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ACKNOWLEDGEMENT

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Neuroplasticity: A Shrouded Self-Recovery

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The human brain is a replica of a well-integrated universe within which light fleets in swathes and heralds the secrets of its unprecedented steadfastness and coherence. The human universe, called brain has been designed capacious enough to withhold the impacts of barter along with the adroitness of guiding the fluid dynamics of majestic human creatures. It was not until 1948 that Jerzy Konorski coined this neuro-physiological dexterity into the term 'neuroplasticity'. The word is the true depiction of its functional mastery over making sophisticated humans adapt to any sort of internal or external change in the environment, through sharing the intense impulses of response with the neurons in closer proximity. This commitment to adaptation leads to either a renovated, recess, or re-establishment relay of neuron connections in brain, named synapses.

This mechanism of self-recovery has been recently incorporated into practical therapy, owing to the flush of discoveries, enlightening both the people of science and laymen with its benefits. Neuroplasticity has been applied in the models of nervous degeneration, cognition, learning, and memory decline translating into flabbergasting outcomes among patients of Alzheimer, stroke, traumatic brain injury, epilepsy, and aging deterioration [1]. The technique has also unwound its potencies to psychologist and psychosocial activists that now recommend neuroplasticity-stimulating exercises to patients of depression and anger issues.

A Question arises on how such a complete package of control is achieved by humans. Research shows and argues that it can be attained in a myriad of ways, no one roadmap has yet been formulated. Certain proteins, molecular switches, high fat diets, muscle vibrations, enforced habitual reinforcements, and conditional piquing of neurons' originator cells onset and drive the plasticity of the neurons. A contemporary scientific investigation on the effects of virtual reality exposure to rats concluded that it fine-tuned the hippocampus region of the brain unveiled through 'eta' waves that were associated with storing memory [2]. Debates are underway whether neuroplasticity is the facilitator of new cranial rewiring or simply an enhancer of existing brain abilities.

Future implications of neuroplasticity include its manifestation in the guise of artificial intelligence (AI). The success in proliferation of AI has been counter-argued with the extent of its ability to interpret and respond to unexpected and untaught stimuli. But the unearthing of systems such as SynapShot, a real time fluorescent apparatus developed to visualize brain's impulse connections, heralds a before long translation of neuroplastic codes into machine language [3]. To arrive at such approaches the need of hour is to fully unlock and explore the mightiness of the plasticity horizons of the neurons, that imitate the ideology of galaxies.

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Review Article

Role of Color Doppler Ultrasound to Evaluate the Lower Limb Deep Venous Thrombosis in Diabetic Patients

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ABSTRACT

Diabetes mellitus is one of the main risk factors for peripheral arterial disease (PAD), and its occurrence is on the rise. In patients with deep vein stenosis, it is quite prevalent. Deep vein thrombosis is a serious health issue in the United States that impacts more than 2.5 million individuals each year. We searched a variety of search engines and databases, including Google Scholar, PubMed, and NCBI, for papers pertaining to our subject. Data on the assessment of lower limb DVT in diabetic patients were extracted from just 20 articles. The current study examined the assessment of DVT in the lower leg. Individuals with diabetes experience different rates of deep vein thrombosis. The result is not statistically significant. The anatomic location of the thrombus indicated that patients with diabetes had a higher likelihood of involvement of the popliteal vein, femoral vein, and common femoral vein compared to non-diabetics.

INTRODUCTION

Diabetes mellitus (DM) is one of the main risk factors for peripheral arterial disease (PAD), and its occurrence is on the rise. Those with deep vein stenosis have a relatively high prevalence of it [1]. Deep vein thrombosis is a serious health issue that impacts more than 2.5 million individuals each year. Pulmonary embolism (PE), the most dangerous side effect of a deep vein thrombosis (DVT), is linked to 50,000–200,000 fatalities annually. Although PE and DVT are sometimes quiet and challenging to identify through a clinical examination [2]. With a history of DVT who also have diabetes had a much greater frequency of symptomatic atherosclerotic plaques, indicating a potential overlap in the pathophysiology of both conditions. Furthermore, epidemiological research has demonstrated the connection between venous and arterial thrombosis, primarily emphasizing the existence of shared risk factors [3].Lower extremity atherosclerotic occlusive disease is a hallmark of peripheral arterial disease (PAD). Diabetes mellitus, cholesterol, and hypertension are associated with an increased risk of PAD. Due to systemic atherothrombosis, PAD is a significant risk factor for coronary and cerebrovascular events, such as myocardial

