.1%) patients whereas among patients with duration of IDA > 3 years the celiac disease noted in 20 (8.7%) patients and this was found to be significant (p-value = 0.015). The study results showed that among patients with normal BMI patients the celiac disease noted in 13 (11.7%) patients whereas among patients with overweight & obese BMI the celiac disease noted in 14 (22.6%) patients and this was observed as significant (p-value = 0.002). The numerical values are shown in Table 2.

Table No.1: Basic demographics of patients enrolled into the studies (n = 205)

Values		Frequency	Percent	
Gender	Male	91	44.39%	
	Female	114	55.61%	
Celiac disease	Yes	27	13.17%	
	No	178	86.83%	
Tests performed to detect celiac disease	Scalloped duodenal folds	Present	27	13.2%
		Absent	178	86.8%
	> 2 SIEL	Present	27	13.2%
		Absent	178	86.8%
	Crypt hyperplasia	Present	27	13.2%
		Absent	178	86.8%
	Atrophic villi	Present	27	13.2%
		Absent	178	86.8%

Table No.2: Comparison of celiac disease in different groups

Values		Celiac Disease		p-value
		Yes	No	
Age (years)	≤ 30	10	52	0.410
		16.1%	83.9%	
	> 30	17	126	
		1.9%	88.1%	
Gender	Male	12	79	0.995
		13.2%	86.8%	
	Female	15	99	
		13.2%	86.8%	
Duration of IDA (years)	≤ 3	7	91	0.015
		7.1%	92.9%	
	> 3	20	87	
		18.7%	81.3%	
BMI	Underweight	0	32	0.002
		0.0%	100.0%	
	Normal	13	98	
		11.7%	88.3%	
	Overweight & obese	14	48	
		22.6%	77.4%	

DISCUSSION

Gluten is a protein found in wheat, barley, and rye that triggers an immunological response in persons who are genetically predisposed to developing celiac disease. Failure to thrive, malabsorption, diarrhea, weight loss, vomiting, odd feces, and abdominal distention are all symptoms traditionally associated with celiac disease, which was thought to be an intestinal illness of infancy and adulthood. Celiac disease is characterized by IDA. Patients referred for evaluation of IDA had Celiac disease identified in 0% to 8.7% of studies employing serologic testing and small-bowel biopsies.⁸

The prevalence of celiac disease in our research was 27 (13.2%) among individuals who presented with iron deficiency anemia. Celiac disease was more prevalent in the younger age group (40 years old; 24 (75%); mostly female (22 (68.75%); and more prevalent in the Kashmiri community⁹ ($p=0.0002$). According to one research, only 7.14 percent of IDA patients suffer from celiac disease.

According to the findings of one research by Shahzad, Amir et al., Anti-tTG antibodies were positive in 27.27% of patients, while anti-endomysia antibodies were positive in 16.88% of cases.⁸ Prevalence About 12.99% (10/77) of the individuals who had underlying IDA were identified to have simultaneous celiac disease at the time of presentation. Patients with IDA were surveyed in Iran by an other author Mahmud Baghbanian et al to determine the prevalence of celiac disease.² Forty-two of the 402 IDA patients tested positive for celiac disease antibodies. All patients with a positive serology had pathological abnormalities (Marsh I, II, and III) in their small intestinal biopsies.¹⁰⁻¹¹ They determined that anti-tissue transglutaminase antibody screening for celiac disease should be performed routinely in individuals with IDA. Celiac disease may be a rare or common finding in patient with IDA. A prospective research conducted in Isfahan (Iran) and found that 13 patients (10%) were diagnosed with celiac disease.¹² The prevalence of celiac disease was 14.6% among 4120 IDA patients in research done in Tehran, Iran.¹³ Another Iranian research found that 6.3% of IDA patients also had celiac disease. Prevalence rates of 8.7% and 8.33% were found in American and Turkish research, respectively.^(3,4) The selection of patients and the frequency of celiac disease in different regions may also contribute to this discrepancy.

Another researcher found that celiac disease often had IDA as one of its first symptoms. Iraqi Medical Conference Transcripts, Volume 37. The author reported that 33.3% of anemic people with iron deficiency had celiac disease. However, another research found that the frequency of celiac disease was nearly four times higher in individuals with IDA, at

27.27%. However, one research found that 42% of those diagnosed with IDA also had celiac disease.¹⁴ Srihari Mahadev et al⁵ found a very low rate of celiac disease in their sample of IDA patients. They found 18 papers with a total of 2998 IDA patients to include in their analysis. Research was conducted in a variety of countries, including the UK, USA, Italy, Turkey, Iran, and Israel. Celiac disease had a crude un-weighted prevalence of 4.8% ($n=143$).¹⁵ The prevalence of biopsy-confirmed celiac disease in individuals with IDA was 3.2% (95% confidence range = 2.6-3.9), according to our weighted pooled analysis. However, there was a lot of diversity ($I^2=67.7\%$).¹⁶

CONCLUSION

This research found that 13.2% of patients with IDA who were referred for endoscopy also had celiac disease. The debate is gone, and the number of people diagnosed with celiac disease is small, but not negligible. The findings of this research will be used in the future to inform preventative and management strategies.

