Resident Journal of Rawalpindi Medical University
July 2024 Volume: 6 (1) ISSN No. 1685502 www.supp.journalrmc.com

Resident Research Forum

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Role of Evolving Artificial Intelligence in Modernizing Otorhinolaryngological Procedures

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In this modern era of healthcare, technological advancements have revolutionized the way medical procedures are conducted, leading to improved patient outcomes and enhanced efficiency. One area where this transformation is particularly evident is in otorhinolaryngology, a branch of medicine specializing in the diagnosis and treatment of disorders related to the ears, nose, and throat. With the rapid evolution of artificial intelligence (AI) technologies, there has been a paradigm shift in the approach to otorhinolaryngological procedures, ushering in a new era of precision, accuracy, and innovation. Artificial intelligence, encompassing machine learning algorithms and deep neural networks, has demonstrated remarkable capabilities in analyzing complex medical data, interpreting diagnostic images, and assisting healthcare professionals in decision-making processes.[1] In the field of otorhinolaryngology, AI applications are increasingly being integrated into various aspects of patient care, from diagnosis to treatment planning and surgical interventions.

One of the primary areas where AI is making significant strides is in the interpretation of medical imaging studies, such as computed tomography (CT) scans and magnetic resonance imaging (MRI) scans. These imaging modalities play a crucial role in the evaluation of anatomical structures and pathological conditions affecting the ears, nose, and throat. AI algorithms trained on vast datasets can quickly and accurately identify abnormalities, assist in differential diagnosis, and provide valuable insights to clinicians.[2] By leveraging AI-driven image analysis, otorhinolaryngologists can expedite the diagnostic process, leading to timely interventions and improved patient outcomes. Furthermore, AI-powered virtual assistants and decision support systems are augmenting the capabilities of healthcare professionals in otorhinolaryngology clinics and operating rooms. These intelligent systems can analyze patient data, recommend treatment options, and even assist in performing surgical procedures with precision and accuracy.[3] By harnessing the power of AI, otorhinolaryngologists can streamline workflow, reduce procedural errors, and optimize resource utilization, ultimately enhancing the quality of care delivered to patients.

In addition to diagnosis and treatment planning, AI is also playing a vital role in advancing surgical techniques and procedures in otorhinolaryngology. Robotic-assisted surgeries, guided by AI algorithms, enable surgeons to perform intricate procedures with enhanced dexterity and control, leading to improved surgical outcomes and reduced postoperative complications.[4] Moreover, AI-driven simulation platforms allow trainee surgeons to hone their skills in a risk-free virtual environment, accelerating the learning curve and ensuring proficiency in complex surgical techniques. However, as we embrace the transformative potential of AI in otorhinolaryngology, it is imperative to address challenges related to data privacy, algorithm bias, and regulatory compliance. Safeguarding patient information and ensuring the ethical use of AI technologies are paramount to maintaining trust and integrity in healthcare delivery.[5]

Additionally, ongoing research and collaboration between clinicians, engineers, and data scientists are essential to further refining AI algorithms, enhancing their performance, and expanding their applicability in otorhinolaryngological practice.

So, the integration of evolving artificial intelligence technologies holds tremendous promise for modernizing otorhinolaryngological procedures and advancing patient care. By harnessing the power of AI-driven diagnostics, decision support systems, and robotic-assisted surgeries, otorhinolaryngologists can usher in a new era of precision medicine, where treatment strategies are tailored to individual patient needs. However, it is essential to approach the adoption of AI in healthcare with caution, ensuring that ethical, legal, and regulatory considerations are carefully addressed. Through collaborative efforts and responsible innovation, we can leverage the transformative potential of AI to revolutionize otorhinolaryngological practice and improve patient outcomes.

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Variations In Electrocardiographic Changes Across Different Spectrums Of Heart Failure

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Abstract

Objective: Study aims to compare the electrocardiographic (ECG) abnormalities in patients of heart failure presenting with different spectrum of syndrome based upon value o f ejection fraction.

Methods: This was a retrospective cross-sectional study based on previous record and new cases collected from Department of cardiology, Benazir Bhutto Hospital. Consecutive sampling was done and data of patients with HF who were admitted or visited outdoor clinics of hospital was collected. The data was entered and analyzed in SPSS version 25.

Results: The study found that male and female heart failure patients have different EF distributions. EF is more likely to be reduced in men and mildly in women. Age was also associated with cardiomyopathy (p=0.022). There was a significant association between smoking and the development of heart failure. Heart failure patients with reduced ejection fraction (HFrEF) have longer PR and QT intervals, ST segment elevation, and T wave inversion. The study found that arrhythmia distribution differed by ejection fraction. HFrEF patients had a higher rate of atrial fibrillation (3%) and flutter (8%) than HFpEF or HFmrEF patients.

Conclusion: We found that patients with HFrEF are more likely to have ECG abnormalities and arrhythmias than patients with other types of heart failure. Early detection and treatment of arrhythmias can help to prevent serious complications.

Keywords: Heart failure, ECG, Ejection Fraction, Arrhythmia.

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1. Introduction

Heart failure is a condition of progressive nature, marked by a decrease in the heart's capacity to pump blood efficiently, which can cause a number of symptoms, such as fatigue, edema, and shortness of breath.[1] It is considered to be a threat to human on global scale as it is estimated, that there will be 80 million people living with HF by year 2030, which would have surpassed the current prevalence of 64.3 million.[2] At the moment there are around 2.8 million patients of HF in Pakistan, which is thought to increase threefold to almost 8 million in 2030.[3] The incidence and prevalence of HF are on the rise, due in part to an aging population and improved survival rates for people with other chronic cardiovascular diseases. Despite advances in treatment, HF mortality remains high, particularly in older patients with multiple comorbidities.

About half of heart failure patients have an ejection fraction (EF) of 50% or greater, which is considered to be "preserved" (HFpEF).[4] Diastolic dysfunction, a condition that impairs the heart's ability to relax and fill with blood, is thought to be the main cause of HFpEF. Patients with HFpEF are typically aged, more likely to be women, and more likely of having a prior history of uncontrolled blood pressure than patients with HF with reduced EF (HFrEF) with an ejection fraction of less than 40%. (5) They may also have a decreased mortality risk than patients with HFrEF, but this is not always the case.

ECG and echocardiography are two important tools used to diagnose and manage HF patients. ECG provides information about the heart's electrical activity, while echocardiography allows clinicians to visualize the heart's structure and function. The correlation between ECG changes, echocardiographic parameters, and cardiovascular mortality is of paramount importance in risk stratification and patient management. Studies have demonstrated that in HF patients, prolonged QT interval is often observed in HF patients, indicating delayed repolarization.[6] Similarly, ECG may show STsegment depression or elevation in HF patients, indicating myocardial ischemia or injury. These changes can have significant prognostic implications and may guide further management strategies. Additionally, a study indicated that HFrEF patients with QRS prolongation, especially those with LBBB, tend to have worse outcomes. QRS duration ≥ 150 msec is associated with a higher risk of sudden cardiac death and overall mortality.[7]

There is a need for a local study in Pakistan on variations in ECG changes, their correlation with

echocardiographic parameters and cardiovascular mortality across different spectrums of heart failure. This is because the prevalence of heart failure is increasing in Pakistan, and the clinical presentation and management of heart failure may differ from that in other countries. The results obtained from this study could be used to develop more accurate risk stratification tools for heart failure patients.

2. Materials & Methods

This cross-sectional study was conducted at the Department of Cardiology at Benazir Bhutto Hospital Rawalpindi. The study recruited approximately 100 patients with HF who were recruited consecutively over a period of 1 month. The study's inclusion criteria were individuals over the age of 18 years with heart failure from any etiology, classified according to the New York Heart Association (NYHA) functional classes I–IV. Participants with massive pericardial effusion, congenital heart disease, acute coronary syndrome, primary valve disease, severe pulmonary diseases (Cor-pulmonale, pneumothorax), those with pacemakers installed, and individuals with malignancy were excluded from the study. The data collected comprised demographic information, clinical examination results, electrocardiogram readings, and echocardiographic findings. The demographic information covered age, gender, and medication history, while the clinical data included the determination of the NYHA class. ECG was recorded on patients lying supine, when standard 12 leads were applied by a trained clinical assistant. Bionet Cardio care EKG-2000 machine was employed to take the recordings of ECGs. Experienced cardiologist, who were unaware of the echocardiogram results, interpreted the ECGs. The ECG report evaluated heart rate and rhythm, axis of deviation in heart, enlargement of heart chamber, changes in ST-T segment, intraventricular blockage, QT, and QTc intervals and the duration of the QRS complex. Any QRS complex which lasted more than 100 msec was considered wide QRS complex.

Echo was used to information like determination the ejection fraction (which was calculated by using method devised by Simpson) and identification the diastolic dysfunction. Heart failure was categorized into three groups: HF with preserved ejection fraction (HFpEF), HF with mid-range ejection fraction (HF mid-range), and HF with reduced ejection fraction (HFrEF). The diagnostic criteria for HFpEF, HF mid-range EF, and HFrEF were ≥ 50%, 40-49%, and <40% ejection fraction, respectively. The study subjects were then divided into three groups accordingly: the HFpEF group, the HF mid-range group, and the HFrEF group.

Statistical Analysis

The data was analyzed using SPSS version 25.0. Qualitative data like premorbid, gender, NYHA classification was presented in form of percentage and frequency while the Quantitative data like the age, echocardiography parameters and electrocardiography parameters were presented in Mean ± SD). Means were compared using student's t-test while the association and its significance among categorical variables was determined by using Chi-squared test. A P value less than or equal to 0.05 was considered statistically significant.

3. Results

The study included 100 heart failure patients who fulfilled inclusion criteria. The distribution of EF in male patients with heart failure showed that majority of male patients (83.3%) had reduced EF, while 3.3% had mildly reduced EF and 13.3% had severely reduced EF. While in female patients (72.5%) had reduced EF, while 17.5% had mildly reduced EF and 10% had severely reduced EF (Figure-1).

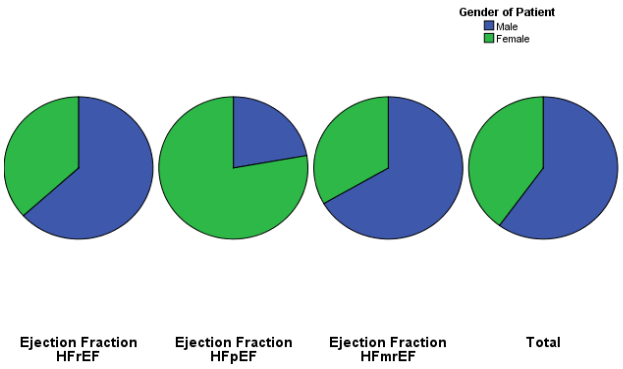

Figure 1: Gender wise distribution with respect to ejection fraction.

There was a significant difference in the distribution of EF between male and female patients with heart failure. Male patients are more likely to have reduced EF, while female patients are more likely to have mildly reduced EF (p value stood at 0.042). Age range for HF patients spanned between 22 to 90 years with mean age being 61.31±11.19 years. Majority of patients lie in age group

between 40-65 with a statistically significant p value of 0.022 (Figure-2).

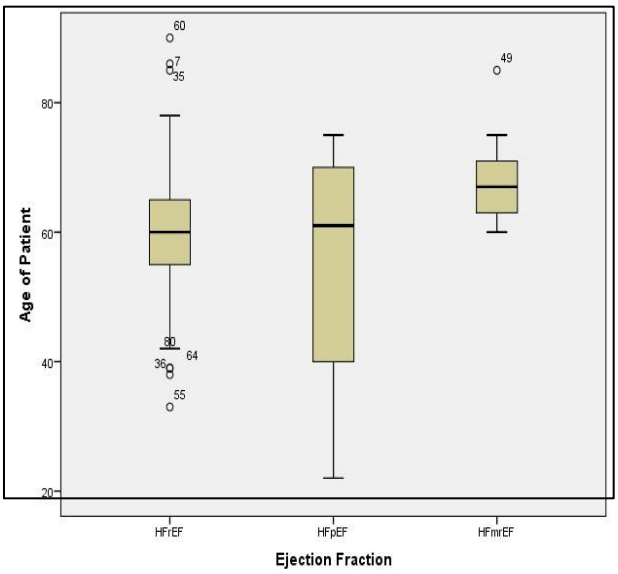

Figure 2: Age -wise distribution with Heart Failure

When patients were classified according to cardiomyopathy, it was discovered that 28% of patients had no cardiomyopathy, compared to 41% who had DCMP and 31% who had ICMP.

60% of the patients had diabetes mellitus, 69% percent had hypertension, and 46% of subjects were found to be smokers upon assessing the data for possible risk factors. A statistically significant association was found between smoking and the development of heart failure (p=0.037). However, both hypertension and diabetes mellitus did not show a significant risk, with p-values of 0.59 and 0.56, respectively.

ECG interpretation revealed that PR and QT interval were prolonged in 4% and 5% of patients, respectively, all of whom belonged to heart failure with reduced ejection fraction (HFrEF). The findings of study indicate that out of 16 patients (12 with HFrEF, 2 with HFpEF, and 2 with HFmrEF) displayed ST segment elevation, while the remaining 63 patients (50 with HFrEF, 7 with HFpEF, and 6 with HFmrEF) did not exhibit this feature. Among these 2 patients (both with HFrEF) had an elevation of 3 mm, 12 patients (8 with HFrEF, 2 with HFpEF, and 2 with HFmrEF) had an elevation of 1 mm, 1 patient (with HFrEF) had an elevation of 0.5 mm, and 1 patient (with HFrEF) had an elevation of 2.5 mm. The ST segment elevation was most commonly localized in V1, V2, and V3, in 12 patients.

There were 19% of cases which showed STdepression and their distribution was 13 cases in HFrEF, 2 cases in HFpEF, and 4 cases in HFmrEF. Most of times depression noted up-to 1 mm, with 63.3% showing depression belonging to HFrEF, group. The inversion of T -wave was shown by 51% of total cases. Patients with reduced ejection fraction contributed most with 39 cases (76.74%) of total incidence. Patients who had medium range and preserved ejection fraction contributed with 13.72 and 9.8% respectively. This phenomenon was mostly depicted in leads V1-V6 (23.52%) and V4, V5, V6 (19.6%).

Of all patients, 56% had no axis deviation, 40% had left axis deviation, and 4% patients had right axis deviation. For the patients with left axis deviation, 34 had a HFrEF, 2 had a HFpEF, and 4 had a HFmrEF. Finally, for the patients with right axis deviation, 2 had a HFrEF and 2 had a HFpEF. In addition to axis deviation, the patients were also evaluated for left bundle branch block, right bundle branch block, and fascicular block. 16% of patients had left bundle branch block, 4% had right bundle branch block, and 8% had fascicular block. Of the patients with left bundle branch block, 15 had a HFrEF and 1 had a HFmrEF. For the patients with right bundle branch block, 3 had a HFrEF and 1 had a HFmrEF. Finally, for the patients with fascicular block, all 8 had a HFrEF.

3% of patients had atrial fibrillation, and all three had heart failure with reduced ejection fraction, 8% had atrial flutter, distributed as 6 patients with HFrEF, 1 with HFpEF, and 1 with HFmrEF. Only 2% of patients had atrial and ventricular tachycardia each, with all of them having reduced ejection fraction.

4. Discussion

This retrospective cross-sectional study investigated 100 cases of heart failure and provides valuable insights into variations in ECG changes, their correlation with echocardiographic parameters across different spectrums in Rawalpindi. The findings of study suggest that there is a significant difference in the distribution of EF between male and female patients with heart failure. Male patients are more likely to have reduced EF, while female patients are more likely to have mildly reduced EF. This difference in EF distribution may be due to a number of factors, including hormonal differences, differences in body size, and differences in the prevalence of risk factors for heart failure.(8) The study

also found that there was a statistically significant association between age and cardiomyopathy (p=0.022). This means that older patients are more likely to have cardiomyopathy.

According to our study, smoking significantly increased the risk of developing heart failure. According to the review of the literature, smoking and the onset of heart failure have a direct correlation. Smoking is a significant risk factor for heart failure and can multiply the likelihood of developing HF by 2 times. (9) In a literature review of 26 prospective studies, it was found that heart failure risk is increased by 75% for current smokers, 16% for former smokers, and 44% for ever smokers when compared with never smokers. (10) Furthermore, a 59% increase in heart failure risk was observed for current smokers when compared with non-current smokers. The study you mentioned revealed a significant association between smoking and the development of heart failure, as well as a decline in ejection fraction, which is a measure of how well the heart pumps blood and serves as a sign of heart failure.

The ECG findings in our study suggest that patients with HFrEF are more likely to have prolonged PR and QT intervals, ST segment elevation, and T wave inversion than patients with other types of heart failure. PR and QT intervals were found to be prolonged in 4% and 5% of patients, respectively, all of these patients had HFrEF. 6 patients (12 with HFrEF, 2 with HFpEF, and 2 with HFmrEF) had ST segment elevation. 19% of patients had ST segment depression. Of these, 13 patients had HFrEF, 2 patients had HFpEF, and 4 patients had HFmrEF. 51% of patients had T wave inversion. Of these, 39 patients had HFrEF, 7 patients had HFmrEF, and 5 patients had HFpEF. The most common ECG finding in patients with HFrEF was T wave inversion. ST segment elevation was also seen in a significant number of patients with HFrEF, but it was less common than T wave inversion. Prolonged PR and QT intervals were seen in a small number of patients with HFrEF. These ECG abnormalities are thought to be caused by the underlying structural and functional changes that occur in the heart in HFrEF. For example, prolonged PR interval and QRS duration are thought to be due to delayed conduction through the heart, which can occur as a result of myocardial hypertrophy or fibrosis. ST-segment depression and T-wave inversion are thought to be due to decreased myocardial perfusion, which can occur as a result of coronary artery disease. QT prolongation is thought to be due to a combination of factors, including electrolyte imbalance, medications, and underlying heart disease.[11,12]

The study found that the distribution of arrhythmias was different in patients with different ejection fractions. Patients with HFrEF had an elevated prevalence of atrial fibrillation (3%) and atrial flutter (8%) than patients with HFpEF or HFmrEF. Only 2% of patients in each group had atrial or ventricular tachycardia. These results of our findings are similar to previously published data showing an association between HFrEF and an increased risk of arrhythmias. In 2018, the Journal of the American College of Cardiology published a study indicating that patients with HFrEF had a higher likelihood of experiencing atrial fibrillation compared to patients with heart failure with preserved ejection fraction.(13) The increased risk of arrhythmias in patients with HFrEF is likely due to a number of factors, including: left ventricular remodeling, ischemic heart disease and patients with HFrEF often experience symptoms such as shortness of breath and fatigue.(13) These symptoms can lead to anxiety and stress, which can also trigger arrhythmias. The findings of this study highlight the importance of screening patients with HFrEF for arrhythmias. Early detection and treatment of arrhythmias can help to prevent serious complications, such as stroke and sudden cardiac death.

In addition to the findings mentioned above, the study also found that the mean septal wall thickness was 9.25±2.53. This suggests that the patients in the study had a relatively high degree of left ventricular hypertrophy, which is a common finding in patients with HFrEF. Left ventricular hypertrophy can also increase the risk of arrhythmias, so it is important to monitor patients with HFrEF for this condition.

Our study has different limitations as study was conducted in a single center, so the results may not be generalizable to other populations. The study was relatively small, so the results may not be statistically significant. Moreover, due to the absence of a control group in the study, it is not possible to definitively conclude that the observed ECG changes were solely attributed to heart failure. Despite these limitations, the study provides valuable insights into the ECG changes that are associated with heart failure. These findings can be used to help diagnose and manage patients with heart failure.

5. Conclusion

We found that patients with HFrEF are more likely to have ECG abnormalities and arrhythmias than patients with other types of heart failure. Early detection and treatment of arrhythmias can help to prevent serious complications.

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Prevalence Of Hypomagnesaemia In Critically Ill Patients Admitted In Medical Intensive Care Unit

Syed Ali Akbar Shah[1], Abrar Akbar[2], Shahzaib Maqbool[3]

Abstract

Objective: We conducted this study to determine the frequency of hypomagnesaemia in critically ill medical patients.
Methods: This is a Descriptive cross-sectional study involving 120 patients admitted in medical intensive care unit (MICU) of Holy Family Hospital, Rawalpindi, Pakistan. The study was conducted from July 2018 to September 2019. About 1ml sample of blood was taken from each p atient included and sent to hospital laboratory for evaluation of serum magnesium levels. All the collected data was entered and analyzed on SPSS v. 23. A p-value of ≤ 0.05 was taken significant.
Results: In our study the mean age of the patients was 42.76 ±12.77 years, the male to female ratio of the patients was 1:1. The mean value of APACHE II score of the patients was 29.68±2.571. The hypomagnesaemia was found in 28(23.33%) patients.
Conclusion: According to our study the frequency of hypomagnesaemia in c ritical ill medical patients was 28(23.33%)
Keywords: Critical, Medically Ill, Hypomagnesaemia, Patients.

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1. Introduction

Magnesium is fourth most abundant cation in human body and it is the second most cation inside the cells after potassium.[1] It is vital in electrolyte homeostasis, intracellular calcium regulation, energy storage and utilization, protein synthesis regulation, and neurotransmitter release.[1,2] Adequate magnesium balance has been reported to reduce the risk of inflammation, diabetes, colorectal cancer, stroke, and cardiovascular disease events.[2] It has significant role in oxidative metabolism.[1] It serves as cofactor for more than 300 enzymatic reactions.[3] It serves its role in maintaining neuromuscular excitability and cardiac function.[3] The incidence of hypomagnesaemia is reported as, 10–20% in hospitalized patients, 50– 60% Intensive Care Unit (ICU) patients, and 30– 80% in persons with alcoholism, and 25% in outpatients with diabetes.[2] In one study prevalence of hypomagnesaemia in critically ill medical patients was found to be 24.29 %. The monitoring of serum magnesium levels has prognostic and therapeutic value.[4] The normal magnesium plasma concentration is from 1.7 mg/dl to 2.55mg/dl.[4]

Long term total parenteral nutrition, hypoalbuminemia, diarrhea, vomiting, sepsis, use of loop diuretics and aminoglycosides can lead to increased frequency of hypomagnesaemia in critically ill patients at various settings.[5,6] Magnesium deficiency can lead to important clinical consequences like hypocalcemia, cardiac arrhythmias, neurotoxicity and hypokalemia.[7,8] When serum magnesium is below 1.2mg/dl then symptoms like confusion, nystagmus, ataxia, convulsions, comma, prolonged QT interval on ECG and atrial and ventricular arrhythmias can occur.[9] Purpose of conducting this study is to evaluate magnitude of hypomagnesaemia in critically ill hospitalized medical patients. By timely identifying the patients with hypomagnesaemia who are at risk of developing neurological and cardiovascular complications we can prevent and address these complications that may aggravate medical ailment.

2. Materials & Methods

This is a Descriptive cross-sectional study involving 120 patients admitted in medical intensive care unit (MICU) of Holy Family Hospital, Rawalpindi, Pakistan. WHO sample size calculator was used to determine sample, using anticipated population proportion of 24.29%[4], keeping level of confidence 95%, and absolute precision of 8%, the minimal required sample size was calculated out to be 120. Both male and female patients of age 15 to 70 years who are suffering from life threatening diseases like sepsis, septic shock, cardiogenic shock, hepatic failure, renal failure, congestive cardiac failure, diabetic ketoacidosis, acute lung injury, acute exacerbation of asthma, acute exacerbation of COPD, multiorgan failure and status epilepticus with APACHE SCORE II more than 25 and duration of illness for more than 24 hours were included in our study. Patients with documented hypomagnesaemia before admission, and who were taking drugs causing hypomagnesaemia diuretic therapy (loop diuretics, thiazide diuretics) and nephrotoxic drugs like aminoglycosides, cisplatin,

amphotericin B and pentamidine were excluded from our study. The study was conducted from July 2018 to September 2019. About 1ml sample of blood was taken from each patient included and sent to hospital laboratory for evaluation of serum magnesium levels. Serum magnesium level on day 1 and day 4 of hospital admission below 1.7mg/dl was considered hypomagnesaemia.

Statistical Analysis

For categorical variables like gender, type of medical illness and presence or absence of hypomagnesaemia, frequencies along with percentages will be calculated. For continuous variables like age, duration of disease, Apache II score and serum magnesium levels, means along with standard deviations was calculated. Effect modifiers like age, gender, duration of disease, type of medical illness was controlled by stratification and Chi-square analysis was applied. All the collected data was entered and analyzed on SPSS v. 23. A p-value of ≤ 0.05 was taken significant.

3. Results

In our study total 120 patients were enrolled. The mean age of the patients was 42.76±12.77 years. The study results also showed that the mean value of APACHE II score of the patients was 29.68±2.571. The study results showed that the mean value of serum magnesium level at day 1 was 2.102±0.51. The study results showed that the mean value of serum magnesium level at day 14 was 2.05±0.43 as shown in Table 1.

Table 1: Descriptive statistics of age, APACHE II score and Magnesium Levels at Day 1 & 14

variables	N	Mean	SD	Minimum	Maximum
Age in years	120	42.76	12.77	17	67
APACHE II score	120	29.68	2.571	25	34
Serum Magnesium Level At Day 1	120	2.10	0.51	1.2	3.0
Serum Magnesium Level At Day 14	120	2.05	0.43	1.3	2.9

this study the male patients were 60(50%) and the female patients were also 60(50%). The male to female ratio of the patients was 1:1 (Figure 1). In figure 2 our study showed the final medical diagnosis of the patients in which the most common diagnoses were congestive heart failure, viral meningitis, sepsis leading to multiple organ failure and acute renal failure.

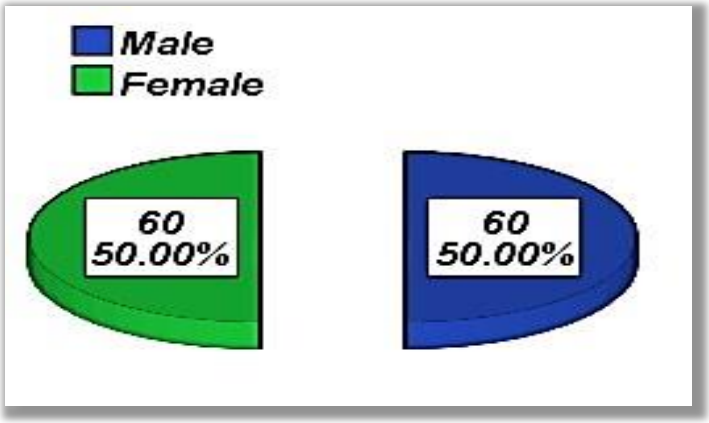

Figure 1: Frequency distribution of gender

In our study the figure 2 showed the final medical diagnosis of the patients in which the most common diagnoses were congestive heart failure, viral meningitis, sepsis leading to multiple organ failure and acute renal failure.