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infarction, stroke, and mortality. Advanced age, cigarette smoking, diabetes mellitus (DM), cholesterol, and hypertension are associated with high risk of PAD. Due to systemic atherothrombosis, PAD is a significant risk factor for coronary and cerebrovascular events. Rarely is PAD a standalone illness; rather, it is a symptom of systemic reduce blood flow. In individuals with DM, PAD is three to four times more common, more widespread, and less symptomatic than in normal persons. Notably, early diagnosis of asymptomatic PAD in patients with DM has crucial consequences, as the risk of limb amputation owing to PAD is much greater in this patient population [4]. It is frequently challenging to detect lower extremity acute deep vein thrombosis (DVT). Only half of individuals with DVT symptoms and signs have thrombi, while up to two thirds of venous thrombi are asymptomatic. Pulmonary embolism, a major cause of morbidity and death for hospitalized patients, can arise from an undetected deep vein thrombosis. Numerous studies have demonstrated compression ultrasonography's (US) better accuracy in the detection of acute DVT [5]. Due to a variety of risk factors not being sufficiently taken into account and differences in the expertise of doctors, deep vein thrombosis (DVT) is not properly controlled in the clinical results of patients. Consequently, to more successfully avoid the development of DVT. Depending on where thrombus development occurs, lower limb DVT may be divided into two categories: proximal deep vein thrombosis and distal deep vein thrombosis. The incidence of adverse events in DDVT cases is much lower than in PDVT cases [6]. Doppler offers a more accurate assessment of the hemodynamic importance of occlusive illness and is noninvasive, portable, and quick to perform [7]. A non-invasive, practical, and non-radioactive vascular test that can reliably and efficiently represent limb vascular status is doppler ultrasonography. Numerous academics have started looking into the lower extremity DVT risk factors. The period of thrombosis and the danger of thrombus detachment are associated, and ultrasonography elastography is a reliable way to find out when DVT forms. This approach has a danger, too, since it might cause the thrombus to come off when the DVT is being examined. As a result, a more precise and safe approach is needed to assess DVT stability. Vibrance Doppler ultrasonography may be a better option for identifying DVT stability because of its high accuracy and ease. Furthermore, thrombus formation and progression are impacted in several ways [8].

METHODS

Different search engines, databases like Google scholar, PubMed, NCBI were used to search the articles related to our topic. The search on databases & search engines identified 39 articles related to topic, among which only 26 articles were as per requirement. And 6 articles were discussing other different pathologies that was not related to statement. Finally, 20 articles were found eligible to carry review forward with them.

RESULTS

Only 20 articles were used for extraction of data related to role of color Doppler ultrasound in the evaluation of lower limb DVT in diabetic patients. The current study looked at color Doppler ultrasound used for lower limb DVT evaluation (Table 1, Figure 1 and 2).

Table 1: Summary of Included Studies

Study Name	Country	Objective	Findings
[1]. Ballotta *et al.*, 2014	Italy	To evaluate lower extremity arterial reconstruction for diabetic critical limb ischemia.	The survival and amputation-free survival rates of diabetes individuals undergoing lower extremity artery reconstruction for critical limb ischemia can be comparable to those of non-diabetic patients. They clearly show that diabetics with critical limb ischemia can anticipate the same quantity and quality of life as nondiabetics based on their equivalent technical and clinical outcomes.
[2]. Aquila *et al.*, 2001	Connecticut	To evaluate deep vein thrombosis in relation to various risk factors.	If DVT occurs, being aware of individuals who are at risk and informed about the symptoms and indicators of the condition can enable quick diagnosis, treatment, and patient education.
[3]. Kremers *et al.*, 2019	Netherland	To clarify how neutrophils and coagulation contribute to atherothrombotic episodes in individuals who have had peripheral artery disease or deep vein thrombosis in the past.	Neutrophil activity does not seem to be a significant driver in DVT patients. Furthermore, no correlations between NET products and coagulation activity were discovered, indicating that neutrophil activation is not a major factor in the risk of thrombosis in DVT or PAD.