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Author's Contribution:

Concept & Design of Study:	Ayesha Hanif
Drafting:	Abdul Qadir, Maryam Arshad
Data Analysis:	M Bilal Nasir, Ghias Un Nabbi Tayyab, Sikandar Maqsood
Revisiting Critically:	Ayesha Hanif, Abdul Qadir
Final Approval of version:	Ayesha Hanif

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Salivary Biomarkers: A New Wave in Early Disease Detection and Diagnosis

Salivary
Biomarkers in
Early Disease
Detection

Faraj Alotaiby

ABSTRACT

Salivary biomarkers have emerged as a revolutionary tool in the field of medical diagnostics, offering a non-invasive, accessible, and cost-effective approach for early disease detection and monitoring. This review provides a comprehensive examination of salivary biomarkers, highlighting their diverse roles in diagnosing various health conditions. It delves into the composition of saliva and its diagnostic potential, underscoring the advantages of using saliva over other biological fluids and addressing the challenges associated with saliva collection and analysis. Significant advancements in technology that enhance the detection and analysis of salivary biomarkers are discussed, along with breakthroughs in identifying specific biomarkers for diseases such as cancer, cardiovascular diseases, diabetes, autoimmune disorders, and infectious diseases. Ethical and privacy considerations, particularly concerning consent and the implications of early disease detection, are critically examined.

Key Words: Salivary Biomarkers, Non-Invasive Diagnostics, Early Disease Detection, Technological Advancements in Healthcare, Biomarker Sensitivity and Specificity

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INTRODUCTION

Salivary biomarkers are biological molecules found in saliva that can be indicative of various health conditions or diseases. They include a wide range of substances such as enzymes, hormones, antibodies, and genetic materials.¹ The significance of these biomarkers lies in their potential to provide non-invasive, easily accessible, and cost-effective means for early disease detection and monitoring.² Unlike blood tests, which require venipuncture and can be more invasive and stressful for patients, saliva collection is simple and can be done without the need for specialized medical personnel or equipment.³ This aspect of salivary biomarkers holds great promise in transforming healthcare by enabling more widespread and frequent monitoring of health conditions, particularly in settings where traditional medical resources are limited.⁴

The present review paper is particularly important as it consolidates current knowledge and advances in the field of salivary biomarkers.

It aims to highlight the molecular mechanisms underlying these biomarkers, their clinical relevance, and the technological advancements that have enabled their detection and analysis. Furthermore, this review will discuss the challenges and prospects in the field, paving the way for further research and development. By providing a comprehensive overview of salivary biomarkers, this paper seeks to underscore their potential in reshaping diagnostic practices and contributing to the evolution of personalized medicine.

METHODS

To conduct a literature survey on Salivary Biomarkers, a search was conducted from July 2023 till December 2023 across various electronic databases, including PubMed, SCOPUS, EMBASE, COCHRANE library, and Science Direct. The search utilized MeSH terms/keywords such as "Saliva," "Biomarkers," "Diagnosis," and "Detection." In addition to the electronic search, cross-references and textbooks were manually searched for relevant articles. The inclusion criteria included articles published in the English language from July 2000 to July 2023 that fulfilled the study objectives. The article selection process involved assessing the inclusion and exclusion criteria, as well as conducting a quality assessment. Out of the initial 932 articles identified, 128 were selected based on their titles and abstracts. After evaluating the full texts and applying the inclusion and exclusion criteria, 33 articles were chosen for the review, meeting the study's criteria.

Department of Oral and Maxillofacial Diagnostic Sciences,
College of Dentistry, Qassim University, Saudi Arabia.

Correspondence: Dr. Faraj Alotaiby, Department of Oral and Maxillofacial Diagnostic Sciences, College of Dentistry, Qassim University, Saudi Arabia.

Contact No: +966 50 086 3652

Email: f.alotaiby@qu.edu.sa

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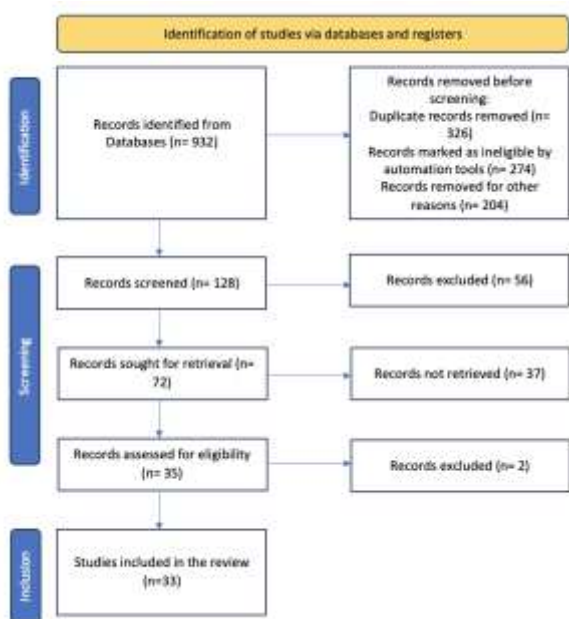


Figure No.1: Flowchart showing the step-by-step identification of the studies via databases

SALIVA AS A DIAGNOSTIC FLUID

Saliva is a multifaceted biofluid that plays a significant role beyond its traditional functions in digestion and oral health.⁵ Its complex composition includes proteins, enzymes, hormones, antibodies, nucleic acids, and cells

shed from the oral mucosa, as well as electrolytes and other small molecules.⁶ These components make saliva a reflective medium of the body's physiological and pathological states, offering a rich source of biomarkers for disease detection and monitoring.⁷ For instance, specific proteins in saliva can be indicators of oral health conditions and systemic diseases, while genetic material in saliva can reveal genetic predispositions or the presence of infectious agents.⁸ This comprehensive molecular profile underscores the diagnostic potential of saliva, positioning it as a critical tool in non-invasive health assessments.⁹