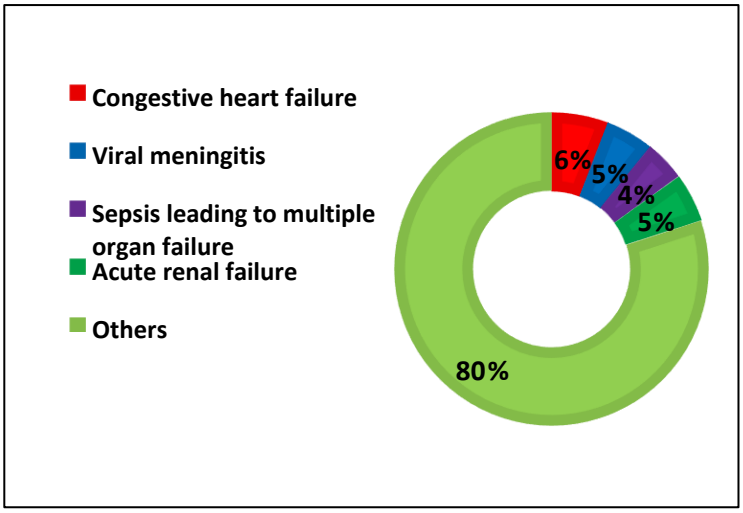

Figure 2: Frequency distribution of final medical diagnosis

In this study the hypomagnesaemia was found in 28(23.33%) patients and it was not found in 92(76.67%) patients as shown in figure 3.

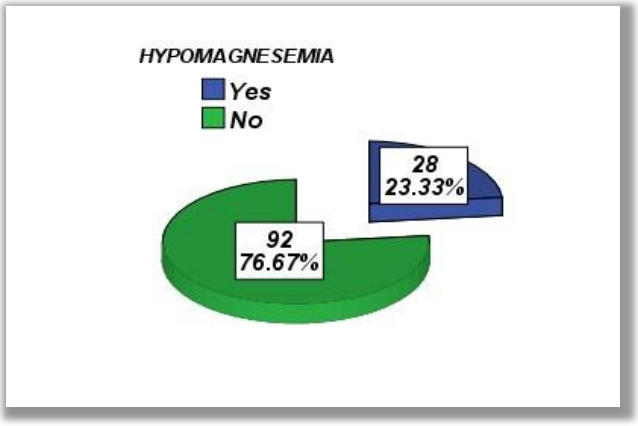

Figure 3: Frequency distribution of hypomagnesaemia

In our study ≤ 40 years patients were 42 in which hypomagnesaemia was noted in 13 cases and it was not found in 29 cases, similarly > 40 years patients were 78 in which hypomagnesaemia was noted in 15 cases and it was not found in 63 cases. Statistically insignificant difference was found between the hypomagnesaemia with age (pvalue=0.148). The study results showed that the male patients were 60 in which hypomagnesaemia was noted in 18 cases and it was not found in 42 cases, similarly female patients were 60 in which hypomagnesaemia was noted in 10 cases and it was not found in 50 cases. Statistically insignificant difference was found between the hypomagnesaemia with gender (pvalue=0.350).

Table 2: Showing the Correlation between Age, Gender and Hypomagnesaemia

Variables		Hypomagnesaemia		Total	p-value
		Yes	No		
Age (years)	≤ 40	13	29	42	0.148
	> 40	15	63	78	
	Total	28	92	120	
Gender	Male	18	42	60	0.350
	Female	10	50	60	
	Total	28	92	120	

The study results showed that the congestive heart failure was noted in 7 cases in which hypomagnesaemia was not found in all 7 cases, viral meningitis was found in 6 cases and hypomagnesaemia was found in 1 case, sepsis leading to multiple organ failure patients were 5 in numbers and hypomagnesaemia was noted in 3 cases, acute renal failure was found in 6 cases and hypomagnesaemia was not found in all 6 cases, 96 cases had other type of medical illness in which hypomagnesaemia was found in 24 cases. Statistically insignificant difference was found between the hypomagnesaemia and types of medical illness (p-value=0.091).

Table 3: Showing association of medical illnesses with Hypomagnesaemia

Variables		Hypomagnesaemia		Total	P value
		Yes	No		
Medical Illness	Congestive heart failure	0	7	7	0.091
	Viral meningitis	1	5	6	
	Sepsis leading to multiple organ failure	3	2	5	
	Acute renal failure	0	6	6	
	Others	24	72	96	
	Total	28	92	120	

4. Discussion

This present descriptive cross-sectional study was conducted at Department of Medicine Unit 2, Holy Family Hospital Rawalpindi to determine the frequency of hypomagnesaemia in critically ill medical patients. Terms hypomagnesaemia and magnesium deficiency are commonly used interchangeably. However, total body magnesium depletion can be present with normal serum magnesium concentrations and there can be significant hypomagnesaemia without total body deficit. In our study the frequency of hypomagnesaemia in critically ill medical patients was 28(23.33%). Some of the studies are discussed below are validating our findings by showing the Prevalence of hypomagnesaemia from 7% to 11% in hospital patients.[10,11,12] In patients with other electrolyte abnormalities hypomagnesaemia is more frequent, 40% in hypokalemic patients, 30% in hypophosphataemic patients, 23% in hyponatremic patients and 22–32% in hypocalcemia patients.[10,13,14] Different studies showed that the prevalence of hypomagnesaemia in critically ill patients is even higher, ranging from 20% to 65%[15,16,17], these findings are in concordance with our study finding of 23.33% prevalence of hypomagnesemia in critically ill patients. The role of hypomagnesaemia in intensive care patients is of paramount significance because it helps in not only from weaning off the patients from ventilatory support but also associated with increased mortality.[18]

The incidence of hypomagnesaemia is reported as, 10–20% in hospitalized patients, 50–60% ICU patients, and 30–80% in persons with alcoholism, and 25% in

outpatients with diabetes[2], however, the prevalence of hypomagnesaemia is towards lower side (23.33%) as compared to above mentioned study involving critically ill patients. Knowing the paramount significance of hypomagnesaemia, the monitoring of serum magnesium levels has prognostic and therapeutic value4.[4] Another prospective observational study by Soliman et al [19], measured ionized Magnesium levels on 446 patients admitted to a university hospital ICU over 3 months and showed that on admission to ICU, 18% of patients had ionized hypomagnesaemia, 14% had ionized hypermagnesemia and 68% had normal ionized Magnesium levels, but there was no association between ionized Magnesium levels on admission and length of stay or mortality. Similarly, two more recent large studies from India and China also showed association between hypomagnesaemia and outcome. A prospective observational study on 601 medical ICU patients showed that 25% of patients had hypomagnesaemia on admission. Hypomagnesaemia was associated with longer medical ICU stay (5.46 ± 5.75 days vs. 3.93 ± 3.88 days, P = 0.0002), need for mechanical ventilation (56.86% vs. 24.33% P<0.0001) and mortality (38.56% vs. 14.73% P < 0.0001), but was not associated with duration of mechanical ventilation [20]. Another prospective observational study on 374 critically ill patients showed that hypomagnesaemia was present in 102 patients (27.27%). Hypomagnesaemia was associated with longer ICU stay (15.98 ± 13.29 days vs. 12.43 ± 7.14 days, P = 0.034), higher SOFA scores (6.86 ± 3.12 vs. 5.46 ± 2.75, P = 0.004), and higher mortality (54.90% vs. 33.88%, P = 0.010).[21] A retrospective study by Safavi et al. evaluated serum Magnesium levels on admission to the ICU in 100 patients, and showed that patients who developed hypomagnesaemia during ICU stay had higher APACHE and SOFA scores on admission, higher maximum SOFA score during ICU stay, greater need for ventilator support and higher mortality, these finding are also validating our finding that is showing the significant association of hypomagnesemia in patients with high APACHE score (29.68±2.571) with increased mortality risk of greater than 50% .[22]

5. Conclusion

According to our study the frequency of hypomagnesaemia in critical ill medical patients was 28(23.33%). Our study is also showing the significant rise in incidence of hypomagnesemia with increasing number days following intensive care unit admission with mean value of 2.10 on day 1 of admission to 2.05 on day 14th of the admission. Similarly, higher APACHE score was also associated with higher prevalence of hypomagnesemia.

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Sonographic Correlation Of Fetal Foot Length As A Reliable Parameter For Estimation Of Gestational Age In Second And Third Trimester Of Pregnancy

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Abstract

Objective: The aim of this study is to determine correlation between fetal foot length and other standard parameters including femur length, biparietal diameter, and abdominal circumference in estimation of gestational age in second and 3rd trimester of pregnancy.

Methods: It was a cross-sectional study conducted at radiology department, Holy Family hospital, Rawalpindi during 20th March 2023 to 19th September 2023. Total 120 pregnant women of second or third trimester attending radiology department for ultrasonographic assessment were selected. The abdominal ultrasound was performed for each participant. Fetal foot length was utilized for determining the gestational age of the fetus. On the other hand, biometric parameters include femur length, circumference of head, abdominal circumference and biparietal diameter were also measured and their correlation with fetal foot was determined. The process of data input and analysis was conducted using SPSS version 26.

Results: 120 participants with the mean age of 28.28±4.37 years had gestational age (mean)of 27.33±4.99 weeks, mean foot length was 47.87±11.88 mm, femur length was 51.29 ± 12.58 mm, biparietal diameter was 69.09 ± 14.05 mm and abdominal circumference was 231.73 ± 51.77 mm. Relationship of fetal foot length with BPD, femur length and AC with gestational age was positively correlated with p-value of <0.0001. The fetal foot length has a correlation coefficient of 0.867, 0.850, 0.743 with FL, BPD and AC correspondingly (p<0.0001) was noticed.

Conclusion: The current study concluded that there exists a direct relationship between fetal foot length and gestational age in second and third trimester of pregnancy and also there is strong correlation of fetal foot length with other standard parameters (femur length, biparietal diameter, and abdominal circumference).

Keywords: Correlation, foot length, Gestational age.

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1. Introduction

Gestation of fetus in mother's body is a physiological process of fetus development. Gestational age is used to define the developmental stage of fetus in comparison to duration of pregnancy.[1] Evaluation of gestational age is the most important estimation done as a part of antenatal care to improve obstetrics care, during the course of pregnancy which is necessary to ensure appropriate fetal growth in relation to time of conception. It also has a significant part in early identification of any abnormality, delayed fetal growth, risk of early delivery and/or termination of pregnancy due to any cause.[2]

Ultrasonographic assessment of gestational age has become integral part of antenatal care around the world. There are various fetal biometric-parameters utilized for the assessment of gestational age and to match it with time of conception, and the choice of each parameter depends on the current trimester of pregnancy. In early pregnancy, the most commonly used fetal biometric-parameters include gestational-sac diameter and crown-rump length, in mid and advanced pregnancy, femur length (FL), abdominal circumference (AC), biparietal diameter (BPD) and head circumference (HC) are widely used.3 Utilizing many predictors has been demonstrated to enhance the accuracy of estimations. When evaluating growth patterns, it is important to include many epidemiological aspects. It is advisable to use specific development profile charts for each distinct group.[4]

Whereas in some cases, the position of baby can hinder the accurate measurement of femur length, head circumference, biparietal diameter and other commonly used parameters, which makes it difficult to correctly assess the gestational age and monitor the fetal growth. Sometimes If the fetal head has an abnormally rounded shape, which is referred to as brachycephalic, or if it is elongated, known as dolichocephalic, then it results in inaccurate measurement of head circumference and biparietal diameter which overestimates or underestimates the gestational age.[5]

In cases when conventional parameters cannot accurately assess the gestational age e.g., due to macrocephaly /microcephaly, macrosomic fetuses, growth-retarted fetuses limb dysplasia, fetal development retardation, head engagement in the

latter stages of pregnancy etc.6, then alternative reliable parameter, like fetal foot length can be performed for assessment of gestational age of the fetus, which can also serve as an additive to the recognition of different karyotypic abnormalities and diseases.[7] Fetal feet develops fully at 12 weeks of pregnancy, therefore fetal foot length can be performed in second or third trimester of the pregnancy. In literature various studies have been conducted to evaluate the gestational-age based on fetal foot length determination.

It was reported that the fetal foot length exhibits a strong correlation with established parameters, including BPD, FL and AC,8,9,10 but there is a limited literature in our population regarding the estimation of fetal foot length in determining gestational length, though it is important to determine its correlation with standard parameters. The current study aimed to find out the correlation of standard parameters including HC, BPD, FL and AC with foetal foot length in determining gestational age among Pakistani pregnant population.

2. Materials & Methods

It was a cross-sectional study, performed at radiology unit of Holy Family hospital, Rawalpindi during 20th March 2023 to 19th September 2023.

A sample size of 120 was calculated by using the correlation sample size calculator, considering the correlation coefficient of 0.9810 between fetal foot length and biparietal diameter to determine the gestational age, 80% study power, 5% confidence level (Formula: $N=[(Z\alpha+Z\beta)/C]2+3$). The research participants were selected using a non-probability consecutive-sampling approach.

Pregnant females of age 18-45 years with normal/uncomplicated pregnancy, singleton pregnancy, sure of pregnancy dates and had a pregnancy of second or third trimester attending radiology department for ultrasonographic assessment during study interval were included. Pregnant females of first trimester, cases of oligohydramnios, Polyhydramnios, intra-uterine growth retardation and skeletal dysplasia were not included.

Consecutive patients visited radiology department were assessed for eligibility before including in the research. Formal consent was granted from eligible participants before enrolment in the study. The baseline demographic and clinical characteristics were noted down on data collection form. The abdominal ultrasound was performed for each participant, on HS 2600 machine using frequency of 3- 4 MHz curvilinear transducer probe. Fetal foot was visualized ultra-sonographically, the image was freezed to measure the foot length. The fetal foot length was calculated from skin edge lying over heel to the distal end of the longest toe, either first or second toe, on plantar or sagittal views by electronic calipers (as shown in figure1).

Figure 1: Saggital view of fetal foot and measurement (arrow).

Fetal foot length was utilized to measure the fetal gestational age. On the other hand, biometric parameters such as HC, FL, BPD, and AC were also measured and their correlation with fetal foot was determined.

The data was inputted and analyzed with the Statistical Package for Social Sciences (SPSS) version 26.0. Descriptive statistics of qualitative variables (e.g. socioeconomic status) were presented in the form of frequencies and percentages while quantitative variables (age (years), duration of pregnancy (weeks), foot length (mm), femur length (mm), biparietal diameter (mm), abdominal circumference (mm) and gestational age (weeks)) were presented as mean±standard deviation. Pearson's correlation test was applied to find relation among gestational age and foot length, as well as correlation between gestational age and femur length, BPD, abdominal circumference was also determined. Statistical significance was determined by a p-value of less than or equal to 0.05.

3. Results

A sample of 120 patients was attained, had mean age of 28.28±4.37 years. Most of the cases, 63 (52.5%), were between the ages of 18 and 30 years. Distribution of women shows that 35% and 41.6% belong of middle and

upper-middle socioeconomic status. Mean gestational age was 27.33±4.99 weeks, mean foot length was 47.87±11.88 mm, femur length was 51.29 ± 12.58 mm, biparietal diameter was 69.09 ± 14.05 mm and abdominal circumference was 231.73 ± 51.77 mm as shown in Table-1.

Table 1: The study population's demographics and clinical characteristics (N=120)

Studied parameters		N / mean	% / SD
Age (n/%)	18-30 years	63	52.50
	31-45 years	57	47.50
Gestational Age (n/%)	>22 weeks	15	12.50
	22-28 weeks	52	43.33
	>28-37 weeks	53	44.17
	>37 weeks	--	--
Socioeconomic status (n/%)	Lower class	28	23.33
	Middle class	42	35.0
	Upper-middle class	50	41.67
Gestational age in weeks (mean/SD)		27.33	4.99
Foot length in mm (mean/SD)		47.87	11.88
Femur length in mm (mean/SD)		51.29	12.58
Biparietal diameter in mm (mean/SD)		69.09	14.05
Abdominal circumference in mm (mean/SD)		231.73	51.77

A positive correlation was found out among the fetal foot length and other parameters in estimating the gestational age. Linear scatter plot (figure-2) shows gestational age of the study population with on the basis of fetal foot length.

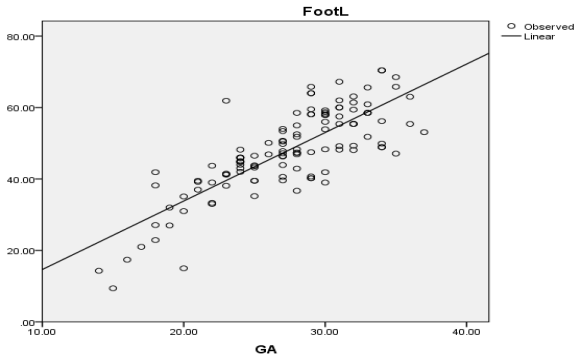

Figure 2: Linear scatter plot shows gestational age on the basis of fetal foot length. GA: Gestational age (years); fetal foot length (mm)

The relationship between the length of the fetus's foot and gestational age is 0.802 with p-value of <0.0001. Correlation between fetal femur length and gestational age is 0.951 with p-value of <0.0001. Correlation between biparietal diameter and gestational age is 0.957 with p-value of <0.0001. Correlation between abdominal circumference and gestational age is 0.909 with p-value of <0.0001. The correlation-coefficient (r) of fetal foot length is 0.860, 0.845 and 0.737 with FL, BPD and AC correspondingly with statistically significant findings (p<0.0001) as mentioned in Table-2.

Table 2: Relationship of fetal foot-length with other standard parameters and gestational age (N=120)

		GA (week)	AC* (mm)	BPD* (mm)	FL* (mm)	FFL* (mm)
Gestational age (week)	Pearson Correlation	--	0.909**	0.957**	0.951**	0.802**
	p value		<0.0001	<0.0001	<0.0001	<0.0001
Fetal foot length (mm)	Pearson Correlation	0.802**	0.737**	0.845**	0.860**	--
	p value	<0.0001	<0.0001	<0.0001	<0.0001	

**GA: Gestational age; AC: Abdominal circumference; BPD: Biparietal diameter, FL: Femur Length, FFL: Fetal foot length **Significant correlation at 0.01 level (2-tailed)*

4. Discussion

The four parameters including Femur length (FL), biparietal diameter (BPD), head circumference (HC), and abdominal circumference (AC) are commonly used to estimate gestational age and are often regarded as the most accurate indicators. They combined provide the highest level of precision in assessing gestational age.[3] Femur length is a valuable biometric measurement that is commonly employed throughout both the 2nd and 3rd trimester in pregnancy. It exhibits linear growth constantly and is most accurately assessed after fourteen weeks of the gestational period.[11] Our study intended to assess the correlation between fetal foot length and other standard parameters in estimating gestational age among pregnant females. We recruited 120 pregnant females with the mean age of 28.28±4.37 years, mean gestational age of 27.33 ± 4.99 weeks, mean foot length was 47.87 ± 11.88 mm, femur length was 51.29 ± 12.58 mm, biparietal diameter was 69.09 ± 14.05 mm and abdominal circumference was 231.73 ± 51.77 mm. A positive correlation between femur length, BPD, AC and fetal foot length with gestational age was observed with statistically significant findings ($p<0.0001$). The fetal foot length had a correlation coefficient value of 0.867, 0.850, 0.743 with FL, BPD and AC respectively ($p<0.0001$). In 2021 Ebraheem M et al.,[8] evaluated gestational age using fetal foot length and concluded that it is a reliable parameter. In 2016, Mukhia R et al.,9 reported that foot length assessment is comparable to femur and humerus measurements for 6 estimations of gestational age of fetus. In 2021, Thennarasi K et al.,10 reported to assessed gestational age using fetal hand and foot length during pregnancy. Though, it was reported that the length of the foot of a fetus has a strong correlation with traditional measures such as the diameter of the head, the length of the thigh bone, and the circumference of the abdomen. In a study, the correlation-coefficient of FL was found to be 0.994 with statistical significance level of $p=0.006$. From 24 to 27 weeks the correlation coefficient was 0.988 ($p=0.012$), from 28 to 31 weeks, the correlation-coefficient was 0.927 and $p=0.074$, from 32 to 36 weeks the correlation-coefficient was 0.995 and p value was <0.0001, which were positively correlated and statistically significant. This study showed the accuracy of the correctly diagnosed cases and significance level decreases as pregnancy advance.[12]

A study by Dagnew et al., reported that there is a substantial and strong positive relationship between gestational age and foot length. The correlation coefficient (r) is 0.865. The p-value is less than the predetermined significance level (i.e. $p<0.0001$).13 The aforementioned results were corroborated by other investigations done in Indian regions, showed a substantial positive association among foot length and gestational age.[14,15] Conversely, a study demonstrated a significant relation among studied variables ($P<0.0001$).16 However, in a study conducted at Pakistani population also reported There is a strong correlation between gestational age (GA) and foot length, with an r2 value of 81.7%.[17] Similarly, Tenali et al. observed a direct correlation between GA and foot length.18 Nevertheless, the coefficient of determination (r2) for foot length and gestational age varies across several research. Rakkappan and Kuppusamy observed a reduced coefficient of determination (r2) of 65% when examining the relationship between foot length and gestational age (GA).19 Joshi et al. discovered a strong association between the length of the fetus's foot and both the gestational age ($r = 0.970$, $p = 0.0001$) and the length of the femur ($r = 0.980$, $p = 0.000$) in a sample of 779 pregnant women in Nepal, ranging from 15 to 40 weeks of gestation.20 Andrzej Bulandra et al. discovered that the correlation index between foot length and femur length was 0.91, while the correlation index between foot length and foetal age was 0.94. Foot length is a dependable technique for ascertaining the gestational age of a pregnancy. It can serve as a tool to aid in the evaluation of gestational age.[21] Therefore, we propose using foot length as a standard method to aid in determining gestational age.

5. Conclusion

This study determined that there is a significant link between foot length and gestational age in second and third trimester of pregnancy and also there is strong correlation of fetal foot length with other standard parameters such as femur length, biparietal diameter, and abdominal circumference. Foot length is an effective indicator of gestational age during pregnancy.

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Effectiveness Of Normal Saline Versus Tetrachlorodecaoxide Dressing In The Management Of Diabetic Foot Wounds

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Abstract

Introduction: Pure solutions are used to produce an electrically treated aqueous solution high in reactive oxygen species (ROS). It is a potent anti-microbial. TCDO has been shown to be bactericidal in vitro. Wound healing is made possible by the mitogenic activities of TCDO on fibroblasts and new blood vessels. The primary goal of this study to Compare the effectiveness of Normal Saline Dressings versus Tetrachlorodecaoxide Dressings in the management of Diabetic Foot Wounds. The study was conducted at Department of Gen eral Surgery, Postgraduate Medical Institute/Shaikh Zayed Hospital, Lahore. Aim is to compare the effectiveness of normal saline versus tetrachlorodecaoxide dressing in the management of diabetic foot wounds.

Methods: A sample size of 40 (20 in each group) in group A, dressing was done with normal saline and in group B, dressing was done with tetrachlorodecaoxide solution. Statistical analyses were performed using IBM SPSS version 20. The mean difference was calculated using an independent t -test, and catego rical variables were stratified using a chi square test or a Fisher exact test as appropriate.

Results: Normal saline significantly shortened the healing duration and wound area after 8 weeks when added to a routine therapy for DFU. A comprehensive strategy is nece ssary to treat DFU effectively. To assist limit the number of patients who may eventually have to have their legs amputated due to DFU -related complications, it may be possible that normal salt water can be used as an alternate treatment option.

Conclusion: In conclusion, normal saline significantly shortened the healing duration and wound area after 8 weeks when added to a conventional therapy for DFU. A comprehensive strategy is necessary to treat DFU effectively. To assist limit the number of patients who may eventually have to have their legs amputated due to DFU -related complications, it may be possible that normal salt water can be used as an alternate treatment option.

Keywords: Diabetes, Normal saline, Tetrachlorodecaoxide, Diabetic foot, Foot ulcers, Super-oxidized solution

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1. Introduction

Diabetic foot wounds and other diseases are becoming increasingly common because of the rise in the prevalence of diabetes. Microvascular and macrovascular problems are all serious consequences of hyperglycemia (coronary artery disease, stroke and peripheral arterial disease). Non-healing ulcers are usually preceded by diabetes as a leading cause of non-traumatic lower extremity amputation. Patients with diabetes have a 15% to 20% lifetime chance of developing a foot ulcer(1).Amputation is required in more than 15% of cases with foot ulcers. The annual incidence of diabetic foot ulcers in the general population is estimated to be between 0.5 and 3 percent. Foot ulcers are reported to occur between 2% and 10% of the time. Neuropathic or ischemic foot ulcers account for more than half of all diabetic foot ulcers, with the latter accounting for around 45 percent of the total. Infection is the leading cause of lower limb amputations in people with diabetes, according to a recent study (2).

Peripheral vascular disease in the lower limbs is accompanied with deep tissue infection, ulceration, and destruction (3).Peripheral neuropathy, which causes the feet to become numb so that an injury goes unrecognized, is one reason that contributes to diabetic foot ulcers. Poor wound healing is also caused by vascular insufficiency, which makes the neuropathic ulcer more difficult to treat. High plantar pressure may be caused by foot deformities and calluses, increasing the risk (4). It is theorized that wound healing is affected by the presence of mechanical stress. Numerous additional factors can increase or decrease a diabetic's risk of developing a foot ulcer and subsequently contracting an infection (5).

Diabetic foot ulceration can be caused by uncontrolled hyperglycemia, long-term diabetes, trauma, incorrect footwear, callus, prior ulcers/amputations, old age, blindness/impaired vision, chronic renal illness, and poor nutrition(6). An infection in the feet of diabetics can lead to a wound that never heals. A recent study found that diabetic foot infections were more common among people with vitamin D deficiency (7).Recent advancements in wound management research have been fueled by the development of novel materials, procedures, and an improved knowledge of wound

healing biology. Topical wound dressings containing tetrachlorodecaoxide and super-oxidized solution are among the most recent, more effective, and more powerful options (SOS). For wounds of all kinds SOS is an effective and safe treatment that moistens, lubricates and debrides. It also decreases the bacteria load in the wound. Pure solutions are used to produce an electrically treated aqueous solution high in reactive oxygen species (ROS). It is a potent antimicrobial. 'It is a bactericidal, virucidal, fungicidal, and sporicidal solution that requires no additional dilution or mixing and is stable, non-flammable, and non-corrosive (8).

The use of tetrachlorodecaoxide (TCDO) is a stride forward in wound healing since it directly activates the macrophage system and increases the partial pressure of oxygen in the wound, both of which contribute to the healing process. If you have a persistent wound, this is critical for the healing process to take place. The wound is moistened using TCDO, an aqueous solution. The oxygen carrier is bio-activated (9).