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[4]. Hur *et al.*, 2018	Korea	To examine peripheral artery disease in type 2 diabetes may be diagnosed using color Doppler ultrasonography.	Color Doppler ultrasound revealed multivessel involvement, bilateral lesions, and stenosis. Moreover, Color Doppler ultrasonography is a helpful method for identifying PAD in individuals with type 2 diabetes.
[5]. Lewis *et al.*, 1994	Minnesota	To evaluate the usefulness of color Doppler flow imaging in the non-venous compre ssion detection of deep vein thrombosis (DVT) in the femoropopliteal system.	For the assessment of suspected acute DVT, color Doppler flow imaging is a useful adjunct to compression ultrasonography. It can also be useful for individuals who have had chronic or prior DVT for the examination of suspected DVT.
[6].Yao *et al.*, 2023	China	To evaluate the creation and validation of a risk nomogram for geriatric patients with hip fractures regarding preoperative proximal and distal deep vein thrombosis (DVT).	The creation of nomograms to forecast the risk of lower extremity DVT at the proximal and distal preoperative stages in elderly patients with hip fractures. Clinicians should step in and treat high-risk patients as soon as possible before surgery, according to this model's assessment.
[7]. Hingorani *et al.*, 2007	New York	Application of Duplex Arteriography in Lower Extremity Revascularization.	For patients in need of primary or secondary lower extremity revascularization, high-quality arterial ultrasonography done by a highly qualified and experienced vascular technologist may be a viable option to traditional arteriography.
[8]. Zhang *et al.*, 2020	China	To evaluate the stability of deep vein thrombosis (DVT) in the lower limbs using Doppler ultrasonography.	An accurate analysis of the stability of DVT in the lower extremities may be possible with Doppler ultrasonography. Reducing DVT in the lower extremities requires related measures that target risk factors.
[9]. Roberts *et al.*, 2020	Australia	To assess the precision of compression ultrasound screening in trauma patients in the intensive care unit who are at a heightened risk of deep vein thrombosis.	When screening for proximal lower extremity deep vein thrombosis in trauma patients in the intensive care unit who are at high risk for DVT, compression ultrasonography conducted by an intensive care physician and duplex ultrasound scans show a significant degree of agreement.
[10]. Singh *et al.*, 2022	India	To evaluate the location, severity, and stage of lower limb deep vein thrombosis in patients with and without diabetes by analyzing and interpreting the color Doppler results.	Patients with diabetes and those without diabetes have different incidences of deep vein thrombosis. Thrombus showed that diabetics had a higher incidence of involvement in lower limb veins than non-diabetics.
[11]. Chung *et al.*, 2015	Taiwan	To assess the impact of diabetes on the likelihood of pulmonary embolism and deep vein thrombosis in a population-based cohort research conducted over the whole country of Taiwan.	According to the long-term countrywide cohort research, those with type 2 diabetes had higher odds of getting VTE than people in general.
[12]. Piazza *et al.*, 2012	Boston	To evaluate the prevention, treatment, and results of venous thromboembolism in individuals with and without a history of diabetes.	After being diagnosed with venous thromboembolism, patients with a clinical diagnosis of diabetes were more likely to experience a complex clinical course.
[13]. Al-Thani *et al.*, 2016	Qatar	Utilizing Doppler ultrasonography to assess clinical presentation, management, and outcomes of deep vein thrombosis.	A certain amount of gender variation in clinical presentation. However, among patients with DVT undergoing follow-up, age—rather than gender—is a significant predictor of mortality. In addition, our patients have high PE and death rates, which are in line with global statistics. Notably, depending on the risk assessment, the clinical pretest probability assessment and customized prophylaxis for inpatients and outpatients must be included.
[14]. Baxter *et al.*, 1990	Scotland	To diagnose lower limb thrombosis by contrasting color Doppler with contrast venography.	Early experience indicates that Color Doppler may be helpful in the identification of calf thrombosis, and it has potential in the assessment of proximal calf vein patency. However, further clinical studies are required for further evaluation.