Advantages of Using Saliva over Other Biological Fluids: Saliva presents several advantages over other biological fluids such as blood in the context of diagnostic applications.¹⁰ Primarily, the collection of saliva is non-invasive, painless, and can be performed without the need for specialized medical staff or equipment, thereby reducing patient discomfort and the risk of infection.¹¹ This simplicity and ease of collection facilitate frequent sampling, which is crucial for monitoring health conditions over time or assessing the effectiveness of treatments.¹² Additionally, saliva collection is less costly compared to blood draws, making it a more accessible option for regular health monitoring in various settings, including remote or resource-limited environments.¹³

Table No.1: Composition and Diagnostic Potential of Saliva

Component	Description	Diagnostic Potential	Examples
Proteins	Enzymes, immunoglobulins, and other proteins.	Indicators of oral health, inflammatory conditions, and systemic diseases like cancer.	Cyclin D1 and CD44 in saliva has been linked to oral cancer
Hormones	Various hormones secreted into saliva.	Can indicate endocrine function and stress-related conditions.	Elevated levels of cortisol in saliva can indicate stress responses or disorders of the hypothalamic-pituitary-adrenal axis.
Antibodies	Immune proteins that respond to pathogens.	Useful in detecting infections and immune response status.	Presence of HIV antibodies and viral RNA in saliva
Nucleic Acids	DNA and RNA, including microbial genetic material.	Can reveal genetic predispositions, presence of pathogens, and cancer biomarkers.	Detection of HPV DNA in saliva can indicate an increased risk for certain types of oral cancers. Additionally, salivary RNA markers like miR-125a and miR-200a have been associated with oral cancer.
Electrolytes	Salts and minerals such as sodium, potassium, and calcium.	Reflect hydration status and electrolyte balance, potentially indicating metabolic disorders.	Elevated sodium levels in saliva may suggest dehydration, while abnormal potassium levels can indicate adrenal disorders such as Addison's disease.
Cells from Oral Mucosa	Cells shed from the lining of the mouth.	Can be used to detect local oral diseases, and potentially, systemic diseases.	Presence of abnormal or dysplastic cells in saliva can indicate oral cancers or precancerous conditions.
Metabolites	Products of cellular metabolic processes.	Can indicate metabolic conditions and provide insight into overall health.	Elevated levels of certain metabolites like lactate in saliva can indicate tissue hypoxia or intense physical exertion. Salivary uric acid, on the other hand, can be a marker for gout or kidney disorders.

Challenges in Saliva Collection and Analysis:

Despite its advantages, saliva collection and analysis present unique challenges. The composition of saliva can be influenced by various factors such as circadian rhythms, food intake, oral hygiene, and individual variability, which may affect the consistency and reliability of biomarker measurements.¹⁴ Additionally, the lower concentration of certain biomarkers in saliva compared to blood requires more sensitive and advanced analytical techniques for accurate detection and quantification.¹⁵ Ensuring the stability of biomarkers during collection, storage, and transport is also critical, as enzymatic activity and other biochemical processes in saliva can alter biomarker profiles. Addressing these challenges is essential for the reliable use of saliva as a diagnostic fluid in clinical settings.

ADVANCES IN SALIVARY BIOMARKERS

In recent years, significant strides have been made in harnessing the power of salivary biomarkers, driven by technological advancements and scientific discoveries.¹⁶ This has opened new avenues for non-invasive, cost-effective, and patient-friendly diagnostic methods, challenging the traditional reliance on blood and other invasive specimens.¹⁷ The following sections will delve into the latest technological developments in salivary diagnostics and the remarkable breakthroughs in identifying specific biomarkers for a variety of diseases. This exploration not only highlights the progress made but also sets the stage for future innovations that could revolutionize the way health conditions are diagnosed and managed.

Table No.2: Recent technological developments in salivary diagnostics

Technological Development	Description	Impact on Salivary Diagnostics
Nanotechnology-Based Sensors	Utilizes nanoscale materials to enhance sensitivity in detecting biomarkers in low concentrations. ¹⁸	Detection of early-stage diseases by identifying minute quantities of biomarkers. ¹⁹
Point-of-Care Devices	Compact, portable devices that facilitate on-site saliva testing, providing immediate results. ²⁰	Rapid, convenient, and frequent monitoring of health conditions.
High-Throughput Omics Technologies	Advanced techniques in genomics, proteomics, and metabolomics for comprehensive biomarker profiling. ²¹	Discovery of new biomarkers and provides a deeper understanding of disease mechanisms.
Microfluidic Technologies	Miniaturized devices for precise fluid handling with minimal sample volumes, improving analysis efficiency and cost. ²²	Enhances the feasibility of salivary diagnostics by reducing sample size requirements and streamlining the analysis process.
Digital and Mobile Health Integration	Incorporating salivary diagnostics with digital platforms, including mobile health apps for data tracking and analysis. ²³	Promotes patient engagement and personalized monitoring, enabling real-time health management.

Significant breakthroughs in identifying specific biomarkers for diseases:

To the esteemed medical community, recent breakthroughs in the field of salivary diagnostics have heralded a new era in disease detection and monitoring.²⁴ Salivary biomarkers have emerged as critical tools in the non-invasive diagnosis of a spectrum of diseases, providing a window into the body's pathological state through a medium that is easily accessible and patient-friendly.⁹ This advancement is particularly significant in oncology, where specific salivary biomarkers have been identified for early cancer detection, including but not limited to oral, breast, and pancreatic cancers.²⁵ In the realm of infectious diseases, saliva-based diagnostics have proven invaluable for rapid and non-intrusive screening, particularly evidenced in the detection of HIV and COVID-19. Additionally, the identification of salivary biomarkers in autoimmune diseases such as Sjogren's syndrome and systemic lupus erythematosus

offers a less invasive diagnostic alternative, enhancing patient comfort and compliance.²⁶ The implications in neurology are equally promising, with salivary biomarkers opening new pathways for monitoring neurological disorders like Alzheimer's and Parkinson's disease.²⁷ These breakthroughs not only underscore the immense potential of saliva as a diagnostic fluid but also align with the ongoing shift towards more personalized, patient-centred healthcare practices.