It interrupts the cycle of hypoxia in a wound. When activated phagocytes need more oxygen, it helps to ensure that the hypoxic conditions necessary for neo-angiogenesis are not compromised. TCDO has been shown to be bactericidal in vitro. Wound healing is made possible by the mitogenic activities of TCDO on fibroblasts and new blood vessels. Toxicity is not generated during the degradation of TCDO via haem-activated decomposition (10).Both TCDO and SOS have been compared against other older options in numerous studies, both alone and in combination. As a direct comparison, these two medications will be compared in this research (11). The objective of this study is to compare the effectiveness of normal saline versus tetrachlorodecaoxide dressing in the management of diabetic foot wounds.

2. Materials & Methods

This After taking approval from Institutional Review Board (IRB) of Shaikh Zayed Hospital, Lahore. A total of 40 patients (20 in each group) fulfilling the inclusion criteria (both male and female gender, age from 30 to 70 years, patients with wound on pressure areas like heel, toes and ankle and patients with uncontrolled or poorly controlled diabetes mellitus) were evaluated by the surgical team in outdoor department. Patients Patients who were not willing to participate in study by giving written consent, those with known allergy to tetrachlorodecaoxide solution and patients who lost follow-up during this study were excluded from the study. Informed written consent was taken by explaining each patient about the purpose and the procedure of the study. All information regarding age, gender BSR, healing period, wound area was noted on prescribed proforma. Group A was represented as Normal saline Group (SOS) and group B was represented as tetrachlorodecaoxide solution group. Patients were following up at least 6-8 weeks in terms of dressing and wound healing.

3. Results

A total of 40 patients with an overall mean age and standard deviation of 56.65 ± 10.61 years and median of 58 with a range of (37-70) were included in this study. In addition, majority of the patients were male22 (55%). Additionally, all the patients were segregated as per diabetic wound grading system and majority of the patients had grade-1 (40%) and grade-2 (42.5), respectively. The overall mean healing time period and random blood sugar levels were 3.14 ± 0.66 and 252.55 ± 37.51, respectively. In addition, wound area was assessed at baseline and after 8 weeks and mean wound area baseline (cm2)143.13 ± 27.25 and 126.61 ± 29.30, respectively as shown in Table 1.

Furthermore, all the patients were equally divided into two groups; normal saline 20 (50%) and tetrachlorodecaoxide solution 20 (50%). Table 2 showed the bifurcation and mean difference all the independent variables with respect to normal saline versus tetrachlorodecaoxide solution groups. There is a statistically significant difference (p-value: 0.03) was observed in healing period in both groups. The healing period in normal saline groups was significantly lower 2.92 ± 0.53 than tetrachlorodecaoxide group 3.36 ± 0.71. Also, wound area after 8 weeks (cm2) was also statistically significant (p-value: 0.03) in both groups. Furthermore, wound area after 8 weeks (cm2) was also lesser in normal saline group versus tetrachlorodecaoxide group (123.47 ± 10.93 versus 129.76 ± 6.10) as shown in Table 2. Figure 1 showed the graphical presentation of mean difference of wound area at baseline (cm2) and wound area after 8 weeks (cm2) of all the patients with respect to normal saline versus tetrachlorodecaoxide solution groups.

Table 1: Baseline and overall characteristics of the patients

Variable Categories		Total n = 40 (%)
Age (years)		
Mean ± SD		56.65 ± 10.61
Median	(min-max)	(35-70)
Gender		
Male		(55.0)
Female		(45.0)
Groups		
Normal saline		(50.0)
Tetrachlorodecaoxide solution		(50.0)
Diabetic wound grading		
0		(7.5)
1		(40.0)
2		(42.5)
3		(10.0)
Healing period (months)		
Mean ± SD		3.14 ± 0.66
Median	(min-max)	3.10 (1.90-4.50)
Blood sugar random (mg/dL)		
Mean ± SD		252.55 ± 37.51
Median	(min-max)	(200-350)
Wound area baseline (cm^2)		
Mean ± SD		143.13 ± 27.25
Median	(min-max)	143.35 (127.25-157.0)
Wound area after 8 weeks (cm^2)		
Mean ± SD		126.61 ± 29.30
Median	(min-max)	125.20 (101.20-145.34)

4. Discussion

Conventional treatment for diabetic foot ulcer (DFU) patients includes wound care, glucose management, appropriate antimicrobial medication, and advice to rest and use therapeutic shoes to reduce foot pressure loading (28). If necessary, amputations and re-vascularization of ischemic limbs are carried out. On the basis of DFU's complex traits (29), such as low tissue oxygen tension and immunological abnormalities (30) that lead to uncontrolled infection and inflammation, conventional therapy has been able to achieve some partial success in treating DFU. Because DFU advances quickly and rigorous therapy is needed to limit the chance of amputation, it is imperative. Amputation rates for diabetic foot ulcers (DFUs) might increase by as much as 150% due to diabetes mellitus. There are more non-traumatic lower leg amputations in the industrialized world due to diabetic foot problems than any other medical condition. Furthermore, up to 25% of all diabetic admissions in the UK and the US are due to foot issues, making them the most common cause of hospitalization.[31]

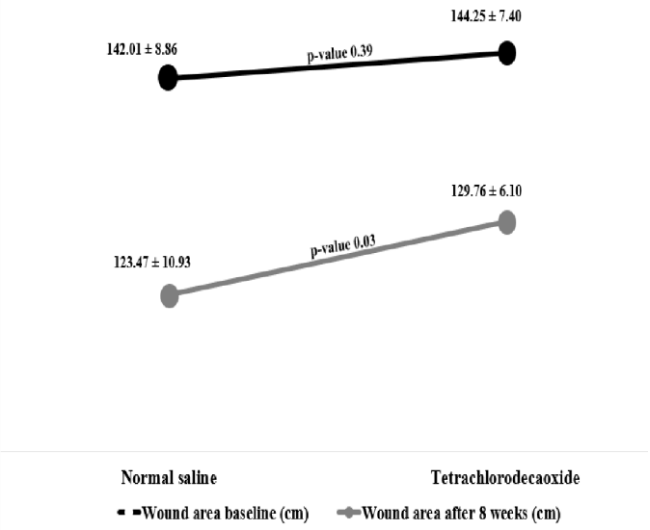
New therapeutic options have been tested in recent years in an effort to enhance patient outcomes. There has been modest success with recombinant platelet-derived growth factor in treating DFUs.[32] Wound healing has been slowed by the inability of other topical medicines

Table 2: Bifurcation and mean difference of all the independent variables with respect to normal saline versus tetrachlorodecaoxide solution groups

Variable Categories	Normal saline n = 20 (50.0)	Tetrachloro decaoxide n = 20 (50.0)	p-value
Age (years)			
Mean ± SD	54.15 ± 10.72	59.15 ± 10.15	0.14
Gender			
Male	(65.0)	(45.0)	0.20
Female	(35.0)	(55.0)	
Diabetic wound grading			
0	(15.0)	-	0.40
1	(40.0)	(40.0)	
2	(35.0)	(50.0)	
3	(10.0)	(10.0)	
Healing period (months)			
Mean ± SD	2.92 ± 0.53	3.36 ± 0.71	0.03
Blood sugar random (mg/dL)			
Mean ± SD	241.35 ±21.17	263.75 ±46.64	0.06
Wound area baseline (cm^2)			
Mean ± SD	142.01 ± 8.86	144.25 ± 7.40	0.39
Wound area after 8 weeks (cm^2)			
Mean ± SD	123.47 ± 10.93	129.76 ± 6.10	0.03

to penetrate the surrounding tissues and deeper infection sites.[33] The effectiveness of tetrachlorodecaoxide solution against normal saline as a topical wound care treatment is compared in this study. A wide range of ulcer types and etiologies were considered during this investigation. Using randomization as a technique of registration, researchers were able to minimize selection bias. Both groups have the same number of instances for each kind of ulcer, wound area score, gender, and diabetes status (diabetes mellitus). There are four main stages of wound healing, each of them overlapping and intertwined with the others: hemostasis, inflammation, granulation and remodeling. As blood cells, fibroblasts, keratinocytes and growth factors are coordinated during the healing of wounds, the healing process is accelerated. Diabetic wound healing may be delayed because of a lack of coordination between these cells and growth hormones and cytokines, which is not fully understood.[12] The wound healing process in diabetic foot ulcers is slowed, according to both clinical and experimental investigations (DFU). Reactive oxygen species (ROS) have been shown to increase apoptosis and delay wound healing in injured tissue. The delayed healing of wounds in diabetics is a result of diminished synthesis of several growth factors, including TGF-, EGF, PDGF, IGF-1, and VEGF, as well as lower collagen deposition and a delayed inflammatory response, which all contribute to the delay in wound healing.[13]

Figure 1: Mean difference of wound area at baseline (cm2) and wound area after 8 weeks (cm2) of all the patients with respect to normal saline versus tetrachlorodecaoxide solution groups.



Diabetes patients with tight glycemic control had a decreased long-term risk of microvascular and neurological complications, according to findings from the Diabetes Control and Problems Trial (DCCT) and the UK Prospective Diabetes Study (UKDPS), which may help with wound contraction speed. DFU presents a significant therapeutic challenge since it is associated to intrinsic issues such as hemodynamic irregularities, hypoperfusion, aberrant angiogenesis, and neuronal ischemia, as well as extrinsic variables such as infection and ongoing trauma that obstruct wound healing. Because traditional pharmaceutical therapy for DFU is lacking, it cannot be treated with a single technique.[14]

Therapies for treating diabetic wounds include the removal of dead, damaged, or diseased tissue; antibiotics; tissue grafts; proteolytic enzymes; corticosteroids; and other treatments. However, only a small percentage of patients benefit from these treatments, and their negative effects prevent them from being widely used. TGF-, EGF, PDGF, IGF-1, and VEGF have been shown in studies over the last few decades to speed wound healing by enhancing cell mitosis, migration, and neoangiogenesis. As a result, they aren't commonly utilized since they might cause problems with wound healing. Chronic, nonhealing DFU is connected with increased expenditures and a worse quality of life for patients. New treatment medicines with low side effects are needed as a result.[15] Nowadays, natural medicines produced from plants that may have hypoglycemic effects are more widely accepted, prompting clinical research based on evidence to be conducted in the regular practice of wound care. Triterpenes, alkaloids, and flavonoids, among other plant-derived active components, have been proven to have wound healing potential through modulating one or more healing stages.[16]

Because of its compatibility with human tissue, normal saline is often suggested as a wound cleaning solution for its ability to cleanse wounds. In the process of healing a wound, this fluid has no negative effects on fibroblasts or keratinocytes. It has not been shown to be beneficial in preventing infection. While many cleaning methods have shown to be safe and effective, others have the potential to harm or kill cells that are critical to the healing process. Nontoxic and isotonic, normal saline is regarded the best cleaning fluid since it does not harm healing tissue.[17] People with diabetes are more

vulnerable to wounds on the lower limbs and feet that don't heal for a variety of reasons. A diabetic's foot may become weak and numb as a result of nerve loss, which may cause discomfort. Numbness may put patients at risk for foot injuries, either by trauma or by walking on a blister or callus without experiencing any discomfort (18).

Diabetic skin is also more prone to breaking, which increases the chance of infection. As a result of diabetes, lower leg and foot blood arteries might stiffen and become obstructed by peripheral artery disease. Patients with this syndrome are more vulnerable to infection and ulcers because of impaired circulation (19). Wound healing can be hampered by inadequate tissue perfusion (the distribution of oxygen in the body), bacterial infection, starvation, and poor blood glucose control. A foot ulcer affects 15 to 25% of diabetics at some point during their life. Lower limb amputations are more common in diabetics than in non-diabetics because these wounds are more difficult to treat and heal(20).

Standard wound care is used to treat patients with diabetic foot ulcers. Hyperbaric oxygen therapy (HBOT) clinics may be recommended to many patients when normal wound treatment fails to heal them. As stated by Fedorko et al., the most important outcome was "freedom from having or meeting the criteria for amputation." One study's definition is different from the others. " There had been no significant improvement in wound healing over the follow-up period, indicating an ongoing threat of serious systemic infections from that particular injury; (2) a deep infection of the bone and tendons had persisted in spite of treatment with antibiotics, hospitalization, and/or the presence of a pathogen; (3) the affected limb was incapable of bearing weight and had seized; and (4) all three of the aforementioned conditions were present. Researchers utilized unverified digital images and vascular surgeons' recommendations to determine if a patient needed a leg amputation. It is only necessary to amputate the diabetic foot that can no longer be salvaged. Some of the circumstances that need the use of this therapy include wet gangrene (infection and ischemia), life-threatening sepsis and substantial muscle necrosis, as well as a bedridden or functionally useless limb(21). At three times, Abidia et al. assessed full ulcer healing. It took six weeks for the HBOT and conventional treatment groups to achieve full healing for five and one of eight patients, respectively. At six months, five patients in the HBOT group had fully healed ulcers, whereas two patients in the conventional therapy group had fully healed ulcers. After a year, five patients in the HBOT group were still exhibiting symptoms of complete recovery, but none in the standard treatment group. This led us to believe that both patients who had fully recovered after six months in the conventional treatment group had recurrences of their original ulcers after a year (22).

A total of two fatalities were recorded in the HBOT group, according to Kalani and colleagues. Multiorgan failure claimed the life of one patient, while increasing heart failure claimed the life of the other. Acute myocardial infarction was the cause of death for two patients in the standard-of-care group, whereas cerebral infarction (stroke) was the cause of death for a third patient (heart attack) (23). According to Londahl et al., one patient in the HBOT group died of multiple organ failure 20 days after the research began. Two patients in the usual care group died of myocardial infarctions after a median of 162 and 218 days, while a third patient died of sepsis caused by an infected foot ulcer, respectively (23).

According to Faglia and colleagues, the usual care group had four forefoot and eight toes amputated whereas the HBOT group had five forefoot and 16 toes amputated. There had been one minor amputation in the HBOT group but none in the conventional care group by an undetermined follow-up date (probably one year after the start of the study)(24). During an undefined amount of time, four minor amputations occurred in the HBOT group and 41 in the standard care group, according to Duzgun et al. time. Londahl et al. reported four minor amputations in the HBOT and conventional treatment groups after a year of follow-up(25). Due to the fact that Fedorko et al used the same criteria for minor amputations as they did for large ones, their results could not be included in the GRADE grading system. During the study's duration, just one minor amputation occurred in the conventional therapy group. After tracing the ulcers onto a clear sheet, Abidia et al transformed the tracings into digital pictures and measured the ulcer surface area reduction. A unique software tool was used to compute the total surface area. The depth of the ulcer was also measured, as were any visible evidence of infection (21). Kessler et al employed a computer programme to calculate the baseline wound ulcer surface

area in square centimeters, as well as the percent decrease in wound ulcer surface area from baseline to day 15, day 15 to day 30, and day 30 to baseline(26). Fedorko et al. used highresolution calibrated digital photographs to take manual measures of wound breadth and computational assessments of wound surface area and perimeter (27).

While the skin's potential to repair itself is enormous, the skin's ability to heal itself is limited by dryness of the wound surface and the presence of infections (34, 35). Normal saline showed better wound healing effect than tetrachlorodecaoxide solution in this study as is shown in table two. In addition, healing period and size of wound area is significantly lesser in normal saline group than that of tetrachlorodecaoxide solution. Because regular saline may keep the wound surface wet and does not interfere with the healing process, it may be to blame." This may explain why wounds treated with regular saline had a slightly better outcome than those treated with tetrachlorodecaoxide solution. Another study demonstrated a significant difference in the healing time of a lesion treated with regular salt water and tetrachlorodecaoxide solution, as well (36). The first step in evaluating a foot ulcer is to ensure that it has been adequately debrided. After removing necrotic tissue and surrounding callus, a healthy bleeding edge can be seen. It is common for patients (as well as doctors) to underestimate the necessity of debridement; therefore, they are often taken aback when the newly debrided ulcer first appears. The use of topical debriding enzymes is prohibitively costly and has yet to be shown effective. Thenon-toxic and isotonic property of normal saline may help in healing of the wound more efficiently than tetrachlorodecaoxide solution. The healing duration and wound area (after 8 weeks) were both statistically substantially (p-value <0.05) lower in normal saline compared to tetrachlorodecaoxide solution, according to this study. There are various flaws in this study. Because of the tiny sample size and the inclusion of only one institution. The findings did not represent the work of general surgeons and internists at other facilities. Despite the fact that these variables raise questions, the underlying conclusion remains sound.

5. Conclusion

In conclusion, normal saline significantly shortened the healing duration and wound area after 8 weeks when added to a conventional therapy for DFU. A comprehensive strategy is necessary to treat DFU effectively. To assist limit the number of patients who may eventually have to have their legs amputated due to DFU-related complications, it may be possible that normal salt water can be used as an alternate treatment option.

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Attitude of Pakistani Women towards Breast Reconstruction after Mastectomy for Breast Cancer

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Abstract

Introduction: The trends in breast reconstruction after mastectomy for breast cancer have changed significantly in the western world but in our part of the world, breast disease and reconstruction are still considered a taboo. This study assesses the attitude of breast cancer patients planned to undergo mastectomy towards breast reconstruction; whether they are familiar with the availability of such procedure and if they would opt for it given the option.

Methods: 150 patients (75 in one-month after mastectomy and 75 in one-year after mastectomy group) were included in this cross-sectional study carried out at tertiary care hospitals' breast clinics in Lahore, Pakistan.

Results: Majority of patients would opt out of breast reconstruction, in both one month and one-year post-mastectomy group (93.9% and 90.7%) respectively. More patients (61.3%) in one-year post-mastectomy were found familiar with methods of reconstruction while only 35% patients knew about it in one-year post-mastectomy patients.

Conclusion: Majority of the women diagnosed with breast cancer do not want to undergo breast reconstruction surgery. Specific approaches are needed to address at the patient level, the negative opinion regarding breast reconstruction for women's own emotional health.

Keywords: breast cancer, breast reconstruction, decision-making, women.

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1. Introduction

During the last decade, with advancement in medical science leading to improvement in early detection and prompt treatment of breast cancer with better survival rates, there has been similar changes in attitude of patients after mastectomy in that patients are more aware of reconstruction options and many inquire and discuss this before undergoing mastectomy and arrange for reconstruction services at the same or different health care facility depending upon the level of expertise and options available especially in the western world(1). Many centers across the world offer early reconstruction services to patients, at a later stage (delayed breast reconstruction, DBR) or at the time of the mastectomy (immediate breast reconstruction, IBR), even though the latter is associated with increased risk of major complications not from the primary surgery but from the breast reconstruction itself.[2] Reconstruction primarily depends on the type of mastectomy performed. Mastectomy aims at resecting the glandular breast tissue up to the inframammary fold. Further modifications of the procedure include skin, areola or nipple sparing mastectomy whereby much of breast's skin envelope, nipple or areolar complex is spared, respectively, or all are spared depending upon the surgeon's assessment, spread of disease and previous procedures done on breast.[3]

There are several methods available for reconstruction for example implant/ expanderbased reconstruction and autologous tissue or flap or fat graft-based reconstruction. Later a refinement surgery is performed to reach symmetry in the two breasts in terms of size, contour and shape. Skin tattooing for nipple is also a part of this (4). Despite the rise in breast reconstruction after surgical treatment for breast cancer, most women undergoing mastectomy do not want to undergo reconstruction even though the overall 5-year survival rate after mastectomy is now 89.7% with stage II disease and more, and 98.8% for those with localized disease. A recently published survey in the United States reported that factors associated with women not undergoing reconstruction include black ethnicity, low educational level, increasing age, major comorbidity and chemotherapy (5). Nearly half of the women in this survey expressed that the most common reason for not having reconstruction was wanting to avoid an additional surgery, with a third believing that it was not very important. Interestingly, 36.3% reported fear of implants and 18.1% did not know that breast reconstruction was available as an option at all (6).

Breast reconstruction, despite of being oncologically safe as well as known to result in better psychosocial outcomes, is not widely popular amongst breast cancer patients. Several factors are associated with decreased rates and popularity of breast reconstruction.[7] These are broadly classified in patient based, physician based and cancer related factors. Patient factors include old age patients, non-white ethnic background and poor socioeconomic status including low income and rural residence.[8] All patients with early breast cancer should ideally be provided with option of mastectomy with breast reconstruction along with breast conservative surgery or mastectomy alone.[9] Universal coverage for postmastectomy breast reconstruction was made mandatory after the enactment of the Women's Health and Cancer Rights Act in the United States in 1998. However, no such reforms are made in this part of the world leading to women feeling less feminine after the surgeries. In the US, several population-based studies have showed attitudes of women towards reconstruction but despite guaranteed insurance, the percentage of patients undergoing reconstruction was only 25% to 35 % during the last decade (10). These numbers have increased during the last five years with as much as 50% females undergoing breast reconstruction at the time of mastectomy for breast cancer and another 20% undergoing it at a later stage (11). This study focuses on the attitudes of people in South Asia towards reconstruction, as talking about this body part per se is frowned upon. Patients are brought in with stage VI disease as they do not want to talk about their private parts let along discuss and consider reconstructing it afterwards. However, with rise in education in Asia, and people becoming more accepting to the idea of a healthy living both physically and mentally, it is important that patients are provided with option to be able to look like what they used to before as it has a significant impact on patient's emotional health (12). European Organization for Research and Treatment of Cancer (EORTC) has developed a questionnaire (EOTRC-BR23) especially for post-mastectomy patients which takes into consideration the loss of breast affecting her quality of life. It consists of a total of 53 questions out of which question numbers 39 to 42 focus on loss of breast tissue by inquiring about feeling physically less attractive after the disease/treatment, feeling less feminine, finding it difficult to look at yourself naked and having been dissatisfied with your body.[13] It is hoped that with this research breast reconstruction will be a topic talked about on public forums and people will be made aware of how breast malignancy does not necessarily mean loss of breast tissue and social awkwardness. Patients can spend a normal life and feel like themselves again .[14]

2. Materials & Methods

The study design is cross-sectional study. Women in Lahore, Pakistan who were diagnosed with breast cancer and underwent surgery in December 2020 were included in this study. Selfmade questionnaire was used for interviewing the patients, which was validated after running a pilot study first and interpreting the results. Study population was patients who attended the breast clinics of three of the tertiary care hospitals of Lahore, Punjab, Pakistan namely Shaikh Zayed Hospital, Lahore General Hospital and Mayo Hospital for follow up of mastectomy for breast cancer. Women included were consented patients, who had undergone surgery for breast cancer (mastectomy). Data was collected from two group of patients: at one month after surgery (January 2021) and one year after the study (December 2021). Patients who were not included in this study were below 18 years of age, any mental or cognitive disability, could not complete survey form in Urdu or English and patients with stage IV breast cancer disease. Patients' demographics included age only. Data was collected using questionnaires inquiring about; whether patients were familiar with the availability of breast reconstruction and secondly if given the option would they choose to undergo breast reconstruction if recommended by the surgeon. All statistical analysis were done using SPSS (Statistical Package for Social Sciences) version 23.0.

3. Results

During December 2020, 168 patients who had undergone mastectomy for breast cancer were interviewed out of which 15 patients did not fulfil the

inclusion criteria while the remaining 3 withdrew their consent to be included in the study.

Table 1: Age groups of the participants and duration after surgery

Age groups	After 1 month surgery		After 1 year surgery	
	N	%	N	%
19-28 years	4	5.3	1	1.3
29-38 years	16	21.3	14	18.7
39-48 years	24	32.0	24	32.0
49-58 years	22	29.3	32	42.7
59 and above	9	12.0	4	5.3

The study was conducted with 150 patients, 75 (50%) of whom had undergone surgery 1 month earlier and 75 (50%) of whom had undergone surgery 1 year earlier. The mean age of the patients was 46 years in the one-month postsurgery group and 54 years in the one-year postsurgery group. All the patients were females. (Table 1).

Most patients are middle aged (39 to 58 years of age), 46% those who underwent surgery one month back and 56% those who underwent surgery one year back. The above mention table shows that majority of females were not familiar with the method of reconstruction. However, only few of them valued their body image and were knowledgeable about reconstructive techniques. There 50 (65%) patients said they would get reconstruction if their surgeon recommended it. 29 (38.7%) of the sample included those females who have surgery just one month before. Out of patients who had undergone mastectomy one month ago, 61.3% were not familiar with methods of reconstruction while in one-year post-mastectomy group, only 35% were unfamiliar with it (Table 2). A large majority of patients from both groups stated that they would not agree to breast reconstruction if recommended by the surgeon, 93.3 % and 90.7 % respectively in both the groups (Table 2).

Table 2: Information related to reconstructive method

Statement	Responses	1 month after surgery		1 year after surgery		P value
		Frequency	percentage	Frequency	percentage	
Familiar with the method of reconstruction	Yes	5	6.7	7	9.3	.000
	No	70	93.3	68	90.7	
Would you agree to beast reconstruction if recommended by the surgeon	Yes	29	38.7	50	65	.480*
	No	46	61.3	25	35	

4. Discussion

The decision to proceed with reconstruction after breast cancer surgery is complex. It is dependent on several factors for example age of the patient, ethnic background, geography (residence in urban or rural areas), income and social pressure. Surgeons, psychologists and social workers must address these in counselling sessions when planning treatment for breast cancer. The decreased rates of patients familiar with breast reconstruction is also attributed to the same along with lack of education and lack of discussions and awareness on public forums (15). In a country where rates of immediate breast reconstruction are less than 1%, it is important to assess the changes in quality of life of women after mastectomy. Pakistan is a country where patients are not accustomed with breast reconstructive procedures due to both financial and social reasons. Therefore, a spotlight on the issue has become mandatory which is provided through our research. This study provides valuable insights into demographics, awareness regarding breast reconstruction methods, and willingness to undergo reconstruction among patients undergone mastectomy.