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[15]. Dauzat *et al.*, 1997	France	The use of ultrasound to diagnose acute lower limb deep vein thrombosis.	Color or duplex With its exceptionally high sensitivity and specificity, Doppler ultrasound of the lower limb deep veins is unquestionably the method of choice.
[16]. Gornik *et al.*, 2014	Ohio	Diagnosis of lower-extremity deep vein thrombosis using duplex ultrasound.	The existence of collateral circulation, venous compressibility, vein lumen size, vein wall appearance, thrombus appearance on B-mode imaging, and venous valve performance are factors that determine the acuity of a deep vein thrombosis.
[17]. de Athayde Soares *et al.*, 2020	Brazil	Rate of Recanalization in deep venous thrombotic patients treated by rivaroxaban in aspects of ultrasound.	At six and twelve months, oral rivaroxaban showed an acceptable overall vein recanalization rate. The lack of popliteal vein reflux, the absence of residual thrombi in the veins, and the length of the femoropopliteal clot were the variables linked to greater overall recanalization rates.
[18]. Elias *et al.*, 2004	France	To evaluate the diagnostic precision of a whole lower limb US that looks at the veins in both the proximal and distal directions.	Compared to restricted US, whole venous US is somewhat less specific but more sensitive and better able to rule out PE. Large-scale outcome studies are required to assess its use in PE diagnosis techniques.
[19]. Jude *et al.*, 2010	Greece	Examine the peripheral artery disease in individuals with diabetes by ultrasound.	PAD is more common in DM patients. In diabetes mellitus (DM), PAD manifests sooner, advances faster, and is typically asymptomatic; nonetheless, overall and postoperative death rates are similarly elevated in this population.
[20]. Sosthène *et al.*, 2020	Republic of the Congo	To evaluate upper and lower deep venous thrombosis by duplex ultrasound.	In the early stages of DVT diagnosis, duplex USG is the imaging modality of choice. It is available, non-invasive, and radiation-free; nonetheless, the results of this inquiry are operator dependent. DVT can be symptomatic or asymptomatic in patients. Compression ultrasound screening is beneficial in people who are at high risk for the condition.

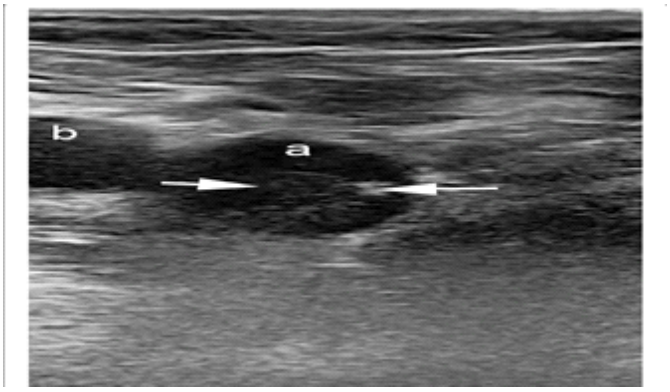

Figure 1 : A person with compression ultrasound confirmed DVT by color Doppler ultrasound [9]

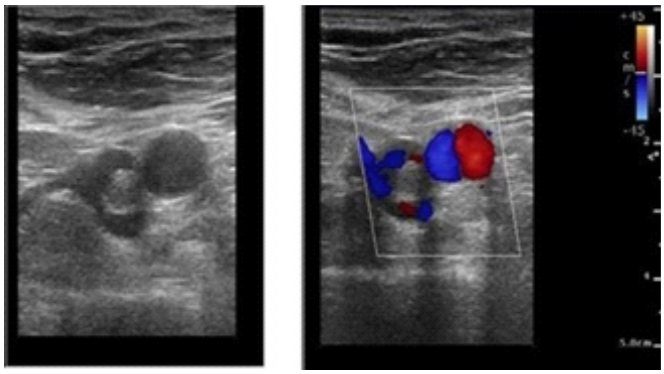

Figure 2 : Color Doppler mode shows along with a normal common femoral artery, diabetes patients have partial, chronic thrombosis of the common femoral vein (CFV) [10]

DISCUSSION

There is now a global diabetes epidemic. The prevalence of adult diabetes worldwide was estimated to be 6.4% in 2010, impacting 285 million individuals. By 2030, that number is expected to rise to 7.7%, affecting 439 million adults. Taiwan had an increase in the overall number of diabetics by more than 70% and in the standardized prevalence rate by 35% between 2000 and 2009, both of which were in line with the worldwide trend for the disease. The majority of research has concentrated on the consequences of diabetes because they lead to increased disability, shorter life expectancies, significant health costs for societies globally, and conditions like diabetic neuropathy, amputations, peripheral vascular disease, cerebrovascular accidents (CVA), diabetic neuropathy, renal failure, and blindness. Blood clots in the deep veins, and these thrombi usually originate in the legs [11]. After multivariable correction, patients with diabetes who later experienced venous thromboembolism has a 74% higher chance of developing recurrent DVT after the initial diagnosis. Following the original incident is treated, a continuously higher risk of recurrent venous thromboembolism remains