SALIVARY BIOMARKERS IN VARIOUS DISEASES

Biomarkers for Periodontal Disease: Periodontal disease can be effectively monitored using salivary biomarkers. Researchers have identified various biomarkers in saliva that are indicative of periodontal disease.²⁸ These include inflammatory cytokines such as interleukin-1 β (IL-1 β) and tumour necrosis factor-alpha (TNF- α), enzymes like matrix metalloproteinases

(MMPs), and bacterial by-products.²⁹ The presence and levels of these biomarkers correlate with the severity of periodontal disease, providing a useful tool for early detection, monitoring disease progression, and evaluating treatment responses.³⁰

Markers for Oral Cancer: In the realm of oral cancer, salivary diagnostics have shown promising potential in early detection and monitoring.³¹ Several biomarkers have been identified in saliva that are associated with oral cancer, including specific proteins, DNA

mutations, and RNA molecules.³² For instance, the overexpression of proteins such as cyclin D1 and CD44, as well as alterations in the levels of certain microRNAs, have been linked to oral cancer. Additionally, the presence of tumour-derived DNA in saliva offers a non-invasive means of detecting genetic alterations associated with malignancy.³³ These salivary biomarkers not only facilitate early detection of oral cancer but also aid in monitoring disease progression and response to treatment.

Table No.3: Salivary biomarkers and Systemic diseases

Category	Disease	Salivary Biomarkers	Clinical Relevance
Systemic Diseases	Cardiovascular Diseases	Biomarkers such as C-reactive protein, myoglobin, and troponin.	Early detection and monitoring of cardiovascular events
	Diabetes	Glucose levels, inflammatory cytokines, and glycoproteins.	Monitoring glucose control and detecting complications related to diabetes.
	Autoimmune Diseases	Autoantibodies and inflammatory markers specific to each condition.	Diagnosing and monitoring diseases like Sjogren's syndrome, rheumatoid arthritis, and systemic lupus erythematosus.
Infectious Diseases	HIV/AIDS	HIV antibodies and viral RNA.	Early detection and monitoring of HIV infection
	Hepatitis	Antigens and antibodies specific to hepatitis viruses.	Non-invasive screening and monitoring of hepatitis infections.
	Other Viral and Bacterial Infections	Pathogen-specific antigens and antibodies.	Rapid and non-invasive diagnosis of various infectious diseases.

CHALLENGES AND LIMITATIONS

Variability in Salivary Composition: One of the primary challenges in utilizing salivary biomarkers for diagnostic purposes is the inherent variability in saliva composition. This variability can be influenced by numerous factors including age, gender, diet, circadian rhythms, and overall health status of an individual. For instance, hormonal fluctuations can significantly alter saliva composition, potentially impacting the concentration of certain biomarkers. Furthermore, conditions like dehydration or salivary gland dysfunction can affect saliva flow and composition, thereby influencing biomarker levels.

Sensitivity and Specificity of Biomarkers: Another significant challenge in salivary diagnostics is ensuring high sensitivity and specificity of biomarkers. Sensitivity refers to the ability of a test to correctly identify those with the disease (true positive rate), while specificity relates to the test's ability to correctly identify those without the disease (true negative rate). Many salivary biomarkers, while promising, still face challenges in achieving the levels of sensitivity and specificity that are standard in more established diagnostic methods like blood tests. This limitation can lead to false positives or negatives, impacting the clinical utility of these tests.

Standardization of Collection and Analysis Methods: The standardization of saliva collection and

analysis methods is crucial for the reliability and reproducibility of results. Currently, there is a lack of standardized protocols for saliva collection, which can affect the integrity and concentration of biomarkers. Factors such as the time of day, method of stimulation, and collection technique can all influence the results. Additionally, the methodologies used in the analysis of saliva samples can vary significantly, leading to inconsistencies in data interpretation. Developing standardized, universally accepted protocols for saliva collection and analysis is essential to ensure the accuracy and comparability of salivary diagnostic tests across different settings and populations.

FUTURE DIRECTIONS

The future of salivary biomarkers holds great promise for transforming personalized medicine and integrating seamlessly with digital health technologies, revolutionizing individualized treatment plans, enhancing patient outcomes, and necessitating focused research, substantial funding, and collaborative efforts across academia, healthcare, and industry to translate innovations into clinical practice.

ETHICAL AND PRIVACY CONSIDERATIONS

Consent and Privacy in Biomarker Testing: The use of salivary biomarkers for disease detection and monitoring necessitates ensuring informed consent,

comprehensive patient education, and robust privacy protections to safeguard against unauthorized access or misuse of personal health information, thereby upholding ethical standards and fostering patient trust in healthcare.

Ethical Implications of Early Disease Detection: The ethical implications of early disease detection using salivary biomarkers encompass concerns regarding the psychological impact, potential stigma, and discrimination, necessitating comprehensive counselling and support for patients, as well as discussions about the right to choose not to know one's genetic risks, particularly in cases where effective treatments or preventive measures are unavailable.

CONCLUSION

The review highlights the potential of salivary biomarkers for early disease detection and monitoring, emphasizing technological advancements, challenges such as variability and ethics, and the promise of integration into personalized medicine and digital health for improved patient care.