Demographics reveals that patients are diverse in age, with the majority falling within the middleaged bracket. The mean age of patients falling in one-month and one-year post-surgery group was 46 and 54 years respectively. This finding is consistent with a similar study done in California (14). There's a significant lack of familiarity with reconstruction methods among a large portion of overcome by raising awareness among the people using social media and news media. Awareness campaigns can be run in societies and patients. This shows a need for improved patient education. More than 90 percent of the participants in both groups were not familiar with reconstruction surgeries. This is a

significant proportion of the population. The major reason behind this result is lack of education. In a similar study, surgeons believe lack of education can be the major reason why most patients are unfamiliar with the breast reconstruction surgeries (16). A study conducted by Mehwish et al. reported that acceptance rate of breast reconstruction surgeries was more among urban population and also among women who were doing jobs as compared to housewives(17). In a lower socioeconomic country, a large population of women are not having a quality education due to cultural and religious reasons. Another reason for not knowing about such surgeries is that healthcare professionals don't aware patients regarding reconstruction after surgery. Due to overburdened healthcare system in Pakistan, doctors seldom find time to share such information with the patients. This could be overcome by raising awareness among the people using social media and news media. Awareness campaigns can be run in societies and rural areas to decrease the knowledge gap. Despite willingness to undergo reconstruction if recommended by their surgeon, the majority of patients were unwilling to agree to the procedure. This attributes to a lot of factors. Alderman et al mentioned some of the factors in his study which include older age, fear of complications, socioeconomic status, frustration about the surgery, late-stage cancer and psychological problems (18). In third world countries social norms and cultural barriers could be the biggest hurdle. The second biggest reason could be the lack of resources. Majority of patients presenting in government hospitals are non-affording. Mehwish et al. reported that financial constrains is a major factor for unacceptability (17). Such cosmetic surgeries are not offered without some cost in government hospitals so most patients are reluctant to have surgery. Many fear the complications of the surgery and being exhausted by the mastectomy before and not willing to undergo another surgery. One of the major factors is demographics. One of the significant findings of the study is the difference of acceptance and willingness of reconstruction surgeries among the set of patients. Patients who were one-year postop were more willing to undergo breast reconstruction surgery as compared to one-month postop group. This difference suggests evolving attitudes over time. Patients might find time to cope with the emotional and physical stress after mastectomy and now being ready for another surgery. Cosmetically unpleasing shape might be one of the reasons that women opt for a delayed surgery. Comprehensive patient education and shared decision-making are crucial to address the identified gaps and empower patients in making informed choices. Healthcare providers play a crucial role in providing precise information, addressing concerns, and supporting patients throughout their treatment journey. Breast awareness campaigns should be improved and made more effective. Rural areas should be more targeted as they are much deprived from the knowledge and education. The limitation of our study was smaller sample size. Our research also lacks the reasons and justification of the patients who are reluctant for not undergoing reconstruction surgeries despite being recommended by the surgeon. Further study is needed regarding this.

5. Conclusion

There are several complex factors (social to socioeconomic and psychological) that influence a woman's decision when dealing with breast reconstruction after surgical treatment for breast cancer. However, this study confirms that women suffering from breast cancer need awareness about the availability of breast reconstruction methods so that they can make an informed decision for themselves. Also, only a few patients if recommended by the surgeon would opt for breast reconstruction.

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Clinical Correlation between Hyponatremia and Complicated Appendicitis, A Prospective Cohort Study

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Abstract

Introduction: Acute appendicitis is a frequent surgical emergency; therefore, prompt diagnosis and management are essential. Certain clinical predictors are used to diagnose it. However, no such predictor is available to assess the complicated appendiciti s in the absence of radiological investigations like CT scan. Serum sodium levels have gained a lot of attention in recent times to assess the severity of the disease and is believed to be a clinical parameter in the diagnosis of complicated appendicitis preoperatively.

Methods: This study involves correlation of hyponatremia with complicated appendicitis. We included 236 patients in this study, meeting the inclusion and exclusion criteria. For each patient, preoperative serum sodium levels were measured and co-related post operatively.

Results: Our study reported a strong correlation between hyponatremia and its pre-operative accuracy in diagnosis of complicated appendicitis.

Conclusion: Hyponatremia can be considered as a reliable marker of complicated appendicitis due to its cost effectivity and easy availability in emergency departments.

Keywords: Complicated appendicitis, Clinical markers, Hyponatremia, Low-income country, Cost effective marker

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1. Introduction

Acute appendicitis (AA) is the most common acute emergency in surgical ER.[1] Appendicitis is the inflammation of the vermiform appendix.[2] It is most seen in middle aged population .[3] It typically presents acutely within 24 hours of the onset of symptoms of fever, loss of appetite, pain right iliac fossa or umbilicus but can also present late.[4] Acute appendicitis can be either complicated (CA) or uncomplicated (UCA).[5] Complicated appendicitis can be either gangrenous, perforated, abscess or a phlegmon.[6] Uncomplicated appendicitis can be managed conservatively with IV antibiotics.[7] Whereas, complicated appendicitis needs aggressive management due to its related complications such as paralytic ileus, surgical site infections and prolong hospital stay.[5]

Current concurrences are unable to predict CA from UCA. A CT scan is widely used to diagnose AA,[4] but carries a lot of drawbacks like cost effectivity, non-readily availability, radiation exposure, contrast associated injury, time consuming and delayed results. Various clinical and laboratory parameters are used for this purpose.[8] The clinical parameters like tachycardia (>100/min), fever (>37.5c), elevated CRP (50mg/l), leukocytosis (>10nl/l) neutrophilia (>85%)[9,] symptoms for more than 24 hours and abdominal pain for more than 48 hours are likely to be associated with complicated appendicitis. However, these parameters are inadequate to differentiate between CA and UCA. Serum sodium levels preoperatively is shown be to a reliable laboratory parameter in aiding the diagnosis of CA. Moreover, it is readily available and cost effective and does not take a lot of time.[10] This hyponatremia is attributed to certain inflammatory changes in the body. Various inflammatory cytokines release such as IL-6 which stimulates the release of vasopressin, leading to increased water retention and decreased sodium levels.[10,11] The rationale of this study is to assess the diagnostic accuracy of hyponatremia in correlation with complicated AA.

2. Materials & Methods

A prospective cohort study was conducted by collecting data from 236 patients who were presented in the surgical emergency of Rawalpindi Teaching Hospital and were operated for acute appendicitis between May 2023 to February 2024. All patients between the age of 15-45 years presented in the surgical emergency were included in the study. Whereas pregnant females, patients of renal failure and children below 15 years were excluded from the study. All patients underwent open appendectomy and intra-operative findings were corelated with preoperative serum sodium levels.

We divided patients into two groups, complicated (CA) and uncomplicated (UCA) groups and their sodium

levels were obtained at the time of admission in the emergency department. Normal sodium levels in uncomplicated group are from 135-145 mEq/L whereas, in complicated group sodium levels were expected to be 128-135 mEq/L.

Statistical analysis was performed using SPSS version 26.0. Data was collected in single format Microsoft Excel sheet. The significance of serum sodium levels was assessed by using paired T test. Numerical data was depicted as mean ± SD. P-value was set at <0.05 which is considered significant using ROC curve.

3. Results

A total of 236 patients underwent open appendectomy between May 2023 to February 2023, mean age was 27.6 years and 121 among them were female and 115 male patients. Out of these, 145 patients had serum sodium level of 128-135mEq/L and the per operative findings showed that 129 patients had complicated appendicitis while 61 had acutely inflamed appendix which was uncomplicated [Table-1 and 2].

Table-1 showing total number of patients, their time of presentation, preoperative serum sodium levels and per-operative findings.

	age	gender		Peritonitis	Neutrophil		Presentation		Intraoperative					
	Mean	Male	Female	Mean	80-90	60-80	<24 hours	>24 hours	acutely inflamed	abscess	phlegmon	gangrenous	perforated	
NA+	128135 meq/L	28.26	67	78	.25	102	43	51	94	16	58	28	29	14
	135145 meq/L	26.70	48	43	.38	64	27	27	64	61	1	16	2	11

Table 2: One sample T-Test was applied which showed significant results between complicated and uncomplicated groups.

	N	Mean	Std. Deviation	Std. Error Mean
UCA	236	.3602	.48107	.03131
CA	236	.6610	.47437	.03088

4. Discussion

Acute Appendicitis is one of the most common surgical emergencies [12,1] where early diagnosis and earlier intervention are required to prevent the complications of CA. The diagnosis of acute appendicitis is still a diagnostic dilemma due to its atypical symptoms and the unreliability of different scoring systems and the cost effectiveness of radiological investigations makes it difficult to distinguish CA from UCA. Gomes et al. introduced classification for the grading of appendicitis based on its intraoperative findings. Grades 1&2: Hyperemia and fibrinous exudative is considered as uncomplicated, Grade3 A: Segmental necrosis, Grade3: Necrosis of the base of the appendix, Grade4 A: localized abscess, Grade4 B: Regional peritonitis, and Grade5: Diffuse peritonitis. Grade 3,4&5 are considered complicated appendicitis.[12]

A systemic review reported recently states that, serum sodium level can be used as a marker in patients with acute appendicitis to further confirm its correlation.[13] Hyponatremia is the most common electrolyte abnormality in admitted patients and it is considered to be a poor prognostic factor in patients with longer hospital stay.[14] Studies have been done in the past that shows the incidence of hyponatremia in post operative patient as IL-6 and Vasopressin levels increases after surgery. [15, 16] In surgical patients it can be used to predict morbidity and mortality.[17,18] This correlation can be explained by neuroendocrine pathway, that implicates the release of IL-6, leading to the release of vasopressin (Anti diuretic Hormone) which ultimately leads to hyponatremia.[19] Several non-osmotic stimuli for the release of vasopressin have been identified, including hypovolemia, pain, nausea, and certain drugs.[20]

As serum electrolytes are a part of routine investigation in patients presenting in emergencies in our hospital, therefore due to its easy availability and cost effectiveness it is suggested to assess the role of serum sodium in predicting CA. Several studies, included in our literature review,[7,10,11,21] have been done previously that suggest its correlation with CA. Hyponatremia

being a predictive marker of severity, can affect the management of patients.[10,22]

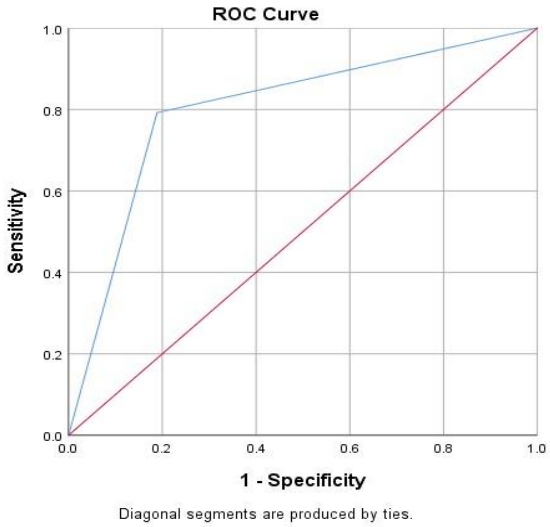

Figure 1: ROC representing the curve obtained to predict accuracy of pre-operative hyponatremia in complicated appendicitis. AUC = 0.739, 95% CI:95%, p-value <0.05.

5. Conclusion

The study was intended to assess the correlation between Hyponatremia and complicated appendicitis. Our study showed significant results therefore it should be used in the emergency department as it is cost effective and easily available.

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Improving The Quality Of Psychiatric Inpatient Discharge Certificates Through A Two Cycle Audit In A Tertiary Care Hospital In Pakistan

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Abstract

Objective: To assess the quality of inpatient discharge summaries according to defined standards. To design a format for discharge summary in accordance with these standards and to provide education and training to the residents about these standards. To reassess the discharge summaries after implementation and evaluate the improvement.

Methods: Cycle 1: In order to improve the quality, and standardize the format of discharge summaries we formulated a set of criteria after taking input from consultants and residents. Two researchers evaluated a total of 30 discharge summaries which were randomly chosen from those issued on April May 2022. Following this a new format of discharge summary was designed and distributed. Residents were educated regarding the procedure of filling new discharge summaries.Cycle 2: Two researchers evaluated a total of 30 discharge summaries which were randomly chosen from those issues on July -August 2022.

Results: In cycle 01 there was 03 (10%) mention of ICD code, gender was mentioned in 11 (36.6%), Contact Details mentioned for 02(6.67%), Inpatient Treatment 07 (23.3%) and Consultant incharge 5(16.67%). Cycle Two revealed significant improvement in most of the areas. Following the implementation there was mention of ICD code in 24 (80%), Contact Details in 20 (66.7%), Inpatient Treatment for 29 (96.7%) and Consultant-Incharge, 19(63.3%).

Conclusion: Cycle 2 showed improvement in most of the areas. Factors which contributed to this would be resident education and circulation of standardized discharge forms.

Keywords: Quality Improvement, Psychiatry, Inpatient, Discharge

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1. Introduction

Psychiatric inpatient discharge summaries play a crucial role in the continuum of patient care, ensuring that essential information is transmitted to primary care providers and patients themselves. These documents should encompass vital information, including diagnosis, treatment details, contact information, and the identification of the medical team responsible for the patient's care. However, the quality of discharge summaries in psychiatric inpatient settings can vary widely, leading to potential gaps in patient care and communication between healthcare providers.

In this study, we address this issue by conducting a two-cycle audit to assess and enhance the quality of psychiatric inpatient discharge certificates in a tertiary care hospital in Pakistan. Our primary objectives were to standardize the format of these discharge summaries based on defined criteria and provide education and training to residents to ensure adherence to these standards. Ultimately, we aimed to evaluate the impact of these interventions on the quality of discharge certificates.

2. Materials & Methods

Cycle 01 - Assessment and Standardization: In the first cycle, we focused on the assessment of existing discharge summaries and the standardization of the format. To achieve this, we employed the following steps:

Criteria Development: We formulated a set of criteria for discharge summaries based on consultations with psychiatric consultants and input from residents. These criteria were designed to encapsulate the essential components of a comprehensive discharge summary.

Sample Selection: Thirty psychiatric inpatient discharge summaries were randomly selected from those issued in April and May 2022 for evaluation. These summaries were chosen to provide a representative snapshot of current documentation practices.

Evaluation: Two researchers independently evaluated each of the 30 discharge summaries according to the criteria developed. The assessment included the presence or absence of key elements such as patient identification, diagnosis, treatment details, and contact information.

Format Redesign: Based on the findings of the evaluation, a new format for psychiatric inpatient discharge summaries was designed. This format aimed to standardize the documentation of patient information and treatment details.

Education and Training: Medical residents were educated about the newly developed format and the importance of accurate and comprehensive documentation in discharge summaries. Training sessions were conducted to ensure that residents understood the criteria and the revised format.

Cycle 02 - Post-Implementation Evaluation: The second cycle aimed to reassess the quality of psychiatric inpatient discharge summaries after the implementation of the new format and resident education. This phase included the following steps:

Sample Selection: A second set of thirty psychiatric inpatient discharge summaries from July and August 2022 was randomly selected for evaluation. This sample allowed us to gauge the impact of our interventions and improvements post-implementation.

Evaluation: Similar to Cycle 01, two researchers independently evaluated the 30 discharge summaries using the same criteria. This evaluation provided insights into the effectiveness of the implemented changes in discharge documentation.

3. Results

The findings from both Cycle 01 and Cycle 02 demonstrated the significant impact of our interventions on the quality of psychiatric inpatient discharge certificates. Below, we summarize the key results from both cycles:

Cycle 01:

ICD Code Mention: Only 10% of discharge summaries mentioned the International Classification of Diseases (ICD) code, an essential element for diagnostic reference and billing purposes.

Gender Mention: Gender was reported in just 36.6% of the discharge summaries.

Contact Details: A mere 6.67% of the summaries included contact details, which are crucial for follow-up care and communication.

Inpatient Treatment: Inpatient treatment details were mentioned in only 23.3% of the summaries, leaving room for improvement in describing the care provided during hospitalization.

Consultant In-Charge: The consultant in charge was identified in just 16.67% of the summaries, which could potentially lead to confusion about patient management postdischarge.

Cycle 02:

The results from Cycle 02 revealed significant improvements in several key areas, indicating the positive impact of the implemented changes:

ICD Code Mention: There was a remarkable increase in the mention of ICD codes, with 80% of discharge summaries now including this crucial diagnostic information.

Contact Details: Contact details improved substantially, with 66.7% of the summaries now containing essential contact information.

Table 1 Analysis of Parameters Before & After Implementation

Parameters	Before Implementation n (%)	After Implementation n (%)	p Value*
Patient's Name	30 (100)	30(100)	-
Hospital ID	26 (86.67)	30(100)	0.056[a]
Gender	11 (36.67)	30(100)	0.000[b]
Age	04 (13.3)	30(100)	0.000[b]
Date of Admission	30 (100)	30(100)	-
Date of Discharge	29 (96.67)	30(100)	0.5[a]
Address	25 (83.3)	29 (96.67)	0.97[a]
Contact Number	2 (6.67)	20 (66.67)	0.000[b]
Diagnosis	24 (80)	28 (93.33)	0.127[a]
ICD Code	03 (10)	24 (80)	0.000[b]
Condition at Presentation	30 (100)	30(100)	-
Condition at Discharge	21 (70)	30(100)	0.001[a]
Inpatient Treatment	07 (23.3)	29(96.67)	0.000[b]
Discharge Treatment	29 (96.67)	29(96.67)	0.745[a]
OPD Follow up	28 (93.33)	30 (100)	0.246[a]
Consultant In-Charge	5 (16.67)	19 (63.33)	0.000[b]
Resident Incharge	24 (80)	30(100)	0.012[a]

'a' signifies Fisher Exact Test (when more than one cell has expected count less than five) superscript 'b' signifies Pearson Chi Square Test

Inpatient Treatment: The mention of inpatient treatment details saw a significant increase, with 96.7% of discharge summaries providing comprehensive information about the care received during hospitalization.

Consultant In-Charge: The consultant in charge was now identified in 63.3% of the summaries, enhancing clarity and continuity of care.

Gender Mention, Age, Date of Admission, Date of Discharge, and several other parameters showed substantial improvements in Cycle 02. However, these changes did not reach statistical significance, suggesting that the focus of the interventions and education primarily influenced the critical elements such as ICD codes, contact details, inpatient treatment, and the consultant in charge.

More than half of all supervisors considered men to be more confident and better at leadership and decision-making in an emergency setting. During the training period, no significant difference was found among male and female supervisors in their attitude and rating of residents (Table 3). There were only 02 areas of significant difference among male and female supervisors: First, in their opinion about the availability of residents at all hours (P=0.013) as most men thought female residents are not available at odd hours; Second, more women supervisors perceived that female residents are better at providing patient care whereas men thought that both male and female residents are equally good (P=0.043).

There was a consensus that family responsibilities are more likely to affect the training of women residents. Eighty-two per cent opined that training women are more likely to suffer due to family responsibilities (Table 3). Only 13% (n=3) thought that the working environment needs to change in surgical departments to accommodate women.

4. Discussion

Discharge is one of the most important processes that hospitalized patients undergo. The transition from hospital to home can be an overwhelming time for many patients given the amount of information provided as they approach discharge.[1] This complex process requires communication between various departments and has a massive impact on patient outcomes. A critical task of the inpatient inter professional team is readying patients for discharge.[2] The significance of enhancing the quality of psychiatric inpatient discharge certificates is demonstrated by this study. The results of our two-cycle audit highlight the effectiveness of standardizing discharge forms after collaboration with residents and consultants alike. It further emphasizes that while handover of pertinent information between hospital and primary care is necessary to ensure continuity of care and patient safety, both quality of content and timeliness of discharge summary need to be improved.[3] In another study focusing on the documentation quality of patient-directed discharge, half of the suggested documentation elements were recorded in no patients. It also revealed that the overall documentation quality was poor, suggesting the need for further training and interventions to facilitate more thorough documentation.[4]

The low mention of ICD codes in Cycle 01 (10%) indicated a significant deficiency in reporting patient diagnoses, which are not only essential for patient care but also serve as the grounds for insurance billing and reimbursement from the government agencies. As proven earlier, a highquality discharge letter contains clear formulations, is structured, contains only relevant information.[5] The substantial improvement in ICD code reporting in Cycle 02 (80%) underscores the positive impact of standardization and education. By making ICD codes a integral part of routine discharge summaries, our contributions have led to improved diagnostic clarity and smoother reimbursement processes.

The low documentation of gender and contact details in Cycle 01 (36.6% and 6.67%, respectively) raised concerns about the hospital's ability to establish contact and maintain follow up with patients after discharge. Overlap of care between hospital and community providers is necessary because it can take several months before people have developed a trusting relationship with community providers.[6] This makes accurate identification details and contact information crucial for post-discharge follow-up to prevent relapse in patients. Communications by hospital mental health staff with outpatient mental health providers is a standard inpatient treatment practice that promotes continuity of care.[7] This communication can only be ensured by accurate documentation of details at the time of discharge. Given the fast pace of hospital psychiatric care and short lengths of stay, it is important to know which patients are most likely to experience improved follow-up care as a result of direct communication between inpatient and outpatient providers.[8] The dramatic increase in both gender (100%) and contact details (66.7%) in Cycle 02 reflects the success of our interventions in addressing these deficiencies.

Similarly, the inadequate mention of inpatient treatment (23.3%) and the consultant in charge (16.67%) in Cycle 01 carried the risk to especially hinder the coordination of patient care. Patients transitioning from inpatient to outpatient care or other healthcare settings rely on comprehensive summaries to ensure that their treatment is continued effectively. The notable improvements in inpatient treatment (96.7%) and the consultant in charge (63.3%) in Cycle 02 underscore the necessity of educating medical residents and implementing standardized discharge documentation to enhance the quality of patient care.

The education and training provided to medical residents were instrumental in improving the quality of discharge summaries. This emphasizes the importance of continued medical education and quality improvement initiatives in healthcare institutions. Additionally, the circulation of standardized discharge forms played a pivotal role in standardizing the documentation process,

ensuring that all necessary elements are consistently included in discharge summaries. Despite these improvements, significant details remain lacking which have the ability to adversely impact patient care. The study's positive outcomes support the need for quality improvement efforts in psychiatric and other inpatient settings. By enhancing the quality of discharge summaries, we not only facilitate the continuity of patient care but also streamline administrative processes, such as insurance billing and reimbursements. Our work emphasizes the fact that collaboration between healthcare providers, consultants, and residents is essential for achieving comprehensive and accurate documentation of patient details. All of these efforts contribute to a much wider impact of consistently improving healthcare for patients and maintaining adequate follow up**.**

5. Conclusion

The two-cycle audit conducted in a tertiary care hospital in Pakistan demonstrates the impact of implementing standardized discharge forms and providing education to medical residents. By addressing deficiencies in psychiatric inpatient discharge summaries, including the omission of key patient information such as ICD codes, gender, contact details, inpatient treatment, and consultant information, we were able to substantially improve the quality of documentation being carried out. This research however underscores the importance of standardized documentation and education in ensuring the quality of psychiatric care received by patients. It is recommended that similar work be carried out in other healthcare institutions to enhance the quality of discharge summaries and, by virtue of that, patient care in psychiatric settings.

While this study has provided valuable insights and demonstrated the efficacy of quality improvement efforts in psychiatric care, it has its limitations, primarily being conducted in a single tertiary care hospital in Pakistan. Future research can elaborate on these findings by examining the impact of such interventions on patient outcomes and the overall quality of psychiatric care in different settings. The results of this study contribute to the ongoing efforts to improve the quality of psychiatric inpatient discharge summaries and, in turn, improve the overall care and treatment of psychiatric patients.

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Efficacy of Upper Limb Orthosis in Pregnant Women Presenting with Carpal Tunnel Syndrome

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Abstract

Objective: To find the efficacy of orthosis on the symptoms of CTS in pregnant women and to investigate the impact of use of CTS splint on symptom relief in pregnant women with CTS.

Methods: A randomized controlled trial (RCT) was conducted involving 28 pregnant women diagnosed with CTS. Fourteen participants were assigned to the intervention group, receiving upper limb orthosis for four weeks, while the remaining 14 comprised the control group. Outcome measures were assessed using the Modified Boston Questionnaire (MBQ), focusing on symptoms such as tingling, numbness, discomfort task difficulty and weakness.

Results: Before the intervention, the distribution of patients based on symptom severity according to the Modified Boston Questionnaire (MBQ) showe d that 85.7% experienced numbness or tingling, 71.4% reported pain or discomfort, 78.6% woke up at night due to symptoms, and 100% had difficulty grasping small objects, difficulty with activities, and weakness in hands or fingers. After the intervention, the intervention group demonstrated a significant reduction in MBQ scores (96.5%) and symptoms (92.9%), compared to the control group (3.5% and 7.1%, respectively). The t-test analysis revealed a significant difference ($p < .001$) between the intervention and control groups, indicating the efficacy of upper limb orthosis in pregnant women presenting with CTS.

Conclusion: The study demonstrates the effectiveness of upper limb orthosis in reducing symptoms of carpal tunnel syndrome (CTS) among pregnant women . With a significant reduction in MBQ scores and symptoms severity observed in the intervention group compared to control over a four -week period, early intervention with orthosis proves beneficial. These findings tell the importance of timely diagnosis an d conservative management in alleviating CTS symptoms during pregnancy, potentially minimizing the need for more invasive interventions.

Keywords: Carpal Tunnel Syndrome, Pregnancy, PRCTS, Wrist Splint, Upper limb orthosis, Median Nerve.

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1. Introduction

Carpal tunnel syndrome is a compression neuropathy of median nerve that causes numbness, tingling and pain in the distribution of the median nerve (thumb, index, middle finger, and the radial side of the ring finger.[1-4] It occurs when the median nerve is squeezed or compressed as it travels through the wrist.[2,3] The carpal tunnel is a narrow passageway surrounded by bones and ligaments on the palm side of the hand[1] The carpal tunnel is a nonextendible osteo fibrous tunnel defined as the space located between the flexor retinaculum, which forms the roof, and the carpal sulcus, which forms the base.[6] The anatomy of the wrist, health problems, and repetitive hand motions can contribute to carpal tunnel syndrome.[1,5] A figure of 55–65% of CTS cases are present bilaterally.[1] Pressure on the nerve can happen several ways, including: • Swelling of the lining of the flexor tendons, called tenosynovitis. • Joint dislocations • Fractures • Arthritis • Fluid retention during pregnancy. These conditions can narrow the carpal tunnel or cause swelling in the tunnel. Thyroid conditions, rheumatoid arthritis and diabetes can also be associated with carpal tunnel syndrome. There can be many causes of this condition.[15]

Carpal tunnel syndrome (CTS) is a common problem in pregnancy. Various theories, including morphological factors,[7] hormonal changes[8] and fluid retention,[9,10] have been suggested as contributing factors of CTS in pregnancy. CTS occurs most frequently during the third trimester of pregnancy and a majority of women have symptoms that are severe enough to affect hand function and sleep,[11] indicating that quality of life is significantly affected in these patients. Various factors, such as an increase in body mass index (BMI), hormones, fluid redistribution, and maternal age, are involved in the etiology of PRCTS.[12.13] Symptoms of this condition can include pain, numbness, tingling, occasional clumsiness, tendency to drop things. The numbness or tingling most often takes place in the thumb, index, middle and ring fingers. The symptoms usually are felt during the night but may also be noticed during daily activities such as driving or reading a newspaper. In severe cases, sensation and strength may be permanently lost.