Author's Contribution:

Concept & Design of Study: Faraj Alotaiby
 Drafting: Faraj Alotaiby
 Data Analysis: Faraj Alotaiby
 Revisiting Critically: Faraj Alotaiby
 Final Approval of version: Faraj Alotaiby

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Assessment of Systematic Reviews Abstract Reporting Quality in Periodontology Journals

Systematic
Review Quality
in Periodontology
Journals

Abdullah Almutairi¹ and Fahad Alharbi²

ABSTRACT

Objective: This study assessed the completeness of abstract reporting in periodontology systematic reviews based on PRISMA guidelines.

Place and Duration of Study: A manual search was conducted in three top periodontology journals (Journal of Periodontology, Journal of Periodontal Research, and Journal of Clinical Periodontology) for systematic reviews published from January 2018 to July 2022.

Methods: Eligible articles were independently screened by two authors. The PRISMA statement checklist was used to evaluate abstract quality. Descriptive statistics, linear regression, univariate analysis, and reliability assessments were performed using SPSS 29.00 software.

Results: We evaluated 1506 abstracts and included 87 systematic reviews with meta-analyses. The Journal of Clinical Periodontology (JOCPE) published the highest number of reviews (66%). The mean abstract reporting score was 54.8, with the highest scores found in studies from South America (60.8) and the Journal of Periodontal Research (JOPR) (mean score: 60). Most journals adequately reported objectives, eligibility criteria, included studies, and result synthesis, but lacked information on sources, bias, synthesis methods, evidence limitations, interpretation, funding, and registration. Univariate analysis showed statistically significant differences between journals ($p < 0.05$).

Conclusion: This study highlights areas for improving abstract reporting in periodontology systematic reviews. Adhering strictly to PRISMA guidelines is recommended to enhance reliability and transparency in periodontology systematic reviews.

Key Words: Systematic Reviews; Periodontology; PRISMA guidelines; Reporting Quality

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INTRODUCTION

Systematic reviews employ a comprehensive and rigorous approach to provide scientific evidence on diagnostic procedures and clinical protocols. As a result, they, along with meta-analyses, occupy the highest position on the evidence pyramid. These reviews utilize a meticulous study design, garnering significant academic interest, attention, and appraisal from researchers. Systematic reviews and meta-analyses prioritize transparency while minimizing bias by implementing a robust search strategy using reputable search engines and databases.

They offer authors a concise and well-defined overview of the available literature on a specific topic, enabling them to identify, organize, and evaluate all relevant research.^{1,2} They provide authors with comprehensive knowledge about research outcomes, help identify gaps in the research, enhance research methodology, and contribute to a deeper understanding of the research field.³ By incorporating a meta-analysis component into systematic reviews, researchers can obtain more robust results compared to relying solely on findings from randomized controlled trials (RCTs)⁴. In recent years, scientific publications have experienced a rapid rise, with a similar trend in the increasing number of systematic reviews and meta-analyses being conducted in both the medical and dental fields^{5,6}.

To ensure an accurate interpretation of study outcomes, it is necessary to properly manage the scientific reporting of research findings. The reporting process should be conducted meticulously by adhering to proposed guidelines, such as the standard guidelines for reporting scientific studies provided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). PRISMA facilitates transparent reporting of systematic reviews by offering a comprehensive checklist framework. By utilizing the PRISMA guidelines, researchers cover all important

¹. Department of Periodontology and Implant Dentistry, College of Dentistry, Qassim University, Buriyadah, Saudi Arabia.

². Department of Preventive Dental Sciences, College of Dentistry, Prince Sattam Bin Abdulaziz University, Al-Kharj 11942, Saudi Arabia.

Correspondence: Abdullah Almutairi, Associate Professor of Periodontology and Implant Dentistry, College of Dentistry, Qassim University, Buriyadah, Saudi Arabia.

Contact No: +966556056555

Email: dr.almutairi@qu.edu.sa

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aspects of their research, thereby ensuring that readers gain a comprehensive understanding of the study and its outcomes⁷. In different fields, including dentistry, there is a gap in proper reporting of systematic reviews with meta-analysis, including in the field of periodontology.^{1,7-9}

It has been observed that in a biomedical article, the abstract is the most important part that researchers read after the title. Various research studies are presented at conferences, and their abstracts are usually made available to readers in the proceedings. Sometimes, only the abstract of a study is accessible when the full text of the article is not available. Therefore, it is of utmost importance to maintain good reporting quality for these abstracts. Abstracts of systematic reviews should contain a well-organized summary that enables a rapid evaluation of the review's relevance and reliability. This structure also aids in the convenient retrieval of articles through electronic searches.¹⁰ A well-framed checklist is being provided by PRISMA for Abstracts (PRISMA-A) to the authors for summarizing the required portions of their systematic review for meeting the essential requirements of the readers. Limited studies have been conducted on evaluating the effect of the PRISMA-A for the reviews being published in the field of periodontology. Thus, the present study was conducted to assess the completeness of reporting the abstracts in systematic reviews in the field of periodontology as suggested by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines.

METHODS

To identify systematic reviews (with or without a meta-analysis) published between January 2018 and July 2022, a literature search was conducted manually, along with an electronic search, focusing on the top three journals in the field of periodontology with the highest impact factors according to the 2022 Reuters report: The Journal of Periodontology (JOP), the Journal of Periodontal Research (JOPR), and the Journal of Clinical Periodontology (JOCP). The terms "Systematic Review" or "meta-analysis" were used to search for relevant articles in the title, abstract, or methodology sections. Narrative reviews and unpublished conference abstracts were excluded. Two authors (FA and AA) independently screened and reviewed the abstracts based on predefined inclusion criteria. Disagreements were resolved through discussion to reach a consensus. A checklist comprising 12 items was developed based on the PRISMA statement to evaluate the quality of reporting in systematic review abstracts. Calibration of the authors was achieved through collaborative assessment of five abstracts against the checklist criteria. Each PRISMA item was rated as "Yes" if it applied and scored as "1," "No" if it did not apply and

scored as "0," or "NA" if it did not apply and was not included in the final score. A percentage score was calculated for each citation based on the sum of scores for the applicable items.