Diagnosis of Carpal Tunnel Syndrome can be obtained by an accurate patient history or by performing physical examination that may include assessing personal characteristics, conducting a sensory examination, performing manual muscle testing of the upper extremity, and utilizing provocative and/or

discriminatory tests (Positive Phalen's test, Durkan's Test, Positive Tinel sign) Obtaining electrodiagnostic tests to differentiate among diagnoses, particularly in cases of thenar atrophy and/or persistent numbness. Electrodiagnostic tests may also be used when clinical and/or provocative tests yield positive results and when considering surgical management.[14] The use of non-invasive diagnostic techniques based on clinical assessments is preferred rather than electromyography, in sensitive populations like pregnant women. The rate of false positivity in electrophysiological tests may be higher than in other diagnostic methods. It may also lead to an increase in the rates of false estimation and then unnecessary treatment.[15]

Better results will occur when carpal tunnel is recognized and treated earlier.[16] The main goal of treatment is to reduce or remove the causes of increased nerve pressure. This should result in a decrease in symptoms. Some nonsurgical treatment options may include 1. Oral anti-inflammatory medicine 2. Steroid injection 3. Wrist splint(s). Oral medications and injections are more effective when symptoms are present for a short period of time, infrequent and mild. Wrist splinting, mainly at night, keeps the wrist out of the bent position. Wrist splints are most helpful with symptoms that are affected by the hand or wrist position. Splints are also more helpful when the symptoms are mild and when symptoms have been present for a shorter period.

Wearing a hand brace helps reduce symptoms and improve functional impairment in individuals with carpal tunnel syndrome (CTS). It provides support to the wrist and limits movement, which can reduce pressure on the median nerve and alleviate symptoms such as pain, numbness, and tingling. Many patients find relief from wearing hand braces, especially at night when symptoms often worsen due to sleeping positions.[17] a splint which supports the wrist and MCP joints is effective[18] Wearing a splint or brace is also recommended as a conservative treatment option for pregnancy-related carpal tunnel syndrome (PRCTS). Correct immobilization can solve up to 80% of symptoms in mild-to-moderate cases of pregnancy-related carpal tunnel syndrome (PRCTS).[19]

A wrist splint serves as a beneficial short-term treatment for Carpal Tunnel Syndrome (CTS). It stabilizes the wrist in a straight or slightly bent-back position, effectively reducing pressure on the median nerve. This allows the wrist a period of "relative rest" from movements that exacerbate CTS symptoms. Nighttime splinting proves effective without the need for medications, making it especially advantageous for pregnant individuals experiencing CTS. Additionally, in the early stages of CTS, nonsurgical methods such as wrist splinting can provide relief and potentially improve the condition, offering a conservative approach to managing symptoms.[20,21]

Fig 1: CTS Wrist Splint

2. Materials & Methods

A Hospital and Clinical based Randomized Controlled Trial was done in Benazir Bhutto Hospital of Rawalpindi Medical University under the institution of Allied Health Sciences. The Study population was all pregnant women presenting with symptoms of CTS. The time duration for this research study was six months after the approval of synopsis. The sample size was: 66 by using Raosoft Sample Size Calculator. A non-probability consecutive sampling technique was applied. A structured questionnaire consisting of the following parts was used. 1- Demographic Details 2- Visual Analogue Pain Scale 3- Modified Boston Questionnaire. Women who were diagnosed with Carpal Tunnel Syndrome (CTS) who meet the inclusion criteria were taken. Informed Consent was taken by explaining the study's purpose, procedures and benefits in a language participants understand (English or Urdu). An informed consent was provided for participants to read and sign, indicating their willingness to participate. If a participant doesn't understand English, the consent form was provided in Urdu along with any necessary explanations. Patients were assured that the confidentiality of their data will not be breached and that it will only be used for the proposed study. Information about participants' demographic characteristics, including age, occupation, medical history, number of children, educational level, age, weight, BMI, marital status, doing exercise was taken.

A non-probability consecutive sampling technique was applied to select participants from all diagnosed individuals. Baseline Assessments were done by doing the Visual Analog Scale (VAS) to assess participants'

pain levels. Calculated the Modified Boston Questionnaire to measure the severity of CTS symptoms and functional limitations. Range of Motion (ROM) tests were conducted to assess joint flexibility and motion. Sensory tests were performed to evaluate nerve function. Motor tests were conducted to assess hand strength and coordination. Randomly assign selected participants to either the intervention group (receiving the CTS splint) or the control group (not receiving the CTS splint). CTS splint to the intervention group was provided and instructed them to use it appropriately. Same assessments were administered (VAS, Modified Boston Questionnaire, ROM tests, sensory tests, motor tests) to both intervention and control groups. Changes in pain levels, CTS symptoms, functional limitations, and physical measurements were recorded for participants using splint.

Data was collected for the control group participants who did not use the splint. The collected data was analyzed using appropriate statistical methods. The outcomes were compared between the intervention and control groups for each assessment tool. The results were interpreted to determine the effectiveness of the CTS splint in reducing symptoms and improving participants' functional abilities. The changes observed in pain levels, symptoms, and physical measurements were interpreted.

Data was entered and analyzed using SPSS version 25.0. Quantitative variables like age, weight and number of children of the patients were represented in Mean ± S.D. Qualitative variables like presence or absence of complications, (Pain, limited mobilization) was represented in Frequencies and percentages. Independent sample t-test is applied to compare quantitative variables between the groups. (to measure functional activity) P-value ≤0.05 was taken as significant association.

3. Results

The study comprised 28 patients with diverse age, parity, education, and demographic backgrounds. Age distribution revealed that 10.7% (n = 3) of the patients were aged 15-20 years, 53.6% (n = 15) were 20-25 years, 25.0% (n = 7) were 25-30 years, and 10.7% (n = 3) were 30-35 years. Parity distribution showed that 32.1% (n = 9) had one parity, 42.9% (n= 12) had two parities, 17.9% (n = 5) had three parities, and 3.6% each had four parities (n = 1) or five or more parities (n = 1). Regarding education, 55.2% (n = 16) had an education level below matriculation, 34.5% (n = 10) had completed matriculation, and 6.9% (n = 2) had an intermediate education level and a bachelor's degree. Demographically, 64.3% (n = 18) of the participants were from urban areas and 35.7% (n = 10) were from rural areas. Additionally, 85.7% (n = 24) of the patients were classified as working women, while 14.3% (n = 4) were housewives.

The study compares the distribution of patients based on symptom severity in both the intervention and control groups before and after a 4-week follow- up period.

Table 1: Showing age distribution

Category	Details with (%)	n
Age Distribution	15-20 years:10.7%	n=3
	20-25years:53.6%	n=15
	25-30 years: 25.0%	n=7
	30-35 years: 10.7%	n=3

Table 2: Showing demographic distribution

Parity Distribution	**One Parity: 32.1%**	**n=9**
	Two Parities: 42.9%	n=12
	Three Parities: 17.9%	n=5
	Four Parities: 3.6%	n=1
	Five or more: 3.6%	n=1
Educational Background	Below Matriculation: 55.2%	n=16
	Matriculation: 34.5%	n=10
	Inter or Bachelors: 6.9%	n=2
Demographic Background	Urban Areas: 64.3%	n=18
	Rural Areas: 35.7%	n=10
Employment Status	Working Women: 85.7%	n=24
	Housewives: 14.3%	n=4

Table 3: The table demonstrates the effectiveness of a treatment for carpal tunnel syndrome (CTS) by comparing outcomes between a control group and intervention group over a 4-week period.

Outcome Measures	Control Group	Intervention Group
Reduction in MBQ score (%)	3.5%	96.5%
Reduction in Symptoms (%0	7.1%	92.9%

In the intervention group, there is a significant reduction in symptom severity after the intervention. Initially, symptoms such as numbness or tingling, pain or discomfort, waking up at night due to numbness, difficulty grasping small objects, difficulty with activities requiring fine finger movements, and weakness in hands or fingers were all scored around 2.5 to 3.0. After the intervention, these scores dropped below 1.5, indicating a marked improvement.

In contrast, the control group showed minimal to no change in symptom severity over the same period. The severity scores for all symptoms in the control group

remained consistently high, around 2.5 to 3.0, with only slight variations. This stark difference highlights the effectiveness of the intervention in reducing the severity of the symptoms.

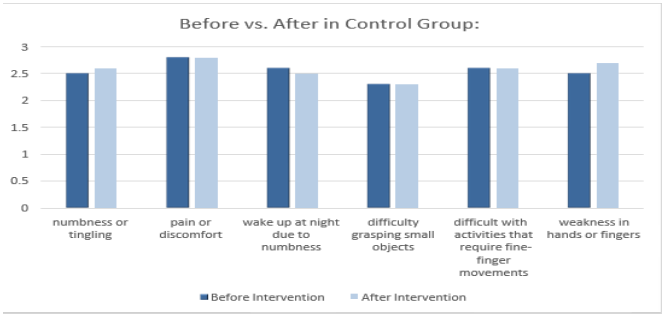

Figure 1: Comparison of Symptoms (before & after) with Control Group

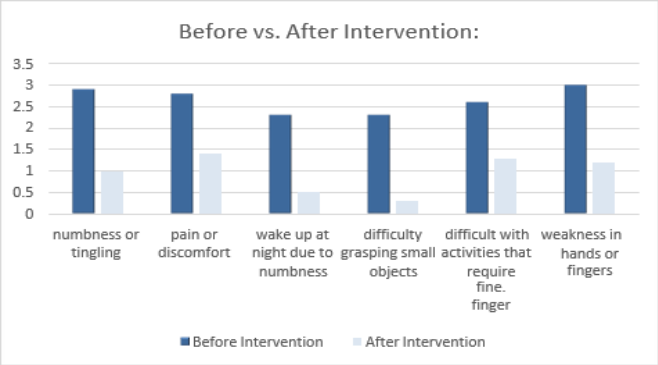

Figure 2: Comparison of Symptoms (before & after) with Intervention Group

Using the Modified Boston Questionnaire (MBQ), which assesses the impact of CTS on daily activities (higher scores indicate more severe symptoms), the control group saw only a 3.5% reduction in scores, indicating minimal improvement. In contrast, the intervention group experienced a significant 96.5% reduction in MBQ scores, reflecting a major improvement in daily function. Similarly, when looking at overall symptom reduction, the control group had a slight 7.1% decrease, showing little change. Meanwhile, the intervention group achieved a substantial 92.9% reduction in symptoms, highlighting the treatment's high effectiveness.

In summary, the intervention led to a pronounced reduction in both MBQ scores and overall symptom severity, highlighting its effectiveness in mitigating the impact of carpal tunnel syndrome on patients' daily lives. The control group, however, showed only minimal improvements, reinforcing the importance and efficacy of the intervention.

For Intervention Group: Sig. (2-tailed): The p-values are both < .001, indicating highly significant results.

For Control Group: Sig. (2-tailed): The p-values are 0.291 and 0.310, both greater than the typical significance level of 0.05, indicating that the results are not statistically significant.

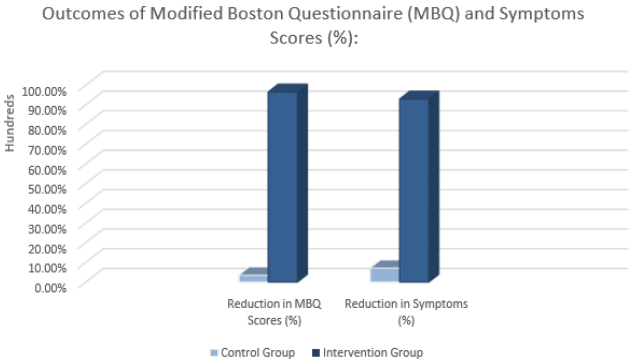

Figure 3: Comparison of Outcomes of MBQ score among Control & Intervention Group

Explanation: The t-tests compare the change in symptom severity scores before and after the intervention between the intervention group and control group. For the intervention group, the highly negative t-values and very low p-values indicate a significant reduction in symptom severity after the intervention. The mean differences are substantial (around -13.89), and the confidence intervals confirm these changes are statistically significant.

In contrast, the control group shows t-values close to zero and p-values above 0.05, indicating no significant change in symptom severity over the same period. Overall, these results demonstrate that the intervention had a significant effect in reducing symptom severity compared to the control group, where symptoms remained largely unchanged.

4. Discussion

The findings of this study shed light on the efficacy of upper limb orthosis as a conservative treatment for carpal tunnel syndrome (CTS) in pregnant women. The significant reduction in Modified Boston Questionnaire (MBQ) scores and symptom severity observed in the intervention group compared to controls suggests that orthosis intervention plays a beneficial role in alleviating CTS-related symptoms during pregnancy. These results are consistent with previous literature highlighting the importance of orthosis in reducing wrist discomfort, numbness, tingling, and functional limitations associated with CTS. The observed improvement in symptom severity in the intervention

group underscores the importance of early diagnosis and proactive management strategies in pregnant women presenting with CTS symptoms. By providing mechanical support to the wrist and maintaining a neutral wrist position, orthosis may help alleviate pressure on the median nerve, reduce inflammation, and improve nerve function, thereby relieving CTS symptoms. Moreover, the non- invasive nature and ease of application of orthosis make it a practical and accessible treatment option for pregnant women, particularly those seeking conservative management approaches.

The findings of this study align with previous research on CTS during pregnancy, such as the work conducted by Aslihan Alp Ozturk (2022) in Turkey. Ozturk's study emphasized the significance of early diagnosis and management of PRCTS using non- invasive diagnostic tools and conservative treatments. [(22)] Teemu Karjalanen's (2022) research on the efficacy of conservative treatments for CTS highlighted the effectiveness of wrist splinting, particularly during nighttime, in reducing symptoms and improving functional outcomes of patients. [(23)]

These findings support the use of wrist splinting as a cost-effective and non-invasive intervention for managing CTS symptoms, as also suggested in the study on splinting for CTS conducted in Australia (2012).

5. Conclusion

The use of upper limb orthosis is an effective conservative treatment for managing carpal tunnel syndrome (CTS) symptoms in pregnant women. The significant reduction in Modified Boston Questionnaire (MBQ) scores and symptom severity in the intervention group compared to control group highlights the importance of orthosis in alleviating CTS-related discomfort and functional limitations during pregnancy. These findings underscore the importance of early intervention and proactive management strategies to improve patient outcomes and quality of life. However, further research is warranted to validate these results in larger cohorts and explore optimal orthosis designs and treatment protocols. Overall, orthosis presents a promising option for the management of CTS in pregnant women, offering a non- invasive, cost-effective approach to symptom relief and improved maternal well-being.

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Effectiveness of Total Contact Cast in Patients with Diabetic Neuropathic foot Ulcers

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Abstract

Introduction: To assess the effectiveness of Total Contact Cast (TCC) in treating diabetic neuropathic foot ulcers, including percentage reduction in ulcer surface area and healing time.

Methods: A quasi-experimental investigation took place in Benazir Bhutto Hospital Rawalpindi, Medical University, for six months, from August 1st, 2023 to January 31st, 2024. The study included thirty diabetes patients with non-ischemic neuropathic foot ulcers up to grade 2A, as classified by the University of Texas. The pre-intervention ulcer size was measured with metal ruler. Debridement was performed in some individuals to remove necrotic tissue, calluses, and foreign objects and Total Contact Cast (TCC) was applied. TCC was repeated every two weeks until the ulcer was healed. Post-intervention ulcer size measurements were taken. The key outcome measures were percentage reduction in ulcer surface area and time to heal in the cast.

Results: Twenty-two patients (73.3%) were males, whereas eight (26.7%) were female. The patients' average age was 59±7 years. Every patient had NIDDM. The majority of forefoot and mid-foot ulcers in the current study healed with a total contact cast. Average healing time was 39 days (three cast's duration). Patients identified as grade 1A recovered completely over the research period, but those classified as grade 2A showed a considerable reduction in ulcer size until the eighth week. Among Thirty patients with diabetic Non-ischemic neuropathic foot ulcers, the mean ulcer size (cm^2) at baseline was 4.6583±2.41090 SD. It changed to 1.3550±1.26228 SD at the end of the trial. The ulcer size at baseline and the ulcer size at the 8-week follow-up were compared using a paired sample t-test. The percentage reduction in ulcer size surface area from baseline at the eighth week was 71% with total contact cast. $P< 0.05$ was considered significant.

Conclusion: The results of the study showed that total contact cast was a successful therapy for neuropathic diabetic foot ulcers of Texas grade up to 2A that were located in the forefoot and midsole region.

Keywords: Diabetic Neuropathic foot ulcers, Total contact cast, offloading.

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1. Introduction

Diabetes is spreading at an alarming rate, causing end- organ damage from long-term hyperglycemia and imposing a large healthcare burden.1 One serious and frequently occurring complication of poorly controlled long-term diabetes is diabetic foot ulcers, or DFUs. A DFU will occur in 19% to 34% of the estimated 537 million diabetics worldwide at some point in their lives.[2] Lower limb amputations related to diabetes are primarily caused by foot ulcers.[3] Numerous studies indicate that foot ulcers cause approximately eighty-five percent of all amputations in diabetics. Individuals with diabetes in developed nations have a minimum of ten times greater risk of lower limb amputation than those without the disease.

In terms of individual disability, subsequent hospital stays, and health care costs which are anticipated to exceed $1 billion annually the diabetic foot has a substantial societal impact.[4] High peak plantar pressure is a major biomechanical factor that predisposes affected individuals to develop diabetic foot ulcers.[5] In diabetic individuals with peripheral neuropathy, the yearly incidence of foot ulcers varies from 5 to 7.5%, although it is slightly more than 2% in all diabetic patients. Peripheral neuropathy is defined by an absence of protective pain perception, autonomic dysfunction, sympathetic denervation, edema, toe clawing, abnormalities of the foot due to Charcoat joints, and callus formation at pressure points.[3]

Multidisciplinary care programs that include surgeons can minimize the number and severity of lower extremity amputations. The prevalence of diabetic foot problems is predicted to rise as the United States' population ages and obesity becomes more common.4 Therapies known as "offloading" release pressure from the area around the wound and re-distribute it to healthy tissues.[6] Pressure offloading is considered the gold standard for the fast and efficient cure of neuropathic plantar diabetic foot ulcers (DFUs).[7] A variety of offloading techniques are available, including two-shell unloading casts, felt cushioning , half-shoes, post- operative shoes, and walkers.

In order to reduce plantar pressure caused by an ulcer, total contact castings (TCCs) appear to be the gold standard procedure in the United States and other western countries.[8] Total contact casting is a rigid cast that fits the shape of the foot and leg to immobilize the affected joints and soft tissue while permitting safe mobility. It runs from just below the tibial tuberosity to the toes.[9] TCC is research-based offloading approach since it promotes compliance while limiting patient activity due to the cast's thickness and weight. By relieving pressure on the wound and spreading

pressure across the whole foot, this encourages quicker healing process.[6] Shear stresses and cast movement are lessened or eliminated using TCC.[10] Although it has been effective in treating plantar ulcerations, to reduce problems, it must be applied carefully, closely monitored, and patients must keep their regular appointments.

Redistributing walking pressures, avoiding direct stress to the wound, lowering edema, and immobilizing soft tissue and joints are all achieved via total contact casts.[11] Although there are benefits mentioned the talent and hard work needed to successfully implement it have made it a lost art and outdated technique in the treatment of neuropathic foot ulcers in modern times.[9] Infected or ischemic wounds are contraindications for total contact casts.[12] Unfortunately the orthopedic surgeon's role in treating foot ulcers nowadays is limited to treating secondary problems like osteomyelitis or pyoarthrosis. Despite the contact casting method's advantage in producing promising results, its use has declined as a result of reliance on alternative, simpler modalities.[9] The purpose of this study was to investigate the efficacy of Total Contact Cast (TCC) in neuropathic diabetic foot ulcers in terms of percentage decrease in ulcer surface area, and healing time. The purpose of this study was to redefine orthopedic doctors' role in preventing amputations by early intervention. Highlighting the effectiveness of this treatment can have a major effect on patient care and clinical practice. Sharing research-based findings may alter ulcer treatment and provide better results.

2. Materials & Methods

The ulcers were classified using the Texas categorization method, and any abnormalities on the feet were noted. The vascular assessment procedure included the use of Doppler ultrasound, pedal pulses, capillary filling time, and ankle brachial index. To rule out osteomyelitis and Charcot disease, foot X-rays were taken, and cultures of aerobic and anaerobic bacteria were taken from ulcers that were infected.

In certain cases, debridement was necessary to remove foreign objects, calluses, and necrotic tissue. Following a surgical debridement, pyodine-soaked gauze pads were used to cover and treat the ulcers. Antibiotics were prescribed for ulcers that were infected based on the results of the culture. During the first visit, each participant's ulcer was evaluated and graded using the University of Texas grading system. The location was identified as either the forefoot, midfoot, or hindfoot.

Interdigital padding, or cast padding, was divided into tiny pieces and placed between the toes to keep them in place. In order to provide at least 50% overlap between each turn, the cast padding was firmly twisted around the leg in two layers, starting from the tips of the toes and ending at the level of the fibular head or tibial tuberosity. Extrapadding was applied over any preexisting abnormalities as well as pressure areas, including the first and fifth metatarsal heads, anterior shin, malleoli, medial portion of the navicular, and heel. Less padding is needed in the other places because, as the reduced edema compresses the padding, too much padding will cause additional motion.

To recreate the contours of the foot and leg, total contact casts (TCC), which are composed of many layers of plaster of paris cast (POP), were utilized. Patients were advised to decrease their activities. Patients were recommended to maintain total nonweight bearing for the first two casts and protected weight bearing for the remaining castings. Up to the eighth week, there were follow-up appointments every two weeks for TCC renewal and complication monitoring.

To avoid recurrence, patients were recommended to utilize custom-made shoes to offload the pressure regions after the cast therapy was completed. All patients had their results evaluated at 2, 4, 6, and 8 weeks after baseline data collection. The main result was a percentage decrease in ulcer surface area after 8 weeks. The data was entered and analyzed using SPSS version 25.0. For qualitative characteristics including gender, ulcer healing, and the existence or lack of complications, frequency and percentages were estimated. Age and ulcer size were among the quantitative variables for which mean and standard deviation were computed. The ulcer size at baseline and the ulcer size at the 8-week follow-up were compared using a paired sample t-test. P-values <0.05 were considered statistically significant.

3. Results

The study consist of thirty patients. Twenty- two (73.3%) patients were male, whereas eight (26.7%) were female. The mean age of all those who presented was 59±7 years. All patients had non- insulin-dependent diabetes (NIDDM). The study found that the majority of patients (73.3%) had diabetic foot ulcers in the forefoot anatomical region, whereas 26.7% had them in the midfoot. In this study, no individuals were treated for heel and hallux ulcers. Based on the University of Texas wound grading method, 46.7% of patients were classified as Grade 1A patients and 53.3% as Grade 2A patients. Approximately 36.7% of the patients had prior

ulcers. 40% of patients had diabetic neuropathic foot ulcers on the left side and 60% on the right. [Table 1].

Table 1: Participants demographic and physical characteristics during Baseline Visit.

Variable	Baseline Characteristics
Age mean(SD)	59±6.97
Gender	
Male [n (%)]	22(73.3%)
Female [n (%)]	8(26.7%)
Diabetes Mellitus	
Type 2[n (%)]	30(100%)
Previous Ulceration%	
YES	11(36.7%)
NO	19(63.3%)
Ulcer Location	
Forefoot [n (%)]	22(73.3%)
Midfoot [n (%)]	8(26.7%)
Involved side	
Right [n (%)]	18(60%)
Left [n (%)]	12(40%)
Ulcer Grade	
Grade A1 [n (%)]	14(46.7%)
Grade A2 [n (%)]	16(53.3%)
Ulcer size mean(SD)	4.6583±2.41090

The majority of forefoot and midfoot ulcers recovered with a total contact cast. The average ulcer healing period was 39 days. Individuals categorized as grade 1A underwent full recovery throughout the research duration, whereas those classified as grade 2A demonstrated a significant decrease in ulcer size until the eighth week. The average ulcer size (measured in cm2) across 30 patients with diabetic neuropathic foot ulcers[1] was 4.6583±2.41090 SD at baseline. After the study was over, the value was 1.3550±1.26228 SD. With a total contact cast, the ulcer size decreased by 71% at the eighth week compared to the baseline. Nevertheless, we were unable to track total recovery in grade 2A patients because of the short research period. There were no significant complications associated with total contact casting in this study. Patients that show non-compliance with total contact cast treatment require assurance and counselling. There was no wound or post-treatment infection among the participants in this study.

Figure 1: Healing sequence with a total contact cast. (a) The baseline ulcer prior to the initial casting. (b) The first cast was applied in the outpatient department. (c) ulcer after two weeks; (d) ulcer size after four weeks (e) ulcer size after six weeks; and (f) ulcer size after eighth weeks.

Table 2: Outcomes of Total contact cast treatment

Healing Outcome	**After 8th weeks**
Ulcer Size(cm²)	1.3550±1.26228
Time to heal (average)	39days
Non-compliance [n (%)]	13(43.3%)
Complete Study [n (%)]	30(100%)

4. Discussion

Pressure reduction is an important element of controlling diabetic foot ulcers. Due to its capacity to alleviate pressure and encourage patient compliance with the unloading treatment, the total-contact cast has shown to be the most effective therapy.[13] Although a number of orthotics can lessen off-loading, their efficacy is compromised by the fact. Total-contact casting is the use of a molded and lightly cushioned cast which makes contact with the whole sole area of the foot and lower leg. Total-contact casting has been widely established to be helpful in managing non-infected, nonischemic plantar diabetic foot ulcers, with recovery rates varies from 72 to 100% in timeframes ranging from one month to multiple weeks.[14] The current study aimed to investigate the efficacy of Total Contact Cast in treating diabetic neuropathic foot ulcers. Most of the ulcers in this study healed quite quickly when total contact casting was used. A total of thirty individuals were recruited. Male patient percentages in the current study were 73.3%, which is lower than the 87.17% reported by

Rajab Ali et al. (2008). The study's mean age was 59±7years, which is younger than the 62 years and 60 years reported by Rajab Ali et al. (2008) and Sahu et al respectively.

Within the current study, diabetic ulcers were categorized into three "grades" (0 for a totally epithelized lesion that occurs before or after ulceration, I for a superficial wound that does not involve a tendon, capsule, or bone, II for a wound that penetrates to tendon or capsule, and III for involvement of a bone or joint) and three stages (A is not both infected and ischemic; B is infected; C is ischemia; and D is both infected and ischemic). Prior to placing the total contact cast, the baseline ulcer size was measured in each of the thirty patients. Antibiotics were administered to patients with infected foot ulcers until the infection cleared up. Thirty patients had total contact casts applied for two weeks up to the eighth week. Up until the eighth week, follow-up appointments were scheduled every two weeks to monitor complications and renew TCC. Measurements of the post-treatment ulcer size were made after two, four, six, and eight weeks. According to post-test data, there was a statistically significant variation in ulcer size between the baseline and eighth week. According to national and international research, healing rates can range from 72% to 100% over the course of a month or several weeks. The results presented in the current study are roughly in accord with these findings. In this research, there were no significant complications related to total contact casting. Patients who refuse to be compliant with the total cast treatment require assurance and counseling. There was no wound or post-treatment infection among the participants in this study. While infection was formerly considered a contraindication for TCC, recent studies suggests that it can be used for neuropathic ulcers that are even mildly infected but do not have peripheral artery dysfunction. Close patient observation, frequent dressing changes and debridement, and appropriate antibiotic coverage are necessary.[15] Only professionals who are familiar with the mechanics of total contact casting should apply it. TCC can be used once the infection has settled.[3]

A study consisting of 39 individuals with diabetic neuropathic foot ulcers was conducted to determine the effectiveness of Total Contact Cast (TCC) treatment for these conditions. 90% of forefoot and midsole ulcers were successfully treated with TCC ($p < 0.001$). Total contact casts have been shown to be effective in treating early-grade neuropathic non-ischemic foot ulcers. This validates the findings of our investigation, which showed that total contact casting significantly improved ulcer healing and reduced ulcer size in diabetic neuropathic ulcers of the feet.[3] A research was conducted to evaluate TCC's efficacy in treating diabetic neuropathic foot ulcers and its impact on gait outcomes relative to pressure-relieving ankle foot orthoses (PRAFO). Thirty diabetic individuals with neuropathic plantar ulcers were examined at the foot clinic and randomly assigned to receive one of two unloading procedures (Total contact cast or PRAFO), regardless of their gender, age, type of diabetes, or duration of diabetes.

The ulcer surface area decreased significantly ($P < .001$) four weeks from the baseline. TCC showed a reduction of 75.75±9.25, while PRAFO showed a reduction of 34.72±13.07. This supports the findings of the current study, which showed that diabetic people having neuropathic non- ischemic foot ulcers had a considerable percentage decrease in ulcer surface area.[5]

A study was done to compare total contact casts with traditional dressings for wound healing in diabetic foot ulcers. The purpose of the research was to compare the security and effectiveness of Total Contact Cast therapy to traditional dressing for the management of neuropathic plantar ulcers. 100 individuals with plantar ulcers caused by diabetes took part in the research. Participants who fulfilled the eligibility requirements while giving their permission for each treatment were randomized to one of two groups. It was observed that there was a male majority in the present research, with 31 men accounting for 68% of all participants. The research findings showed that 39 patients had achieved 76–100% tissue granulation at the six-week follow-up. Patients with TCC dressings experienced granulation at a faster rate, averaging forty-two days, compared with the control group (eighty-four days). For neuropathic, non-ischemic, early-stage diabetic foot ulcers, TCC is an effective treatment. This study confirms the findings of our investigation, which found that diabetic individuals with neuropathic non-ischemic foot ulcers showed a significant reduction in ulcer size after being treated with total contact cast.[16]

5. Conclusion

In our study, ulcers caused by diabetes in the feet were treated using total contact casting (TCC).A significant percentage of the ulcers healed with TCC in

a relatively short period of time. Most people with forefoot and midfoot ulcers experienced healing. The treatment reduced ulcer size significantly over time. Noncompliance with TCC treatment was observed despite its success, highlighting the significance of patient counseling and reassurance. Based on these findings, TCC may be recommended as the standard treatment for diabetic neuropathic plantar foot ulcers. Future study comparisons are required to determine the treatment outcomes of diabetic neuropathic foot ulcers either with or without a total contact cast. Professionals who treat diabetic foot ulcers should use it.

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A Descriptive Study on Efficacy of Lateral Wedged Insoles for Medial Compartment Osteoarthritis of Knee

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Abstract

Introduction: To determine the efficacy of lateral wedge insoles to reduce the pain in patients with medial knee osteoarthritis. To evaluate whether lateral wedge insoles increase range of motion in patients with medial knee osteoarthritis. To enhance physical activities of daily living.

Methods: It is Descriptive longitudinal study spanned a 6-month period, running from June 2023 to December 2023, and was conducted at Benazir Bhutto Hospital, Rawalpindi. Using a non-random consecutive sampling strategy, 30 osteoarthritis patients were presenting in the outpatient department of Benazir Bhutto Hospital Rawalpindi. The six months it took to finish studying. After obtaining written consent, all patients were told to use the insole for five to ten hours every day. The Western Ontario and McMaster Universities Arthritis Index (WOMAC), a visual analog pain scale, was used at baseline and in weeks four and eight.

Results: Thirty patients received the intended treatment and were analyzed for functional and pain status using VAS and the WOMAC. All the patients were evaluated clinically and started using the lateral wedge insoles. There were no losses. The relationships among the results were analyzed using T-test to compare the means before and after using the insoles. At weeks 8 and 24, both groups showed lower results for WOMAC, with a difference from baseline ($P = 0.002$ and $P = 0.001$ respectively) according to table 6. The mean VAS score always showed statistically significant reductions. In comparison with the baseline, in both groups ($P < 0.05$) according to table 3. There was no correlation between anthropometric data and the clinical outcomes. Fifteen percent of all the patients reported ankle discomfort according to table 7. There were no differences between the groups regarding adverse effects. Results show that this research is highly significant.

Conclusion: We conclude that the use of lateral wedge insoles significantly improved the pain according to VAS and activities of daily living according to WOMAC index. More work can be done in this broad field.

Keywords: Osteoarthritis, Orthotic insoles, medial compartment of knee joint.

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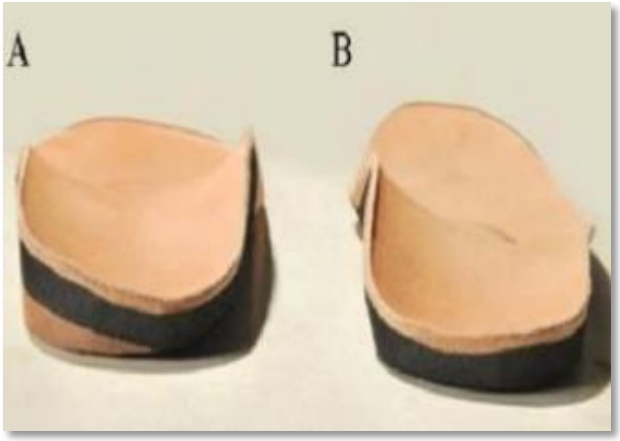
1. Introduction

The most prevalent chronic articular illness is osteoarthritis (OA), which is becoming more widespread as the population ages and becomes more obese. Articular cartilage degradation and ongoing pain are the hallmarks of osteoarthritis, which can lead to impairment, loss of function, a worse quality of life (QoL), and financial hardship1 Osteoarthritis is usually a disease of old age that most commonly occurs after 50 years of age. OA mostly develop in females (62%) more than in males (10%). There are increasing cases of OA with increase in age.2 Joint discomfort, pain, and a reduction in range of motion are the most typical signs of osteoarthritis. Certain factors are known to increase the risk of OA. Some of these factors are beyond our control like age, gender. But we can reduce the risk of developing OA from damage caused by lifestyle factors like obesity, diet, repetitive loading, previous joint injury.3,4

The best treatment for osteoarthritis in the knee is a mixture of conservative and operative approaches. Conservative treatment includes the use of NSAIDS5 and physiotherapy6, which have good outcomes and prove to be beneficial. These therapies and routes of administration are under investigation and some of them have limited their activities of daily living because of pain and stiffness. Due to mechanical axis passing through the medial compartment of knee joint it causes increase wear and tear of the joint which can only be treated by using orthotic devices like lateral wedge insoles. They are designed to position the ground reaction force more laterally during stance phase to reduce the load acting through the medial compartment by re-alignment of the knee joint to reduce pain and increase activity levels.7’8



Knee OA can be treated by operative measures. It includes proximal tibial osteotomy and proximal fibular osteotomy9. Both treatments are invasive and

have post-operative complications. Knee joint replacement can also be done but it is a very expensive procedure. Same results can be achieved using lateral wedge insoles. It works on the same principle, and it is benign, less invasive and doesn't have any complications. These complications can be reduced by use of lateral wedge insoles.10

2. Materials & Methods

This descriptive longitudinal study aimed to investigate the effectiveness of lateral wedge insoles in patients with medial compartment osteoarthritis of knee joint. The study spanned a 6-month period, running from June 2023 to December 2023, and was conducted at Benazir Bhutto Hospital, Rawalpindi. The assignment of lateral wedge to patients was based on the clinical judgment of the treating physician and patient preferences. Inclusion criteria for participation in the study encompassed patients aged 40 years or older with a confirmed diagnosis of medial compartment osteoarthritis of knee joint having grade 1, 2 and 3 according to Kellgren and Lawrence System for Classification of Osteoarthritis. Exclusion criteria included patients with history of any other type of arthritis like rheumatoid arthritis, gouty arthritis. Patients having grade 4 of osteoarthritis or conditions preventing informed consent. Sample size determination involved power analysis. Preliminary data and an assumed significance level (alpha) of 0.05 and a power (1-beta) of 0.80 determined that a sample size of at least 30 patients would be sufficient to detect statistically significant differences in, pain management, increases range of motion and to enhance physical activities of daily living. Data collection included the following:

• Baseline Assessment: Gathering demographic and clinical data for each participant, such as age, gender, body weight, duration of symptoms, joint involvement.

• Intervention: Patients received standard conservative treatment, including the use of lateral wedge insoles. The duration of brace wear was determined by the treating orthopedic surgeon

. • Follow-up Evaluations: Patients i underwent follow-up assessments at baseline, 4th week and 8th week.

• Pain Management: Pain levels were assessed using visual analog scales (VAS)11, with patients indicating their pain level on a scale from 0 (no pain) to 10 (worst pain).

• Physical functioning and stiffness: Participants completed questionnaire, such as the Western Ontario and McMaster Universities Arthritis Index (WOMAC) 12.

• Grading of osteoarthritis: it is done by using Kellgren and Lawrence System for Classification of Osteoarthritis13. It consists of Grade 0, Grade 1, Grade 2, Grade 3, Grade 4.

Statistical analysis was performed using the Statistical Package for the Social Sciences (SPSS) software, version 25. Descriptive statistics, including means, standard deviations, and percentages, were used to summarize baseline characteristics and demographic data. Inferential statistics included paired t-tests for continuous variables a significance level of $p < 0.05$ was considered statistically significant. Results were presented with numerical values, confidence intervals, and p-values where appropriate.

3. Results

Out of 30 patients of medial compartment osteoarthritis of knee joint, 11 were females and 8 were male with mean age of 54.18 +8.48. All the 30 patients were prescribed lateral wedge insoles. Patients were instructed to use insoles for daytime activities and on weight bearing excluding sleeping periods. After follow-up of two months all the patients had gained good improvement.

Table 1: Demographic Characteristics

Demographic characteristic	Mean ±SD
age	54.18 ±8.48
Body weight	3.38 ±0.725
Grade of osteoarthritis	2.56 ±0.591
Joint involvement	1.68 ±0.47

Paired sample T-Test: Statistically significant differences between the pre- and post-condition of the patient regarding the visual analog pain scale and WOMAC index is shown by using paired sample T-Test. It compares the mean of pre-intervention and post-intervention.

Visual analogue pain scale: We measure the intensity of pain using visual analogue pain scale. At baseline 67% intensity of pain was present. At 4th week it was reduced to 56 %. At 8th week of using lateral wedged

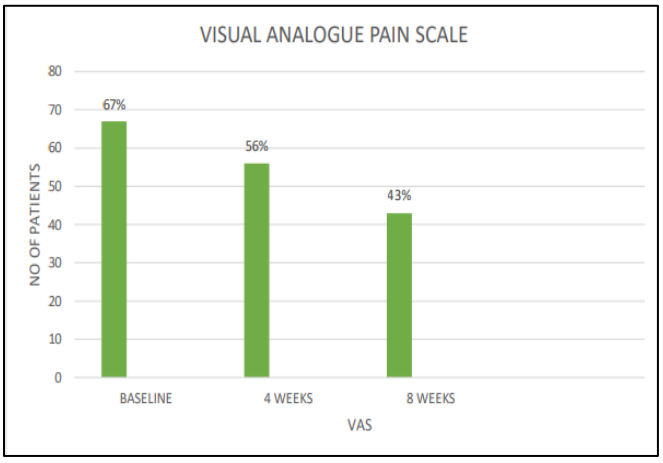
Table 2: Paired sample statistics of vas.

Pair Differences					95% Confidence Internval of the difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig (2 tail)
Pair 1	VAS score at baseline and VAS score at 4th week	1.36	0.49	0.08	1.18	1.54	15.27	29	0.001
Pair 2	VAS score at baseline and VAS score at 8th	2.1	0.48	0.08	1.92	2.27	23.93	29	0.000

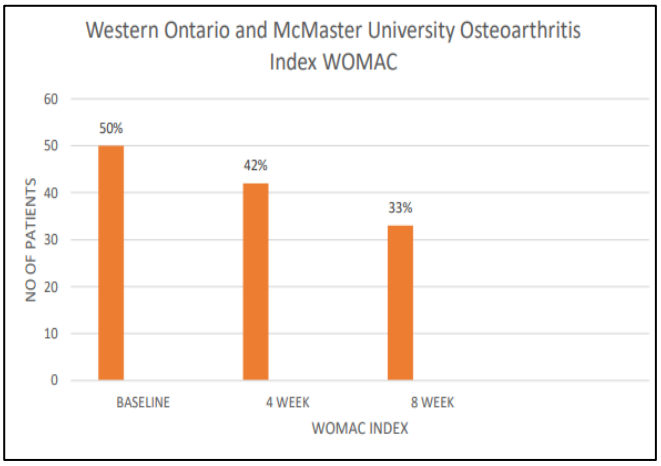
Table 3 Paired sample statistics of WOMAC

Pair Differences					95% Confidence Internval of the difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig (2 tail)
Pair 1	WOMAC index at baseline and WOMAC index at 4th week	2.03	0.61	0.11	1.8	2.26	18.1	29	0.002
Pair 2	WOMAC index at baseline and WOMAC index at 8th week	4.73	1.25	0.22	4.26	5.2	20.6	29	0.001

it was reduced to 43% which shows significant improvement.



was reduced to 42% and at the end of 8th week it was reduced to 33% which shows significant improvement.



Western Ontario and McMaster Universities Arthritis Index (WOMAC):

We measure pain, range of motion and activities of daily living by using an index called Western Ontario and McMaster University Osteoarthritis Index WOMAC which had showed 50% score at baseline. At 4th week it

Thirty patients received the intended treatment and were analyzed for functional and pain status using VAS and the WOMAC. All the patients were evaluated clinically and started using the lateral wedge insoles. There were no losses. The relationships among the results were analyzed using paired sample T-test to compare the means before and after using the insoles. The mean VAS

score always showed statistically significant reductions. in comparison with the baseline, in both groups ($P < 0.05$) according to table 2. At weeks 8 and 24, both groups showed lower results for WOMAC, with a difference from baseline ($P = 0.002$ and $P = 0.001$ respectively) according to table 3. There was no correlation between anthropometric data and the clinical outcomes.

4. Discussion

Osteoarthritis is a chronic degenerative joint disorder. It mostly affects knee joint specifically medial compartment of knee joint, which can be treated conservatively and by operative treatment. Biomechanical and clinical studies have shown that lateral wedge insoles can promote a reduction in the load on the medial knee compartment and symptomatic benefits for patients with medial knee osteoarthritis. Likewise, medial wedge insoles have shown benefits for patients with lateral compartment knee osteoarthritis.

This study showed statistically significant improvement in pain and increase in range of motion. This will correspondingly increase the activities of daily living. Which is shown by using scales like visual analogue pain scale and Western Ontario and McMaster University Osteoarthritis Index WOMAC. In both scales there is reduction in scoring from baseline till week 8th. Because lateral wedge shifts ground reaction force towards lateral side off-loading the medial compartment. A study was conducted by Marcia Uchôa RezendeI on the use of lateral wedge insoles. That was a randomized clinical trial consisting of two groups, one with lateral wedge and other was given a placebo treatment. A group with lateral wedge insoles shows significant improvement in VAS, WOMAC and Lequesne questionnaire.

There is a certain limitation first off, we did not restrict the use of any non-pharmacological medication, including analgesics. We think that wearing insoles shouldn't exclude receiving any other kind of foot care. Second, the clinical result might potentially be impacted by variations in the daily use of wedged insoles

5. Conclusion

We conclude that the use of lateral wedge insoles significantly improved the pain according to VAS and activities of daily living according to WOMAC index. More work can be done in this broad field.

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From Novice to Self-Healer: Exploring Self-Medication among First-Year Medical Students

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Abstract

Objective: To study discusses what first-year medical students know about self-medication, their attitudes toward it, and their actual practices in managing their health.

Methods: The study surveyed 200 first-year medical students from October to December 2023 in Rawalpindi to assess their understanding, approach, and practice of self-medication using a non-random convenience sampling method. Data was analyzed with SPSS Version 27, employing descriptive statistics and correlation analysis.

Results: The prevalence of self-medication among the students was found to be 96%. Females (62.5%) showed a significantly higher association with self-medication compared to males (33.5%). Around 90% of students had basic knowledge of self-medication safety and precautions, and over half had a positive attitude towards it, with only 43.5% feeling confident in its success.

Conclusion: The study highlights a significant prevalence of self-medication among first-year medical students in Rawalpindi, with a majority demonstrating a basic understanding and positive attitudes toward its practice. Despite a lack of confidence in its efficacy, a high percentage of students still engage in self-medication practices. Further research could explore the factors influencing students' confidence in self-medication success to better inform future interventions and healthcare policies.

Keywords: Self-Healer, Self-Medication, Medical Students

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1. Introduction

A noteworthy shift in the healthcare landscape prompts a reevaluation of the attitude and practices regarding personal health management, specifically in the realms of self-care and self-medication. Self-medication, identified as self-prescription, involves treating self-reported illnesses without consulting a healthcare professional.[1] It includes the administration of remedies for self-diagnosed conditions initiated by the individual. [2] Self-medication is a blanket term that encompasses a spectrum of activities from self-care to disease prevention and control, extending beyond the consumption of medicine to lifestyle modifications.[3] The mushroom growth of self-medication practices today is evident, with masses of people treating minor ailments like colds, flu, coughs, headaches, and muscle and joint pain without professional consultation.[4][5][6] These practices manifest in various forms, including using new drugs without a prescription, relying on medicines from prior treatments, and taking medicines from others with similar symptoms.

The rapid proliferation of self-medication poses a serious apprehension for health policymakers. Home remedies offer convenience and cost-effectiveness, providing swift solutions to minor ailments.[2][7][8] However, despite the advantages it offers to some, this trend raises significant concerns regarding potential misuse and adverse effects, underscoring the importance of professional medical advice. Irresponsible self-care practices can lead to many prospective health-related issues like delayed disease diagnosis, misdiagnosis, inappropriate therapy, incorrect administration, adverse reactions, dangerous drug interactions or resistance, and the risk of dependence and abuse. It also interrupts seeking medical advice when needed. [9,10]

Commonly, pieces of advice for self-medication come from family, friends, drug sellers, previous prescriptions, or suggestions from media advertisements.[11-14] People engage in this practice due to trust in self-diagnosis, perceived mildness of the disease, past experiences, having a stock of medicine at home, limited awareness of potential adversities, and lack of time.[2,12] Moreover, the unavailability or high cost of healthcare services, coupled with sloppy medical regulations, marks the predominance of self-medication in the general population.[7,12,15] This study focuses on first-year medical students, recognizing their unique position at the threshold of their medical education. This period is characterized by the assimilation of foundational medical knowledge, the internalization of professional values, and the initiation of clinical skills training. Understanding how these novices navigate

their personal health choices and engage in self-medication is crucial for several reasons.

Global trends among students indicate that the prevalence of self-medication among students worldwide stands at 70.1%, with a wide range from as low as 7.9 to as high as 99.0%.[11] This prevalence ranges from 53% to 61.3% in Pakistan.[23,24] Research suggests that self-medication has a higher prevalence in young adults and university students than any other age group, with a higher incidence among healthcare students compared to their non-medical peers.[11] Pharmacy students are more aware of self-medication, while medical students tend to seek professional assistance.[16] This trend seems to be influenced by medical training, as attitudes favoring self-medication increase through advancing years of study.[7,15,17,18] Additionally, studies reveal that first-year students are the most susceptible to self-care practices, having the least knowledge about safety and danger factors.[7,19]

Despite the global dilemma of improper self-medication, this issue is more pronounced in developing areas like Pakistan, where antibiotics are often accessible without a prescription. Attitudes towards self-medication among future healthcare professionals can influence their future pharmacotherapy practices. Studies indicate a high prevalence of this tendency among medical students in different regions of the country. Many students were distinguished to rehearse self-medication, and a significant portion of the respondents had helpless information; albeit with a positive attitude toward self-prescription. [20,21,22]

With the motivation to inform policymakers and facilitate the design and implementation of focused educational programs aimed at preventing unguided self-prescription, we conducted a comprehensive self-medication analysis of first-year medical students in Rawalpindi, Pakistan. Our primary objective was to target this specific cohort, providing valued insights that can shape future healthcare practices and educational interventions.

2. Materials & Methods

The study was a questionnaire-based cross-sectional study conducted to assess the level of understanding, approach, and practice of self-medication among first-year medical students in seven medical colleges of Rawalpindi. A total of 200 first-year medical students participated in the research. Responses were collected by non-random convenience sampling method. The analytical cross-sectional study was conducted from October to December 2023. The participants included in this study were consenting first-year undergraduates studying in the selected medical universities of Rawalpindi. Students who were repeating their first year, the students who were unwilling to provide informed consent due to factors like legal restrictions, and participants whose responses were incomplete, inconsistent, or deemed unreliable during data collection or analysis were excluded.

After initially calculating the sample size of 163 using the WHO sample size calculator, factoring in a 95% confidence interval, 5% margin of error, and a population proportion of 88.18% from a prior investigation[25], we increased it by 25% to account for potential factors such as withdrawals, and incomplete questionnaires. Consequently, the final sample size was set at 204.

A structured digital questionnaire was administered among first-year medical students of the selected medical institutes to gather data after obtaining informed consent from the participants. Students were explained the study's purpose. An informed consent was obtained from all participants for data collection. Confidentiality and anonymity were maintained strictly for all collected data, and compliance with the World Medical Association Declaration of Helsinki's guidelines was ensured, and personal data remained undisclosed. 200 responses fitting best in the inclusion criteria were recorded for analysis.

The questionnaire comprised statements covering the socio-demographic variables. Additionally, knowledge and attitude toward self-medication were assessed using questions adopted from a study by Siraj EA. [26] Various questions about self-medication practices were asked by a questionnaire based on prior investigations.[27][28]

Data was summarized and analyzed through SPSS Version 27. Descriptive statistics were applied to provide an overview of students' understanding, beliefs, and behaviors regarding self-medication as percentages. Correlation analysis was used to predict the relationship of these variables.

Our study defined first-year medical students as students in the final stages of their first year of MBBS in the medical universities of Rawalpindi. Self-medication knowledge was categorized as Good knowledge by students who scored greater than 3, average knowledge by students who scored greater than 0, and poor knowledge by students who scored less than 0. The outlook of medical students toward self-medication was positive for a score of 0 and above, while a negative score showed a negative attitude. Self-medication practice was the reported use of medications for the treatment of self-perceived ailments without professional consultation in the previous six months.

3. Results

Of the total 200 first-year medical students who were surveyed, 70 (35%) were males and 130 (65%) were females. Table 1 The prevalence of self-medication among the students was found to be 97%. Females (62.5%) showed a significantly higher association with self-medication compared to males (33%).

Table 1: Frequency Distribution according to Gender

Gender	Frequency	Percentage
Male	70	35%
Female	130	65%
Total	200	100%

Table 2. The major illness for seeking self-medication was headache, reported by 126(63%) students according to Figure 1.

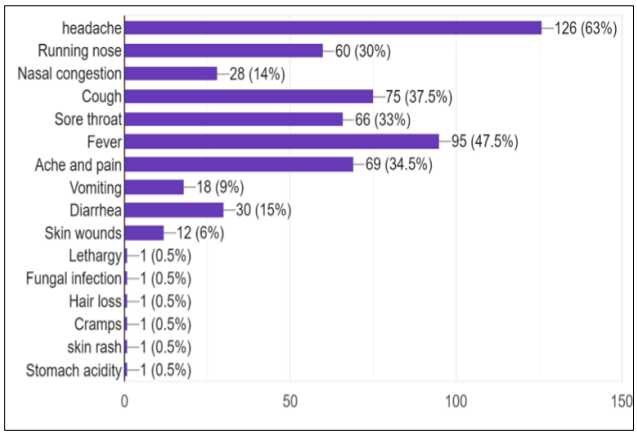


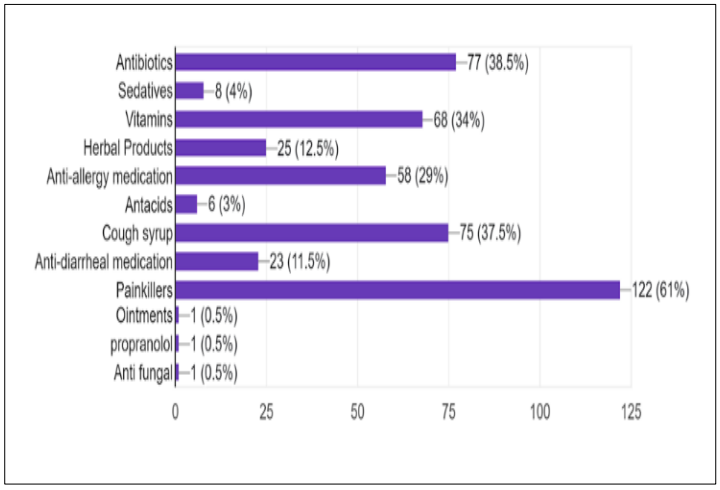
Figure 1: Indications for Self-Medication

The classes of drugs used for self-medication are shown in Figure 2, which illustrates that painkillers were the most commonly self-medicated drugs, as stated by 122 (61%) students.

Table 2: Practice of self-medication in medical students

Gender	Practice self-medication (%)	Do not practice self-medication (%)
Male	67(33.5%)	3(1.5%)
Female	125(62.5%)	5(2.5%)
Total	192(96%)	8(4%)

Figure 2: Drugs Used for Self-Medication



Sources of information about self-medicated drugs are depicted in Figure 3, while the sources of drugs are illustrated in Figure 4. Possible reasons associated with self-medication are shown in Figure 5. The majority of students self-medicating experienced no adverse effects Figure 6.