Additional information, such as the journal of publication, number of authors, affiliation of the lead author, and continent of publication, was collected for each study. In order to assess the consistency between examiners in scoring the PRISMA scores, a second examiner (FA) evaluated a randomly selected 10% sample of the articles. Three months after the initial data collection, the first examiner (AA) re-evaluated a second randomly selected 10% sample of the papers to determine the consistency within the examiner.

Statistical Analysis: The statistical analysis involved calculating descriptive statistics for each reporting item and systematic review (SR), which were then converted into a percentage scale. Linear regression modelling and univariate analysis were used to determine the characteristics associated with the mean score. Inter-correlation coefficient tests were conducted to evaluate both inter-examiner and intra-examiner reliability. A significance level of $p < 0.05$ was used to determine statistical significance. All analyses were performed using SPSS 29.00 (Stata Corp, College Station, TX, USA)

RESULTS

A total of 1,506 abstracts were initially assessed, and after reviewing them, 87 systematic reviews with meta-analyses were included in the current study.

The characteristics of all included systematic reviews, such as journal name, year of publication, number of authors, region, and settings, were evaluated and calculated. The proportion of published systematic reviews was found to be 5.7% of the published articles during the investigation period. Among the included reviews, 66% were published in the Journal of Clinical Periodontology (JOCP), followed by 29% in the Journal of Periodontal Research (JOPR), and 6% in the Journal of Periodontology. The majority of the published systematic reviews originated from Europe (63%) and were authored by academicians ($n=86$) from universities or mixed settings. The overall mean score for reporting abstracts was 54.8 (95% CI: 52.6 to 56.9), with the highest scores observed for studies conducted in South America (60.8; 95% CI: 55.9 to 65.6), followed by European-based systematic reviews with a mean score of 54.1% (95% CI: 50.9 to 57.2). However, the difference in scores between these regions was not statistically significant ($p\text{-value} > 0.05$). The Journal of Periodontal Research (JOPR) received the highest score among the journals (mean score: 60; 95% CI: 57.2 to 62.8) (Table 1).

Table No.1: Characteristics of the 87 SRs

Journal	Mean	N	%tage	Std. Deviation	95% CI
JOP	53.3	5	6%	4.6	47.6 to 59.0
JOCP	52.6	57	66%	11.0	49.7 to 55.6
JOPR	60.0	25	29%	6.8	57.2 to 62.8
Year					
2018	58.3	8	9%	4.4	54.6 to 62.1
2019	58.6	27	31%	11.01	54.8 to 62.4
2020	48.7	33	38%	9.7	42.3 to 52.2
2021	57.7	14	16%	8.3	52.9 to 62.5
2022	60.0	5	6%	10.8	46.5 to 73.5
Authors					
4 t 6 authors	55.2	8		11.7	45.3 to 65.0
Less than 4	54.0	58		10.4	51.3 to 56.7
More than 6	56.7	21		9.4	52.5 to 61.0
First continent					
Asia	56.1	11	13%	6.6	51.6 to 60.5
Africa	50.0	1	1%	.	.
North America	52.1	8	9%	5.9	47.1 to 57.0
South America	60.8	10	11%	6.9	55.9 to 65.6
Australia	50.0	2	2%	11.8	(-0.55 to 1.5)
Europe	54.1	55	63%	11.6	50.9 to 57.2
Settings					
Private	58.3	1	1%	.	.
University	55.0	77	89%	10.2	52.6 to 57.3
Mixed	52.8	9	10%	11.0	44.3 to 61.2
Total	54.8	87	100%	10.2	52.6 to 56.9

Table No. 2: Calculated score value of PRISMA-A checklist

Item	All Journals	JOP	JOCP	JOPR
Identify the report as a systematic review.	100%	100%	100%	100%
Objectives	97.7%	80%	100%	100%
Eligibility criteria (Inclusion and exclusion criteria)	89.9%	100%	87.7%	100%
Information sources(databases/registers)	48.9%	40%	38.6%	80.0%
Risk of bias	9.9%	0%	10.5%	12.0%
Methods of Synthesis results	12.0%	60%	12.3%	4.0%
Included studies	86.0%	100%	91.2%	92.0%
Synthesis of results	91.5%	100%	98.2%	100%
Limitation of evidence	1.1%	0%	1.8%	0.0%
Interpretation	33.3%	0%	12.3%	100%
Funding	47.4%	60%	64.9%	24.0%
Registration	10.2%	0%	14.0%	8.0%

Table No.3: Univariate linear regression derived coefficients (B) and 95% confidence interval with mean score of compliance with PRISMA-A as dependent variable for 87 SRs

Model		Unstandardized Coefficients	95.0% Confidence Interval for B	
Authors		B	Lower Bound	Upper Bound
	4 t 6 authors	Baseline (reference)		
	Less than 4	0.012	-0.065	0.089
	More than 6	0.027	-0.025	0.079
Continent				
	Europe	Baseline (reference)		
	Asia	0.02	-0.047	0.087
	Africa	-0.041	-0.246	0.164
	North America	-0.02	-0.097	0.057

	South America	0.067	-0.002	0.137
	Australia	-0.041	-0.187	0.105
Journal				
	JOCP	Baseline (reference)		
	JOP	0.007	-0.084	0.098
	JPR	0.074	0.027	0.12
Year				
	2020	Baseline (reference)		
	2018	0.096	0.023	0.168
	2019	0.099	0.051	0.147
	2021	0.09	0.031	0.149
	2022	0.113	0.024	0.201

The completeness of checklist items was also assessed, revealing that all journals (100%) reported the study type as a systematic review. Proper reporting of objectives was observed in 97.7% of the journals, while eligibility criteria were mentioned in 89.9% of the articles. Information about the included studies was reported in 86% of the abstracts, and the synthesis of results was mentioned in 91.5% of the articles. However, some items were inadequately reported in abstracts published in all journals, including information sources (48.9%), risk of bias (9.9%), methods of result synthesis (12%), limitation of evidence (1.1%), interpretation (33.3%), funding (47.4%), and registration (10.2%). The reporting of abstracts was individually evaluated for each of the three journals based on the checklist criteria (Table 2). Univariate analysis demonstrated statistically significant differences between the journals (Table 3). The inter-rater and intra-rater reliability levels, assessed by ICC tests, were high, with values of 0.88 and 0.94, respectively.

DISCUSSION

The present study aimed to assess the quality of abstract reporting in systematic reviews published in high-impact factor periodontology journals. Systematic reviews (SRs) and meta-analyses (MAs) are widely recognized as valuable sources of evidence due to their ability to effectively evaluate clinical applicability and treatment outcomes. However, for these reviews to fulfil their potential, it is crucial that their reporting is of high quality. This not only helps to minimize bias in research but also enhances transparency and reproducibility, thus contributing to the overall credibility of the findings¹¹. Various authors have evaluated the reporting quality of systematic reviews in diverse fields such as dentistry, medicine, psychology, and industry. These assessments have focused on different aspects, including the evaluation of complete systematic reviews^{7,8,12-14}, methodology^{15,16} or solely abstracts^{1,3,7,8,14,17-24}. To our knowledge, our study is among the limited number of investigations^{1,9,14,17,22}

that examine the reporting quality of abstracts in systematic reviews in the field of periodontology.

We have included and evaluated a total of 87 systematic reviews (SRs) from three highly reputable periodontology journals in order to assess the reporting quality of their abstracts. Our primary objective in conducting this study was to evaluate the impact of the PRISMA-A guidelines on the comprehensive reporting of abstracts in SRs. The articles included in our analysis were sourced from the Journal of Clinical Periodontology (JOCP), Journal of Periodontal Research (JOPR), and Journal of Periodontology, covering the period between 2018 and 2022.

During the investigation period, the proportion of published SRs accounted for only 5.7% of the total published articles. Among these, the majority (66%) were published in the Journal of Clinical Periodontology (JOCP), followed by 29% in the Journal of Periodontal Research (JOPR), and the remaining 6% in the Journal of Periodontology. Geographically, a significant number of the published SRs originated from Europe, comprising approximately 63% of the total. Furthermore, the majority of these SRs were authored by academicians (n=86) affiliated with universities or mixed academic settings.

Various authors have conducted studies in different fields to assess the quality of abstract reporting in systematic reviews (SRs)^{1,9,14,17-24}. Consistent with our study, the majority of these authors have reported that a significant proportion of contributing authors were affiliated with institutions in European countries^{1,18,23,24}.

In contrast, Wasiak et al²⁵ observed a higher prevalence of authors from North America, while Bassani et al⁷ found that most of the authors in their assessment of SRs were from Latin America. It is important to note that these variations may be attributed to different studies being conducted at different time frames, using diverse journals from various fields. Consequently, these findings cannot be generalized to all research on SRs across different time periods.

In our study, we found that the overall mean score for reporting abstracts was 54.8% (95% CI: 52.6 to 56.9). The highest mean score was observed for abstracts of studies conducted in South America, which was 60.8%

(95% CI: 55.9 to 65.6). European-based SRs had a mean score of 54.1% (95% CI: 50.9 to 57.2), showing no statistically significant difference (p -value>0.05).

A similar study conducted by Martin et al¹ also assessed the quality of abstract reporting in selected SRs published in periodontology journals from 2002 to 2020, using the 12 items of the PRISMA-A checklist. They reported a general mean PRISMA-A score of 55.72% (95% CI, 54.46–56.79%), which is almost similar to our findings [54.8% (95% CI: 52.6 to 56.9)]. Furthermore, they observed a statistically significant improvement in the mean score after the publication of the PRISMA-A guidelines in 2013.

In our study, we observed that the highest mean score was found for systematic reviews (SRs) published in the Journal of Periodontal Research (JOPR) (mean score: 60; 95% CI: 57.2 to 62.8), followed by the Journal of Periodontology and the Journal of Clinical Periodontology (JOCPr). However, there was no significant difference in scores between these journals. Martin et al⁵ also noted that the International Journal of Dental Hygiene had a significantly better PRISMA-A score compared to top-ranked journals such as the Journal of Clinical Periodontology and the Journal of Periodontology. These findings suggest that even highly esteemed journals may sometimes fall short in maintaining publication standards. In another study conducted by Faggion et al¹⁴ in 2012, abstracts of SRs with meta-analyses in the field of periodontology and implant dentistry were screened using a customized checklist of 7 items. They found that only two-thirds of the abstracts provided proper evidence, and less than 50% exhibited precision in reporting. Furthermore, they observed that only 5% of the selected abstracts demonstrated consistency in reporting. It is worth noting that their study was conducted before the publication of the 12-item PRISMA-A checklist, so their results cannot be directly compared to our study.