Approximately 90% of students demonstrated a basic knowledge about safety, hazards, and precautions of self-medication, while more than half exhibited a positive attitude toward its practice. However, only 43.5% of students reported feeling assertive in successful

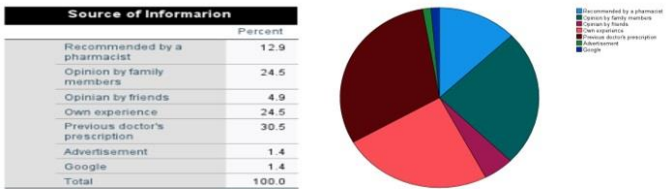


Figure 3: Source Of Information About Drug

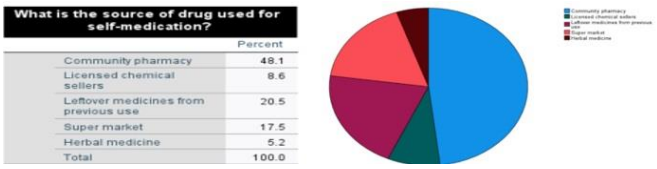


Figure 4: Source Of Drug

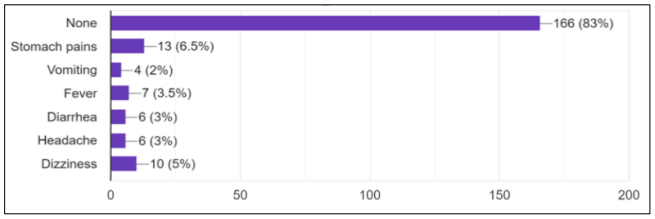


Figure 5: Adverse Effects From Self Medication

Correlation analysis suggests that certain gender-related factors may be associated with variations in knowledge levels regarding self-medication. Similarly, a potential influence of gender on individuals' attitudes toward and engagement in self-medication practices is seen. Furthermore, individuals with higher knowledge levels tend to harbor more positive attitudes
treatment by self-medication. Interestingly, despite this lower confidence level, self-medication was prevalent among 97% of the peers. Table 3.
toward self-medication, though it may not necessarily translate into increased confidence in practicing it. The most striking finding is that individuals with more positive attitudes toward self-medication may paradoxically exhibit lower confidence levels in its practice. Additionally, there is a proposition that individuals who engage in self-medication practices may exhibit higher confidence levels. Table 4

Table 3: Knowledge, Attitude, Practice, And Confidence

		Gender		Total	p-value
		Male	Female		
Knowledge	Good	29.5%	61%	90.5%	
	Average	4.5%	3.5%	8%	.095
	Poor	1%	0.5%	1.5%	
Attitude	Positive	20%	34%	54%	.307
	Negative	15%	31%	46%	
Practice	Yes	33.5%	62.5%	96%	.682
	No	1.5%	2.5%	4%	
Confidence	Yes, I can	14%	29.5%	43.5%	
	No, I cannot	3%	4%	7%	.114
	Not Sure	12%	31.5%	49.5%	

Table 4: Correlation Analysis of Study Variables

		Gender	Practice	Knowledge	Attitude	Confidence
Pearson Correlation	**Gender**	1.000	.117	.147	.046	.061
	Knowledge	.147	-.049	1.000	.101	-.090
	Attitude	.046	-.073	.101	1.000	-.289
	Practice	.117	1.000	-.049	-.073	.153
	Confidence	.061	.153	-.090	-.289	1.000
Sig. (1-tailed)	**Gender**	.	**.050***	**.019***	.258	.195
	Knowledge	**.019***	.244	.	.077	.104
	Attitude	.258	.152	.077	.	**<.0001***
	Practice	**.050***	.	.244	.152	**.015***
	Confidence	.195	**.015***	.104	**<.0001***	.

4. Discussion

The purpose of the present study was to assess the knowledge, approach, and practice of self-medication among first-year medical students in Rawalpindi, Pakistan, and to discuss the potential factors contributing to self-medication. Our study suggests that 96% of the students self-medicated in the last six months, in contrast to 80.9% prevalence according to a study conducted in Islamabad.[29] In our study, it was found that more female students practice self-medication than male students, consistent with the results of a few other studies.[30,31,32] It contradicts studies showing no difference between the self-medication practices of males and females[33,34], and those which report more males practicing self-medication.[35,36]

This study augments the previous findings that medical students tend to self-medicate more in illnesses like colds, headaches, and muscle and joint pain with antibiotics, and painkillers because of the mildness of the disease, faster relief, and previous experiences.[2,12,15] The amalgamation of findings from these studies emphasizes the universality of self-medication practices among health science students. The prevalence, motivations, and associated factors underscore the importance of targeted educational interventions, regulatory measures,

and collaborative efforts between educational institutions and regulatory bodies to promote responsible self-care practices. The collective insights provide a foundation for comprehensive strategies aimed at fostering a more informed and conscientious healthcare workforce among students pursuing health-related disciplines.

5. Conclusion

Self-medication (SM) has become a significant health issue in developing countries and is widely practiced among first-year medical students, with painkillers being the drug used most. Headaches were the most common cause. The major contributing factors towards self-medication were mildness of illness, quick relief, and previous use of medicine.

Self-medication among first-year medical students is concerning because they have inadequate knowledge and are not immune to the risks associated with over-the-counter medications. It can contribute to the development of drug dependence and even addiction. This highlights the urgent need for tighter legislation, government policies, and regulations concerning the sale of painkillers by community pharmacies. Consciousness about the possible adverse effects of self-medication must be endorsed via specific educational assistance and awareness programs. The provision of accessible mental health resources, counseling services, and workshops to help students manage stress and anxiety is important.

Limitations

The study has several limitations, including the absence of a comparative group, such as students from another field, and a small sample size. Other limitations involve the non-random sampling method and recall bias among participants, which may have led to inaccurate responses. There is a concern that participants might provide socially acceptable answers rather than their genuine preferences, causing fluctuations in results. Furthermore, the generalizability of the study results may be inadequate. The field of study could also benefit from an expansion in terms of compliance rate.

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A Cross-Sectional Study To Analyse The Prevalence Of Dysmenorrhea With Its Associated Complaints And Management Strategies Among Students Of Rawalpindi Medical University

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Abstract

Objective: To study prevalence of dysmenorrhea, its impact on daily routine, the associated complaints and the symptomatic management by the medical students at RMU.

Methods: Our research was based on a cross-sectional study from Aug 2023 to Dec 2023. Questionnaires were distributed among medical students of RMU with total participants of 170. Collected data was analyzed using SPSS version 27.0. The chi-square test was used for evaluation. Simple frequencies, percentages, and mean were obtained.

Results: We collected responses from 170 participants. Mean age of respondents was 20.59 ± 1.5 years. Based on the data we collected, we found that 70% of the respondents experienced dysmenorrhea with varying frequency. Dysmenorrhea had a considerable impact on students' daily life activities. 45% of the participants faced productivity issues, 28% experience emotional stress while 23.5% reported they avoid social events and 19% even miss school. Several complaints were associated with dysmenorrhea experience; most common were muscle cramps (45%), back pain (40.5%), nausea (27%) and fatigue (27%). We also investigated that majority of the students use self-management strategies to overcome their symptoms, which mainly included relying on pain relievers (36%) and use of heat therapy (37%). Use of herbal remedies was also common among 34% participants. 28% of the respondents had daily exercise routine, 19% avoid junk and 36% avoid cold water during menstruating days.

Conclusion: The study revealed that primary dysmenorrhea is a prevalent complaint among female at RMU, which severely affects their daily life. Meanwhile the myalgia, digestive, mental, physical, sleep, and appetite issues were self-managed by 63% while 37% sought medical help. The most prevalent symptomatic management are over the counter medicines, heat therapy some practice herbal remedies as well.

Keywords: dysmenorrhea, medical student, associated symptoms, pain relievers

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1. Introduction

Dysmenorrhea, commonly referred to as menstrual cramps or pain, is a prevalent gynecological condition that affects a significant number of menstruating women.[1] According to WHO (World Health Organization) dysmenorrhea is defined as the presence of pain or discomfort in the lower abdomen or pelvis, occurring just before or during menstruation. This pain can vary in Intensity, ranging from mild to severe, often associated with other symptoms and complaints that can impact overall well-being WHO states the prevalence to be in a range of 50-90% among the menstruating female. Primary dysmenorrhea pathophysiology is due to the abnormally increased uterine activity due to the release of prostaglandins during menstruation. [2,3]

Dysmenorrhea is classified among two categories Primary dysmenorrhea is defined as Painful menses without any underlying abnormality and occurs before or during menstruation. Whereas the next category refers to dysmenorrhea caused by several identifiable pathological conditions such as: endometriosis, adenomyosis, leiomyomas and pelvic inflammatory disease. [4,5,6]

A study was conducted by Lacovides et.al emphasized that primary dysmenorrhea estimated prevalence was from 45-95% of menstruating females with associated GIT, physical and mental health issues with discomfort-[7]. Along with the prevalence, the wide range of pain and discomfort experienced among females of different ages, as well as the cultural association is an impact over the prevalence and intensity of primary dysmenorrhea. Moreover, cultural and geographical difference is also a topic of Prime search Focus The prevalence of dysmenorrhea in Nepal 75.2% Ethiopia was reported 71.69%.[8] In Saudi Arabia primary dysmenorrhea 92.3%, and Secondary dysmenorrhea was 77% prevalent.[6.] In India; 62.75%. In Ireland it was 55% prevalent. According to astudy where prevalence among different

countries was stated as 73% in Brazil, Egypt 76.1%-8. In Iran more than 70%[9] and 85.4% in Pakistan.[10] "A study that surveyed Prevalence of Dysmenorrhea among university students Of Pakistan at Lahore listed 91.5% prevalence rate.[11]

Dysmenorrhea often presents with many complaints such as: low back pain, fatigue ,vomiting, diarrhea, insomnia[12], emotional distress[13], lack of focus, headache, constipation, diarrhea, sweating as well .its risk factors include smoking , alcohol consumption , higher body mass index, family history, depression, heavy menstrual flow[14].its common treatments include self-care strategies[15]; herbal medicines with analgesic and anti-inflammatory properties such as ginger[16,17], heat therapy , hot drinks[18], N-SAIDS such as Panadol, paracetamol[19,20,21], acupuncture[22],Kinesio tapes[23] and relaxing therapies such as meditation.

Although, literature reveals various researches being conducted so far in Pakistan still dysmenorrhea being such a prevalent complaint needs to be taken under light with regards to its prevalence, associated symptoms, degree well as the management strategies being practiced among females which include cultural practices being passed on by older generations as well as the personal effective preferences. Our study covers the other generalized Complaints that include a vast domain; Gastrointestinal, systematic, psychological, physical, and eliminatory. The purpose of our study is to deal with the symptomatic management of P-Dysmenorrhea among medical Students (who are somewhat aware of their health) as well inculcating the effect of Food choices and physical management. many studies associate work life balance issues and decreasing academic performance[10,24] with dysmenorrhea as it hinders the concentration and results in focus issues therefore our focus is to assess the impact and the management among medical students despite managing their tough academic life.

2. Materials & Methods

This Cross-sectional study was conducted from August 2023-December2023 at Rawalpindi Medical University, Pakistan. The Study Population was 1st and 2nd year medical students at RMU. Inclusion Criteria was female students with complaint of Primary dysmenorrhea. Those with some secondary cause for dysmenorrhea known as secondary dysmenorrhea such as Bleeding irregularities, Polycystic Ovarian syndrome, Abdominal infections were **excluded** from study.

A questionnaire was compiled and validated at RMU by holding a trial among students and getting the approval of Professors at university. After a successful trial and positive feedback this questionnaire was being circulated and filled online. Collected data was analyzed using SPSS version 27.0. The test was used to analyze the obtained data. Simple frequencies, percentages, and mean were obtained. Our sample size was 169 using the Open Epi Sample Size Calculator with a confidence interval of 95%, a margin of error of 5% and a population size of 300 since we surveyed only the female students of 1st and 2nd year of Rawalpindi Medical University. Data was collected from participants after their approval for informed consent. Participants were ensured of their given data confidentiality and were well informed of objectives of research. Further, our research was reviewed and approved by the "Ethical Review Board" of Rawalpindi Medical University. Data analysis was carried out using SPSS version 25. P-value less than 0.05 will be considered significant.

3. Results

We collected 170 responses to our questionnaire from the female students at Rawalpindi Medical University. The age of the participants ranged from 16 years - 27 years but Mean Age was 20.59 ± 1.5 years. Figure 1 represents a summary of the age groups that participated in this study. Based on our collected data, out of 170 respondents, 51 (30%) respondents never experienced dysmenorrhea(menstrual pain or cramps) but the rest of them (70%) experienced it with varying frequency. However, more than 30% of the respondents have been experiencing it for 5 years or longer duration. We further investigated if the issue of dysmenorrhea was due to any underlying cause (pelvic, hormonal or abdominal abnormalities or any other menstrual disorder) but such causes were prevalent only in 11% population.

We also studied the impact of dysmenorrhea in the lives of the students and based on the results, 28 (16%) participants were significantly impacted while 39 (23%) participants were moderately affected, and 32 (18%) participants were slightly affected due to dysmenorrhea

symptoms in their daily life activities. Less than 2% participants were not at all affected. Upon further investigation, we summarized that 45% of the participants face decreased productivity issues while 28% of the participants experience emotional stress and lack of focus. About 23.5% respondents avoid social events and 19% even miss school or work due to dysmenorrhea.

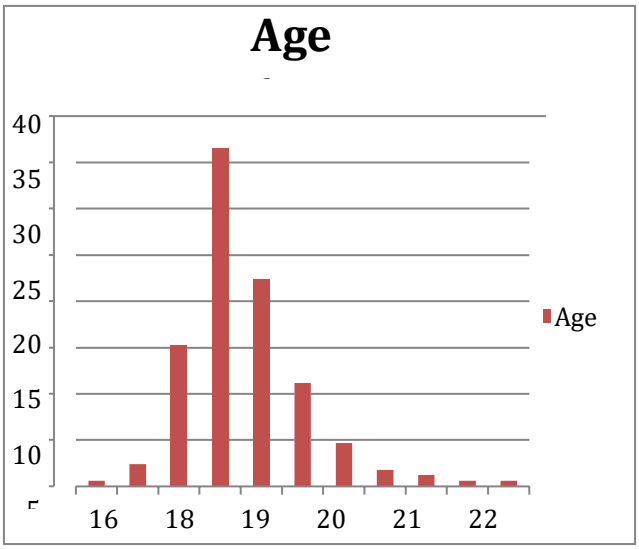

Figure 1: Age of Respondents

A number of associated symptoms are experienced by the participants who have issue of dysmenorrhea. Most prevalent symptom includes abdominal muscle cramps common among 77 (45%) participants, followed by back pain which is common among 69 (40.5%) participants. Substantial number of respondents (27%) also experience nausea and fatigue. Another prevalent complaint is of mood disorder which is experienced by at least 29% of the participants while loss of appetite is faced by 25% of the respondents. 22% participants reported that they also experience vomiting while 21% had complaints of pain in thighs, knees or legs. Another striking complaint was of anxiety among the participants due to dysmenorrhea whichwas reported by almost 19% students. 12% students also reported that they experience nervousness. Almost 15% students had affected sleep due to painful menstruation and experienced sleeplessness. Almost 13% reported about constipation. Other commonly experienced complaints by the respondents included diarrhea,myalgia, frequent urination and sweating, increased appetite etc.

Based on the data we collected, we found that majority of our study population never sought medical adviceor treatment for their symptoms. Most of them relied on self-management strategies which includes the use of pain relievers reported by 36% respondents while 37% relied on using heat through hot water bottles or heat pads to alleviate their symptoms. 34% participants used herbal remedies such as herbal tonic or herbal tea to help themselves. Use of ginger (in 15% population), peppermint (in 6% population), cinnamon (in 5% population) and corom seeds (in 9% population) was also observed among the respondents. 14% students reported that they made significant changes in their diet as well to deal with their symptoms. 10% students also try relaxation techniques like meditation, breathing exercises while 6% try warm up exercises. 7 students reported that they even have to take IV therapy due to the severity of their symptoms. Only 13 students reported that they take some kind of supplementation. 33 (19%) students also revealed that they avoid junk food while 47 (28%) students reported that they avoid cold water close to their menstruation days. Thus, mostly students do not seek official or medical help for their issues and rely on self-therapy by using various techniques Figure 2.

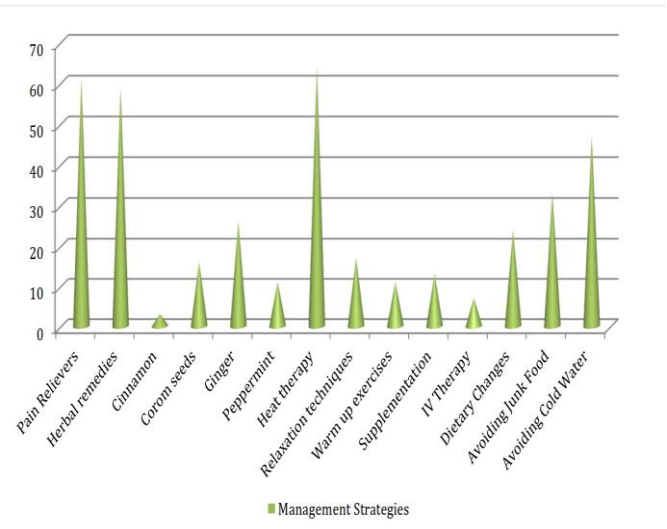

Figure 2: Various management strategies employed by the respondents

4. Discussion

Dysmenorrhea is the most prevalent complaint among menstruating female all over the world. It has so far gathered much limelight in the research domain. WHO states its prevalence about 50-90%. Our survey revealed the prevalence rate of 70% among the medical students at RMU. Dysmenorrhea being a frequent issue surely is concerning to deal with. Therefore, many researches across the world have been conducted so far to study and analyze the relief and worsening factors, the preventive and the causative aspects, the frequent complaints and symptomatic managements, its effects over physical and mental health as well as work life balance issues for females .A study concluded the effects of dysmenorrhea among university going female was a academic hurdle compared to those who didn't have it [25].

Our study was meant to reveal the prevalence of primary dysmenorrhea, excluding the secondary one, among medical students at RMU. As well as explore the related genres. The period for how long the participants have been suffering was though variable but 30% of the respondents have been dealing with it for more than five years. The impacts of painful menstruation are worth discussing. Our study focused on overall influence over daily life which includes mental health and status, physical activity and endurance, anxiety and mood, social events avoidance, skipping university. The results appeared to be significant 29% of respondents gave a verdict of severely influencing while 39% were moderately affected. A study revealed significant impact of dysmenorrhea on quality of life. [26]

Another aspect of our study was to rate the prevalence of other complaints as dysmenorrhea pain comes along with various other health disturbances often which include dietary and appetite issues, sleep issues, emotional and mental health disturbances [13], digestive issues such as constipation, diarrhea, vomiting, nausea, pains such as: headaches, myalgia, abdominal cramps, joint pain, back pain and reduced focus and productivity [27].

Management strategies being practiced all over the world vary with culture and regional aspects also with efficient self-choice. Being medical students the participants of our research were well aware of the reproductive cycle and the changes associated with it going around in their body. Therefore, self-management was found to be prevalent. The management strategies most prevalent were heat therapy (37%), pain relievers (36%) and herbal remedies. randomized control trials were held to study the significant effect of heat therapy on dysmenorrhea. [28] Herbal remedies such as ginger, cardamom, ajwain; carom seeds are as well preferred by 34% population.[29]

The cause known for dysmenorrhea is due to the inflammatory factors produced because of shredding of endometrium during menstruation and the abnormal contractions of uterus due to chemical imbalances. Therefore N-SAIDS; over the counter medicines are helpful in alleviating the pain. [14] Some preventing options for worsening dysmenorrhea as well is the step forward in raising the awareness of dealing this issue among females [31]. Our research also dealt with the practice of such methods among students at RMU that include; dietary changes, junk avoidance, avoiding food that worsens inflammation, cold water avoidance, maintaining good health, supplements for minerals and vitamins in routine basis to ensure balanced diet intake, also regular exercise [32]

The gap which we couldn't bridge through our study is the comparison of prevalence, impact, prevalence and management between medical females and non-medical females. Our data responses are limited to 1st and 2nd year only. However, the students from other years also allied h health sciences indeed can be the source of better analysis. The number of responses collected were though significant but still a limiting aspect of our research.

5. Conclusion

Dysmenorrhea being such a prevalent complaint should be addressed by the medical healthcare providers. Young female group should be guided with the efficient management strategies. Lectures could be conducted at institute to well equip the complainers with the knowledge of management options. Proper counselling can help the students minimize the impacts of dysmenorrhea over their daily life. Dietary choices and physical as well as mental therapies that provide relief should be brought about to practice. Medical students being well aware of the dysmenorrhea can help in playing a key role in raising awareness among general female public over this issue

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Exploration of Newborn Care Practices among Mothers in Tertiary Care Hospitals of Rawalpindi; Insights and Implications

Mehreen Noor[1], Umbreen Noor Muhammad[2], Shahana Ghazal[3]

Abstract

Objective: To evaluate the newborn care practices of mothers who presented to a tertiary care hospital of Rawalpindi district and to ascertain the correlation between newborn care practices and different socio-demographic characteristics

Methods: In this Cross-sectional study, 232 mothers of newborns during the first seven days of live birth who reported In Holy Family Hospital, Rawalpindi were interviewed through a self-structured questionnaire. The questionnaire comprised of 3 sections. The participant's socio-demographic profile was the first, prenatal care was the second, and newborn care practices comprised the final section containing 15 items. Data generated was analyzed using SPSS version 25.

Results: 69.4% of mothers practiced averagely, 19.8% practiced well, and 10.8% practiced poorly. Mothers who reported having at least one prenatal visit were 92.7%. Ill practices regarding cord-care were reported as Eighty-six percent said they used pyodine, oil, or spirit on the cord stump. Providence for appropriate skin and eye care was 93.5% and 71.1%, respectively. Delayed Bathing (after a 24-hour period) following delivery was reported by 88.4% of respondents. The percentage of exclusive breastfeeding was 38.4%. Only 15.9% of mothers started nursing in the first hour after giving birth. Pre-lacteal meals were given by majority of our study participants i.e. 64.2% .65.5% participants reported giving colostrums to the newborn. A strong correlation was established between good practices and urban living (p=0.006). Better hand hygiene before touching a newborn (p=0.048) and bathing the infant after each episode of stool (p=0.026) was significantly associated with higher maternal education level.

Conclusion: The care practices for newborns were mediocre. Health education can help women become more knowledgeable about best practices for caring for their newborns.

Keywords: Newborn care, Cord Care, Pre-lacteal, Exclusive breast-feeding.

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1. Introduction

Globally, approximately four million newborns perish annually before reaching their first month, with nearly 57% of neonatal deaths occurring within the initial three days of life. Developing countries account for about 99% of these fatalities.[1] According to World Health Organization (WHO), some of the major reasons contributing to mortality within the first 28 days of life are a consequence of improper care practices at birth[2]. Consequently, developing countries in Central and South Asia bear the largest figures (27 deaths per 1000 live births) in terms of neonatal mortality.[3] A demographic analysis done by UNICEF found Pakistan to be a significant contributor towards neonatal mortality rate of South Asia, with its current figures being 39 deaths per 1000 live births.[3] The stated numbers have remained near stagnant over the past two decades.[3] Maternal practices of newborn care have been associated to have a significant impact in neonatal mortality as shown by one survey done in Bangladesh that established a relationship between delayed bathing and reduced neonatal mortality rate. The high neonatal mortality rate in Pakistan is significantly influenced by cultural practices surrounding newborn care, including immediate bathing after birth, pre-lacteal feeding, colostrum disposal, herbal bathing, improper cord care, and application of various substances to the umbilical cord.[4] According to Essential Newborn Care Practices (ENC) stated by WHO, a newborn should be provided with clean environment during delivery, proper cord care, skin care and provision of eye hygiene, maintaining optimum body temperature to prevent hypothermia, early breastfeeding initiation and exclusive nursing for the first six months of life, at least, and vaccination.[5]

Numerous studies have been conducted throughout Pakistan to evaluate newborn care practices. A research done in Sindh province of Pakistan found that 68% of newborns initiated breastfeeding early, while 32% of mothers provided pre-lacteal feed (such as animal milk or commercially available formulas, honey, or fresh butter/ desi-ghee).[6] A study in Karachi revealed that 36.8% of newborns received proper cord care, 34.9% received adequate thermal care, and 73.7% were appropriately fed.[7] According to the findings of the study

conducted in Lahore, it was customary to utilize traditional substances on the umbilical cord, discard colostrum, postpone the onset of nursing, and exclusively feed newborns[8]. However, there is little research done on neonatal care practices in the Rawalpindi district.

A recently released UNICEF report states that Pakistan ranks among the worst countries in terms of infant mortality rate, highlighting the urgency to address malpractices contributing to this issue[9]. This study was conducted to identify and understand these malpractices among mothers attending tertiary care hospitals in Rawalpindi, enabling health personnel to provide appropriate guidance. The objective of this study was to evaluate the newborn care practices of mothers who presented to the immunization department of a tertiary care hospital of Rawalpindi district and to ascertain the correlation between newborn care practices and different socio-demographic characteristics.

2. Materials & Methods

Place of Study: Vaccination center, Holy Family Hospital (HFH), Rawalpindi.
Study duration: 6 months after the approval of synopsis, February 2023 to September 2023.
Study Design: A Quantitative Descriptive Cross-sectional Study design was employed.
Study Population: Mothers of the newborns from birth till 7 days of giving birth to the neonate who came to the immunization department of Holy Family Hospital, Rawalpindi.
Sample size: 232, it was calculated by WHO sample size calculator by keeping Confidence Level of 95% and 5% as margin of error.
Sampling technique: Convenience sampling.
Inclusion criteria: Mothers who brought their babies within a week after delivery to the EPI vaccination facility Holy Family Hospital, Rawalpindi for the BCG immunization during the study period and indicated interest in participating in the study.
Exclusion criteria: Mothers who delivered via cesarean section or those newborns who were not accompanied with their mothers or the neonates borne with various co-morbidities were not included. Furthermore, the research did not include caregivers of infants whose mothers died during or after delivery.
Data Collection: To assess the degree of Essential Newborn Care (ENC) practices, a self-structured questionnaire that was in line with World Health Organization (WHO) standards for neonatal care was developed after a thorough literature review of related researches both national and international and it was reviewed by Public Health experts of our institute. As stated in Appendix-I, the questionnaire was divided into three main components, such as socio-demographic profile, prenatal care/Antenatal Care, and Essential Newborn Care practices respectively. There were fifteen questions about ENC practices, each with two possible answers. For every right answer, one point was awarded; for every erroneous answer, zero points were awarded. The overall score might be as low as "0" or as high as "15". Practices were categorized as Poor/Bad (score 0-7), Fair/Average/Moderate (scoring 8-11), or Good (score 12–15) based on the results of the questionnaire. After obtaining informed consent, all eligible mothers were interviewed that was conducted by the researchers themselves, and the data was entered into the printed questionnaires by the researchers.
Statistical Package of Social Sciences (SPSS) version 25 was utilized for the analysis of the data. Descriptive and Inferential statistical tools were used for analyzing the data. For Categorical/ Qualitative variables, frequencies and percentages were calculated, and for Quantitative variables or continuous numeric data, mean and standard deviation was determined. Then the overall Newborn Care practice scoring was calculated for each individual form. The practice scores were cross-tabulated with various socio-demographic factors. Chi-square test was applied to establish relationship between Newborn Care Practices and socio-demographic variables. A cutoff point of $p<0.05$ was set for significance.
Following clearance from the Holy Family Hospital, Pediatric Department Head and the Institutional Research Forum of Rawalpindi Medical University, data collecting got underway. Mothers of babies who qualified for the study were asked if they were willing to participate in the study after explaining all the potential risks and benefits. The participants were assured that the data will be kept confidential.