Other studies conducted by authors in various fields of dentistry have yielded similar findings regarding the reporting quality of abstracts in systematic reviews (SRs). For instance,¹⁹ discovered that the mean PRISMA-A score for SRs in the field of Orthodontics was 53.39 (95% CI, 51.83-54.96). Similarly, Fleming PS et al²⁶ reported a mean overall PRISMA score of 64.1% (95% confidence interval [CI], 62%-65%). Like Martin MA et al., both Vásquez-Cárdenas et al. and Fleming et al^{19,26} noted an improvement in the overall score of studies after the publication of the PRISMA-A checklist.

Various authors indicated that they found promising results and improved quality after following the PRISMA guidelines in reporting abstracts, methodology and even complete systematic reviews and metanalysis. In our study we also assessed the completeness of the checklist items and found that in all journals (100%) reporting was being done as SR, in

97.7% journals objectives were properly reported; 89.9% articles followed to mention eligibility criteria in the abstract; 86% mentioned about the included studies and the synthesis of results was reported in 91.5% articles. In accordance with our study, Martin MA et al., observed that there was improvement in various reporting criteria after the PRISMA-A checklist guidelines are being followed. They found a statistically significant improvement in items like “included studies” and “synthesis of the results” of the PRISMA-A checklist.

Another notable finding from this study is that the abstracts published across all journals consistently lacked adequate reporting of certain items. These items included information sources (48.9%), risk of bias (9.9%), methods of synthesis of results (12%), limitation of evidence (1.1%), interpretation (33.3%), funding (47.4%), and registration (10.2%). Similarly, Martin MA et al¹ also identified low scores in items such as “registration,” “funding,” and “conflict of interest report,” followed by “strength and limitation of evidence” and “risk of bias” sections in systematic review abstracts. Thus, both studies revealed that the items with the lowest scores were limitation of evidence and risk of bias, followed by registration and funding details.

In 2013, Faggion et al¹⁴ advocated for the reporting of risk of bias, limitations of evidence, and measures of heterogeneity in studies to improve the reporting quality of systematic reviews with meta-analyses. They emphasized that this would provide readers with a better understanding of the strengths and weaknesses of the findings, thus enhancing the clinical utility of evidence-based studies. These findings from Faggion et al. align with our study, as we also observed that limitation of evidence and risk of bias were the least reported items.

Our study revealed an important observation concerning the reporting of registration details in SR abstracts. It was evident that only 10.2% of the SR abstracts included registration details. Surprisingly, similar findings were consistently reported in studies conducted by Vásquez-Cárdenas J et al¹⁹, Pulikkotil et al²⁷, Jiancheng et al¹⁸, Seehra et al²³, and Kiriakou et al²⁴ across various medical and dental fields. These results are particularly surprising considering the increasing number of SRs being registered in databases like PROSPERO since 2013. It is crucial to emphasize the inclusion of registration details in SR abstracts. Even in cases where an SR is not registered, it is essential to explicitly mention this fact within the abstract. Similar guidelines should be implemented to address the reporting of funding information. Interestingly, our study revealed a complete absence of funding source reporting in any of the SR abstracts examined. By ensuring the proper reporting of registration and funding information in SR abstracts,

transparency and accountability can be significantly improved. This will allow readers to critically evaluate the research and gain a better understanding of any potential biases or conflicts of interest associated with the study.

Our analysis revealed a positive correlation between the number of authors involved in a systematic review and the quality of its reporting. Similar findings were noted in studies conducted by Vázquez-Cárdenas J et al., Pulikkotil et al²⁷, Jiancheng et al¹⁸, Seehra et al²³, and Kiriakou et al²⁴. Conversely, Bigna et al²¹ found no significant relationship between the quality of reporting and the number of authors. Systematic reviews are extensive, well-structured, and detailed write-ups that necessitate meticulous screening, thorough search procedures, and careful selection processes. Therefore, we strongly advocate for larger collaborative teams that can facilitate effective collaboration and support, ultimately ensuring the production of high-quality research outputs.

The study findings are subject to a few limitations. Firstly, our evaluation focused solely on the quality of abstracts, which means we did not assess the full texts of the selected articles. Consequently, this approach may have excluded articles that conducted meta-analyses but did not explicitly mention the term "meta-analysis" in the title, abstract, or keywords. Additionally, our screening was limited to three high-ranking journals within the field of periodontology, and the study was conducted within a specific time frame. As a result, the generalizability of our findings to the broader field of periodontology or dentistry as a whole may be limited.

Despite acknowledged limitations, our study offers valuable contributions due to its unique strengths. Notably, we included a relatively large number of systematic reviews sourced from the three main periodontology journals. To ensure the reliability, accuracy, and transparency of our reporting, we employed a validated checklist and followed a meticulous calibration process. However, it is crucial to acknowledge that our inclusion criteria may introduce selection bias, as we only considered reviews published within a specific timeframe (2018-2022) from the designated journals.

CONCLUSION

The present study provides valuable insights into the adherence to PRISMA guidelines by authors when reporting abstracts of systematic reviews in the field of periodontology. The findings reveal areas that require improvement in the practice of abstract reporting in systematic reviews. As a result, we strongly advocate for a strict adherence to PRISMA guidelines to enhance the reliability and transparency of systematic reviews in the field of periodontology.

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Author's Contribution:

Concept & Design of Study:	Abdullah Almutairi, Fahad Alharbi
Drafting:	Abdullah Almutairi, Fahad Alharbi
Data Analysis:	Abdullah Almutairi, Fahad Alharbi
Revisiting Critically:	Abdullah Almutairi, Fahad Alharbi
Final Approval of version:	Abdullah Almutairi, Fahad Alharbi

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