3. Results

232 mothers took part in the research. The socio-demographic details of the research participants are shown in Table 1. The average age of the participants was 26.8±0.33 years, and the majority (32%) was

between the ages of 20 and 27. Of them, 32.8% or 30.2% had two children. The majority of mothers gave birth at tertiary care facilities (58.6%). Among all the study participants, around 22.8% had no formal education and 22.4% had completed school all the way to matriculation. 93.5 percent were housewives, while the remaining 6.5 percent had jobs. Residents were divided between urban (77.2%) and rural (22.8%) regions, with a sizable percentage (73.3%) coming from lower socioeconomic classes. At least one antenatal care (ANC) appointment was attended by nearly all participants (92.7%), with 87.5% of them receiving treatment from a gynecological expert. Tetanus toxoid coverage was reported at 93.5%.

According to WHO recommendations the Essential Newborn Care Practices were picked and assessed. Participants understanding of several elements of Newborn care varied; 161 (69.4%) showed fair practices, 46 (19.8%) showed good practices, and 25 (10.8%) showed poor practices. About 80.6% said they have applied various substances on the cord stump, such as oil, desi-ghee, alcohol, or iodine. Newborn receiving appropriate skin and eye care was reported by 91.1% and 93.5% of respondents, respectively. 88.4% of mothers said they waited till 24 hours after birth before giving newborns their first bath. Only 15.9% of newborns started nursing within the first hour of life. Mothers gave colostrum in 65.5% of cases, and pre-lacteal feedings in 64.2%. 38.4% of breastfeeding cases were exclusive. Significant associations (p=0.006) were found between urban residency and good practices (Table-2). Higher levels of maternal education were associated with good hand hygiene practices before handling the infant (p=0.048) and washing the baby with every incident of stools (p=0.026). The knowledge of newborn care was correlated with Family monthly income (p=0.03), and participants from upper-middle-class families showed more knowledge than those from lower-middle and lower-class families (p=0.025). However, their methods did not differ substantially (p=0.324).

4. Discussion

Maternal knowledge regarding accurate ENC practices is crucial to decrease the overall burden of neonatal mortality in Pakistan. Our cross-sectional study gives a comprehensive overview of newborn care practices among women presenting at EPI center of Holy Family. Furthermore, it also correlates various socio-demographic factors with understanding of newborn care practices among women. The participants included in our study are primarily from the lower socio-economic strata, many of whom have either no formal education or minimal educational attainment.

The significance of antenatal check-ups during pregnancy cannot be overstated. WHO recommendations are atleast four ANC visits during each pregnancy and ensuring childbirth at a healthcare facility by hands of a skilled healthcare worker[11]. We found an encouraging statistics of 92.7% for utilization of antenatal care by the participants of this study. Our figures align with the research done by Khan et al. in Islamabad, which showed that 95% of women attended a minimum of one antenatal visit with a healthcare professional.[12]. Similarly, a research conducted in Sindh reported 83.5% of participants receiving antenatal care on one or more than one occasions, primarily from qualified doctors (95%) [13].

However, a survey study conducted by the National Institute of Population Studies revealed a lower utilization rate, with only 51% of mothers receiving antenatal care from healthcare providers[14]. Moreover, there may be geographical differences in the use of prenatal care services[15].Our study observed that mothers living in urban areas tended to exhibit better knowledge of ENC practices as compared to the ones in rural setting, a finding consistent with research conducted in Sindh[7] and Ethiopia[16]. This trend may be attributed to the greater accessibility of healthcare services and higher levels of education in urban settings compared to rural areas.

In our study, it was found that the majority (69.4%) of participants exhibited moderate neonatal care practices. This proportion is greater than the findings of a study conducted by Kebede[16], where the rate of newborn care practice was reported to be 60.6%.

WHO recommends implementation of standard ENC practices that include early commencement of breastfeeding, adequate warmth for newborns, early identification of neonatal danger signals and proper care of the umbilical cord, which are essential for newborn survival[17]. However, contrary to WHO guidelines that recommends starting nursing within the first hour of the baby's life, only 15.9% of participants in this study complied with this recommendation. Furthermore, the prevalence of use of pre-lacteal feed was notably high in our study, mirroring similar findings reported by Asim et al.,[18]and Kumar et al[7]. However, this is on contrary to a study conducted in India, where participants exhibited better knowledge regarding breastfeeding[19].

Table-1 Socio-demographic background of the study participants (n = 232)

Variable	Groups	Count	Percentage
Age at Marriage	<20 years	7	3
	21-27 years	125	53.9
	28-35 years	28	37.9
	> 35 years	12	5.2
Parity	1	76	32.8
	2	70	30.2
	3	43	18.5
	4	23	9.9
	5	12	5.2
	6	6	2.6
	7	1	.4
	11	1	.4
Gravidity	1	55	23.7
	2	66	28.4
	3	46	19.8
	4	36	15.5
	5	14	6.0
	6	8	3.4
	7	3	1.3
	8	2	.9
	9	1	.4
	11	1	.4
Place of delivery	Home	16	6.9
	Primary health care	38	16.4
	Secondary health care	42	18.1
	Tertiary health care	136	58.6
Education level	Non formal education	53	22.8
	Primary	19	8.2
	Secondary	25	10.8
	Matriculation	52	22.4
	Intermediate	34	14.7
	Graduation	33	14.2
	Post-graduation	16	6.9
Occupation	House wife	217	93.5
	Working	15	6.5
Place of living	Rural areas	53	22.8
	Urban areas	179	77.2
Monthly income	<20,000 pkr	153	65.9
	21,000-40,000 pkr	50	21.6
	41,000-60,000 pkr	15	6.5
	61,000-80,000 pkr	5	2.2
	81,000-100,000 pkr	8	3.4
	>100,000 pkr	1	.4
Economic Status	Upper class	0	0
	Upper middle class	10	4.3
	Lower middle class	52	22.4
	Lower class	170	73.3
Attended Antenatal care	Yes	215	92.7
	No	17	7.3
Antenatal care given by	Valid	17	7.3
	LHW	4	1.7
	General physician	8	3.4
	Gynae specialist	203	87.5

The difference is attributed to India's robust breastfeeding programs, which are lacking in the setting of the current study. Unhygienic pre-lacteal feeding methods and poor feed quality can increase the risk of infections in newborns. It's crucial to recognize and address these practices within communities to educate mothers and caregivers about proper breastfeeding techniques.

Newborns rely on external help to control body temperature. Factors like protection and bathing greatly impact their ability to regulate heat[20]. In terms of giving first bath to newborn, WHO strongly recommends a delay of 24 hours between birth and provision of first bath or atleast a gap of 6 hours between the two if cultural reasons intervene. This is done to prevent the risk of hypothermia that is strongly associated with an early bath following birth.[17]. According to this study, 88.4% of mothers gave their babies a bath 24 hours after birth. Our study was conducted in a hospital setting, where respondents may have received health education emphasizing proper thermal care practices. India also reported similar findings[21]. Conversely, a research conducted in Uganda found that 86% of respondents agreed to bathe their newborns within 24 hours[22]. These differences may arise from varying cultural beliefs, as some cultures consider newborns unclean at birth, leading to early bathing practices. Ensuring appropriate handling of the umbilical cord during the newborn period is crucial, as inappropriate methods have been linked to infections. [22]. However, this study revealed inadequate cord care practices, such as application of clarified butter (desi-ghee), oil, pyodine, and spirit to the cord stump. Interestingly, Ghana (64.3%)[24] and Ethiopia (66.9%)[25] also reported similar and high statistics of malpractice in terms of cord care. The choice of materials used on the cord stump is influenced by traditional practices and the belief that they promote early separation and prevent bleeding.

Our study established no significant relationship between the mothers' age and number of children, with their knowledge and practices of newborn care. Mothers from upper-middle class backgrounds had a greater comprehension of ENC practices, however, their practices differed slightly. Similarly, higher maternal education was found to be a strong influence on newborn care practices. Past researches have also established that that well-educated mothers adopt better hand hygiene practices and knowledge of newborn care[15, 26].In our study, maternal employment status showed no significant association with newborn care knowledge and practices; although, some studies suggest working mothers may possess better knowledge[7, 27]. The

disparities in these findings may be attributed to variations in study participants, socio-demographic factors, cultural values, time periods or the influence of other family members.

The key feature of this cross-sectional study is that it has explored numerous socio-demographic characteristics linked with ENC practices. However there are some limitations to the study. The data on the ENC practices was gathered from mothers who had given birth one week before their first presentation to EPI center for neonatal vaccination. Therefore, there could be some recall bias impacting the data quality. Moreover, as all participants were utilizing healthcare facilities, there might be bias regarding the practices of mothers who do not utilize such facilities.

Table-2 Comparison of ENC practices: Rural versus Urban areas.

Item	Parameters	Rural Areas	Urban Area	p-value
Initiation of breast Feeding	Not Giving Breast feed After 1 hour Less than or equal to 1 hour	25% 68% 8%	12% 18% 70%	0.022
Breast feeding exclusive or not	Yes	28%	41%	0.049
BCG Vaccination to newborn	Yes	87%	97%	0.007
Number of times cord cleaned per day	None 1-2 times With each diaper changed	17% 45% 38%	9% 27% 64%	0.003
Substance of cord	Yes	66%	85%	0.002
Proper Eye care providence	Yes	87%	96%	0.023
Practices Scoring	Bad Practices Moderate Practices Good Practices	21% 70% 9%	8% 69% 23%	0.006

5. Conclusion

Our study found that majority of the mothers adopted moderate newborn care practices hence highlighting numerous shortcomings in ENC. Newborn care practices were found to be significantly influenced by maternal cultural backgrounds, beliefs and local traditions as well as socio-economic status. A positive trend of acquisition of standard antenatal care and utilization of proper healthcare facilities for childbirth was observed among the participants of our research. This promotes the opportunities for adequate maternal awareness by health care providers, regarding the standard ENC practices to prevent early neonatal deaths and reduce neonatal mortality rate of Pakistan.

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Chimeric Antigen Receptor (CAR) T-Cell Therapy And Cytokine Release Syndrome: Do We Need To Be Innovative To Overcome The CAR T-Cell Associated Toxicities

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Abstract

Chimeric antigen receptor (CAR) T -cell therapy is the target specific therapy that utilizes the function of genetically engineered T -cells in production of artificial T-cell receptors for being utilized as immunotherapy for treating cancers. It's not only an exciting revolution in the field of hematology, but also now being utilized in treatment of solid tumors. Despite of having such an exciting revolution, the use of CAR T-cell therapy is restricted due to its associated toxicities like cytokine release syndrome (CRS) and neurotoxicity thus posing the dire need of development of new strategies that could ameliorate the toxic side effects and can provide better target specific therapies like CAR off switches, suicide gene strategies, modifying the CAR transduced T cells, and altering the affinity of the CAR -T cell's antigen binding domain.

Keywords: CAR-T cell therapy, Cytokine release syndrome, Toxicity.

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Chimeric antigen receptor (CAR) T-cell therapy is the target specific therapy that utilizes the function of genetically engineered T-cells in production of artificial T-cell receptors for being utilized as immunotherapy for treating cancers.[1] The genetically engineered T-cells formed through CAR-T cell therapy are destined to act on specific targets in order to achieve heroic therapeutic results in treatment of various cancers.[1] Chimeric antigen receptor (CAR)-T cell therapy has been revolutionary as it has produced remarkably effective and durable clinical responses. CARs are engineered synthetic receptors that function to redirect lymphocytes, most commonly T cells, to recognize and eliminate cells expressing a specific target antigen. CAR binding to target antigens expressed on the cell surface is independent from the MHC receptor resulting in vigorous T cell activation and powerful antitumor responses.[2] Tisagenlecleucel (Kymriah®) was the first Chimeric antigen receptor T-cell therapy that was approved by the US Food and Drug Administration (FDA) in 2017 for being utilized in treatment of B-cell acute lymphoblastic leukemia in children and young adults.[2] There are many other newly developed CAR T cells therapies like Axicabtagene Ciloleucel (Yescarta®), Idecabtagene vicleucel (Abecma®), Lisocabtagene maraleucel (Breyanzi®) that are now being excitingly utilized in the treatment of various hematological malignancies like mental cell lymphoma, multiple myeloma, and large B-cell lymphoma.[3] The utilization of CAR T cell therapy is now being a matter of debate for being used for solid tumors as well.

Despite of being highly effective therapy in treatment of B-cell ALL with 81% response rate, improvement in overall survival (OS) and progression free survival (PFS), and being excellent in other malignancies, there are some limitations that have been observed in patients undergoing CAR-T cell therapy. The most commonly observed limitations are antigenic escape, on target off tumor, CAR T-cells trafficking and infiltration, immunosuppressive microenvironment and finally the CAR-T cell therapy associated toxicities.[4] The most common and lethal of all toxicities was cytokine release syndrome along with neurotoxicity observed in patients undergoing CAR T-cell therapy.[5] Although CAR T-cell therapy has been approved as a revolutionary step towards the field of oncology, still the CAR T-cell therapy associated toxicities have been preventing it to be used as first line therapy. The most debilitating side effect observed was cytokine release syndrome (CRS) that is characterized by the release of various inflammatory cytokines like C-reactive protein (CRP), ferritin, interferon (INF)-ϒ, and various interleukin (IL-1, IL-2, IL-4, IL-6 and TNF).[6] The first presentation of CRS as observed in various literature is fever with variable pattern and developing at different days following the infusion of CAR T-cell therapy.

Some studies have even shown the development of fever on the very next day of therapy followed by day 9 and day 14 of the therapy.[7] The other symptoms associated with CRS are hypotension, hypoxia and sinus tachycardia as well.[7] The CRS is not only a single disease entity, actually it is a set of disorders

that can be vary from just fever to hypotension requiring vasopressin and finally cardiac and respiratory depression leading to death. The most commonly used management options are immediate use of corticosteroids and tocilizumab (IL-6 receptor inhibitor) as well as supportive care.[8]

The second most common toxicity associated with CAR T cell therapy is immune effector cells mediated neurotoxicity that is manifested as delirium, hallucinations, seizers, dysphagia, nerve palsies and motor and sensory defects due to white matter degeneration of brain tissue.[9] The neurological symptoms were also presented as encephalopathy secondary to hepatic failure leading to CAR T cell mediated encephalopathy. The neurotoxicity urgently warrants the use of corticosteroids (high dose dexamethasone) for prevention of long-term neurological consequences.[10] Similar to the variability in the development of fever, the neurological manifestation was also showing variability in the disease course, being developing from the day following the three to four weeks that need vigilant attention in this regard.[11] Though the toxicities associated with CAR T-cell therapy are debilitating, but the benefits we getting and the revolutionary pillar the therapy has been built is outrageous. So, there is dire need of getting innovation in this field as well because the toxicities associated with CAR T-cell therapy are really the point of concern in this era of paramount excellence in the field of oncology and hematology.

These toxicities related limitations have served as a strong incentive to develop strategies to ensure safety, and another potential avenue to ameliorate CAR-T cell toxicity is through implementing of various strategies like CAR off switches, suicide gene strategies, modifying the CAR transduced T cells, and altering the affinity of the CAR-T cell's antigen binding domain. Thus, preventing the toxicities and maintaining the effectiveness of CAR T-cell therapy in fighting against various malignancies along with perspective role in solid tumors as well.

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A Rare Case Of Sino-Nasal Sarcoma With Intracranial Extension: A Case Report

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Abstract

Herein, we are reporting a rare case of sinonasal sarcoma with intracranial extension. Patient presented with complaints of nasal obstruction and epistaxis. The investigations including histopathological analysis were suggesting a highly aggressive sinonasal sarcoma with intracranial extension also involving the internal carotid artery in circumferential manner. Tumor was unresectable due to extent of invasion and patient was referred to radiotherapy department for reduction of tumor size with radiotherapy.

Keywords: Sinonasal sarcoma, intracranial extension, Spindle cells, Fascicular pattern.

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1. Introduction

Malignant spindle cell tumors account for 1% of the total head and neck cancers and of all 5-10% are classified as sarcomas in adult population.[1] According to World Health Organization (WHO) classification in 2017, the head and neck sarcomas are divided into eight histological subtypes: undifferentiated pleomorphic sarcoma, fibrosarcoma, angiosarcoma and malignant peripheral nerve sheath tumor (MPNST).[1] Sinonasal sarcoma is one of the unique tumors now presented by WHO and has been added in the classification of head and neck malignancies recently.[2] Herein we are reporting a rare case of sinonasal sarcoma in 38-years old female presented to department of otolaryngology and head and neck surgery, Benazir Bhutto Hospital, Rawalpindi.

2. Case Presentation

A 38-years old female presented to Outpatient department of otolaryngology and head and neck surgery, Benazir Bhutto Hospital, Rawalpindi with complaints of bilateral complete severe nasal obstruction and intermittent epistaxis. Patient also has history right sided nasal obstruction 13 years back with epistaxis for which intranasal polypectomy was done and symptoms of nasal obstruction and epistaxis were resolved. But now patient again presented with symptoms of B/L nasal obstruction and epistaxis. At presentation patient was vitally stable and laboratory analysis was also normal.

On external nasal examination a deformity (expanded vestibule was observed) with increased inter-canthal and inter-pupillary distance but Normal eye movement and reflexes, on anterior rhinoscopy B/L completely obstructing nasal mass was observed that was bleeding with probing. On palpation, the mass was painful and tender sinuses were present. Nasal patency was absent bilaterally with anosmia bilaterally. No neurological dysfunction was present at the time of presentation. Posterior rhinoscopy was insignificant and there were no significant findings in throat and ear examination. Cervical level II lymph nodes on left side of the neck were palpable.

On X-ray (water's view) of nose and para-nasal sinuses, homogeneous haze in B/L maxillary and frontal sinuses and nasal cavity was observed suggesting polypoidal mass formation as shown in figure 1..

Figure 1: Showing the X-ray PNS (Waters' view) that is delineating the complete obstruction of nasal cavity and maxillary sinuses with Sino-nasal sarcoma

On CECT aggressive looking polypoidal heterogeneously enhancing soft tissue density mass measuring 9x6.3x5.6cm involving nasal cavity and all para-nasal sinuses causing their expansion, obliteration, and bony erosions with intracranial extension was observed as shown in figure 2. MRI scan was suggesting a highly neoplastic mass with bony erosions with intracranial extension and involving right cavernous sinus as well. Tumour was also encircling the internal carotid artery covering 90% of its circumstance validating the unresectable mass with intracranial extension. On

incisional biopsy, microscopy showed low grade spindle cell proliferation in fascicular herring bone pattern suggesting sinonasal sarcoma as shown in figure 3. On immunohistochemistry analysis, S-100 was positive

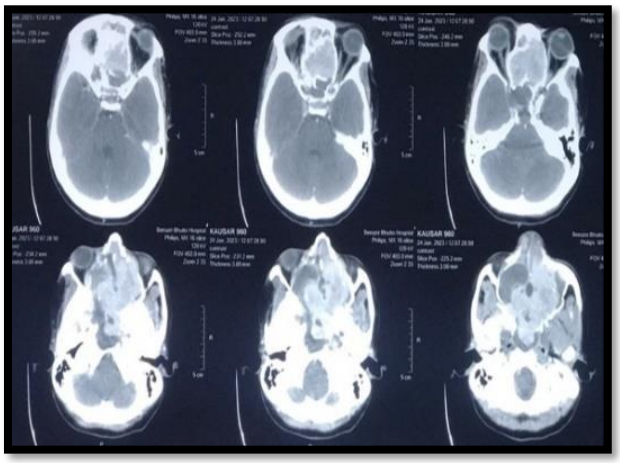

Figure 2: Showing the presence of mass completely obstructing Sino-nasal cavities and with bony erosions and aggressive looking spread

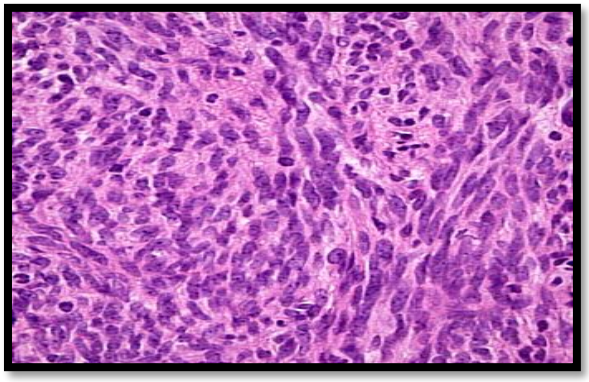

Figure 3: Histological presentation of biopsied sample depicting fascicles of low grade, monotonous spindle cell proliferation in herringbone pattern suggesting sinonasal sarcoma. (H&E).

After all baseline and specific investigation and work up a final diagnosis of sinonasal sarcoma was made and it was labelled as unresectable mass due to intracranial extension and vascular invasions and patient was referred for radiotherapy for reduction in mass volume.

3. Discussion

Sinonasal sarcoma is described as low-grade carcinoma with neural and myogenic differentiation that initially came into literature in 2012 with the efforts of Lewis et al.[3] The sarcomas of head and neck are rare and only accounting for 10% or less of overall head and neck malignancies.[4] The sarcoma arising from sinonasal cavities is rarely observed location for such kind of low-grade sarcomas. The etiological association of sinonasal sarcoma is not clearly elucidated in the literature, however; the involvement of genetic factors is of paramount significance in the development of sinonasal sarcoma.[5] Association of sinonasal sarcoma with other diseases like, TP53 mutation, Gardner syndrome, Li-Fraumeni syndrome, tuberous sclerosis, Neurofibromatosis, and irradiation for pre-existing cancer and Epstein-Barr virus infection, have been observed in many studies.[6]

The signs and symptoms of sinonasal sarcoma can vary depending on the location and size of the tumor. Common symptoms include nasal obstruction, congestion, epistaxis (nosebleeds), facial pain or pressure, and sinusitis-like symptoms such as facial swelling, headache, and nasal discharge. Other potential symptoms include vision changes, double vision, eye pain, and proptosis (bulging of the eye)[7,8] Because these symptoms are non-specific and can also be caused by other conditions such as sinusitis, they can sometimes lead to a delay in diagnosis. However, if a sinonasal sarcoma is suspected, further testing such as imaging studies and biopsy can help to confirm the diagnosis.[9]

Detailed investigations like CT scan, MRI and PET can provide information of paramount significance in terms of size and location of the tumor, as well as whether it has spread to other parts of the body.[10] In addition, newer imaging techniques such as diffusion-weighted MRI and dynamic contrast-enhanced MRI may be useful for evaluating the extent of tumor invasion and vascularity.[11] Biopsy is the definitive diagnostic test for sinonasal sarcoma. A tissue sample is taken from the tumor and examined under a microscope to confirm the presence of cancer cells and determine the specific type of sarcoma.[10] Endoscopy and fluorescence-guided endoscopy may be used to visualize the tumor and obtain a tissue sample for biopsy.[12,13]

The optimal treatment for sinonasal sarcoma depends on various factors such as the type and stage of the tumor, as well as the patient's overall health and preferences. Surgery is the mainstay of treatment for sinonasal sarcoma, and the goal is to remove the entire tumor with negative margins. Depending on the location and extent of the tumor, different surgical approaches such as endoscopic resection, open craniofacial resection, or a combination of both may be used.[14] Adjuvant radiation

therapy may also be given after surgery to reduce the risk of recurrence.[15] Radiation therapy may also be used as the primary treatment for sinonasal sarcoma in some cases, particularly for tumors that are not amenable to surgery or for patients who are not candidates for surgery due to advanced age or comorbidities. Chemotherapy is generally not considered a standard treatment for sinonasal sarcoma due to its limited effectiveness, although it may be used in certain situations such as for unresectable or metastatic tumors.

4. Conclusion

It was a rare case of sinonasal sarcoma of aggressive nature that was completely occupying nasal cavity and para-nasal sinuses with bony erosions. CT scan and MRI was suggesting a highly aggressive mass with intracranial extension (extradural). The mass was also abutting the internal carotid artery with its 90% circumference and was labelled as an unresectable mass and patient was referred for radiotherapy.

CONFLICTS OF INTEREST- None

Financial support: None to report.
Potential competing interests: None to report

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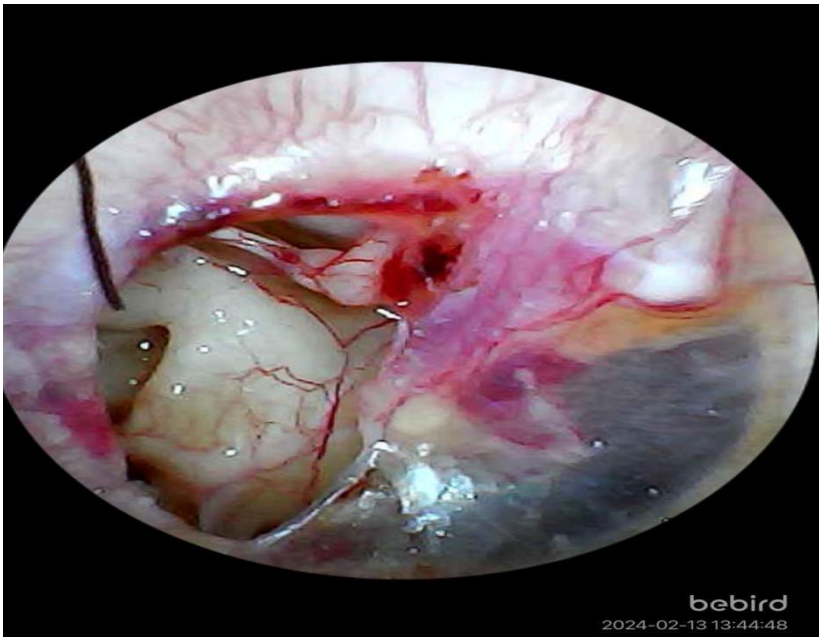
PICTURE OF THE ISSUE



Showing the traumatic Sub-total perforation of Tympanic Membrane (Endoscopic-view) in 19 years old male presenting in ENT department of Benazir Bhutto Hospital, Rawalpindi, Pakistan.

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