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following therapy for various medical comorbidities. However, only diabetes is a significant independent predictor of recurrent DVT in multivariable regression analysis that included several of these concomitant conditions [12]. Venous ultrasonography is currently the recommended diagnostic method for a conclusive DVT diagnosis. It is a very sensitive noninvasive diagnostic technique for DVT diagnosis. Doppler ultrasonography might be utilized more precisely in conjunction with compression to identify and validate a vessel's compressibility. According to a study, Doppler ultrasonography has a 97% sensitivity for diagnosing DVT in the veins of the calf. Every patient have a clinical suspicion of having DVT is reliably identified with the disease using duplex ultrasonography [13]. With the patient in a supine posture and the leg slightly externally rotated, a 5 MHz probe is used to do color Doppler scanning. In both a transverse and longitudinal axis, the common and superficial femoral veins are visible all the way down to the adductor canal. Visualization of the saphenofemoral junction was prevalent. Patency of the popliteal and proximal calf veins is evaluated when the patient is in a lateral decubitus posture with the knee flexed to a degree of around thirty degrees. The distal calf vein compression helps to better view the tibioperoneal trunk on a longitudinal axis. Compressibility, intraluminal echogenicity, and venous flow pattern are evaluated for every venous segment [14]. The main characteristics of DVT are the absence of spontaneous blood flow, the presence of echogenic intraluminal material, and vein incompressibility. Other minor characteristics include an enlarged vein diameter, immobility of the venous wall and valve, echogenicity of the spontaneous blood flow both upstream and downstream, and an enlarged collateral vein with increased flow. Deep vein thrombosis (DVT) is vein incompressibility, which occurs when the vein can't be crushed by medium pressure using an ultrasonic transducer due to the presence of thrombi. The principal, direct symptom of thrombus echogenicity is dependent upon the B-mode system's dynamic range being properly calibrated and contrast resolution being properly maintained. It is advised to precisely control the gain during the contralateral side scan in order to display a noise-free luminosity at the maximum level [15]. The most accurate way to determine whether thrombus is present in a vein is to observe a decrease in compressibility [16]. The prognostic parameters pertaining to the outcomes of DVT are significantly influenced by the ultrasonography elements of the disease's progression. Post-thrombotic syndrome was predicted by ultrasonographic data obtained either during or after therapy for DVT in legs [17].Therefore, venous imaging is crucial for real-time color Doppler as well venous hemodynamics, and the depth of the vascular structures determines which probe to use [18]. However, there are more therapy options now that the mechanics of atherosclerosis are well understood. Altering one's lifestyle and successfully controlling known risk factors, such as hypertension, dyslipidemia, & hyperglycemia, might slow the disease's course and lower the risk of heart disease [19]. Sonographic results often indicate either acute or chronic DVT. When DVT is persistent, the intraluminal blood clot is hyperechoic with peripheral revascularization on color Doppler imaging, as opposed to hypoechoic or anechoic in acute DVT [20].

CONCLUSIONS

Deep vein thrombosis occurs at varying rates in people with diabetes. However, the outcome is not statistically significant. Diabetic patients were more likely than non-diabetics to have common femoral vein, femoral vein, and popliteal vein involvement, according to the anatomic localization of the thrombus. Symptoms such as discomfort were substantially more prevalent in non-diabetics than in diabetics. Doppler USG is a safe, non-invasive, and quick way to identify deep venous thrombus. As a result, early identification of DVT in clinically suspected individuals is essential.

Authors Contribution

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All authors have read and agreed to the published version of the manuscript.

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The authors declare no conflict of interest.

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Review Article

Role of Physical Therapy Intervention and Gene Therapy on Muscular Dystrophies, Current Status and Future Perspectives: A Narrative Review

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ABSTRACT

Muscular dystrophies form a collection of genetic disorders marked by progressive muscle weakness and degeneration. The identification of the majority of responsible genes has enabled precise diagnosis and subtype-specific anticipatory care. Over the years, various therapies, encompassing genetic, cellular, and pharmacological approaches, have emerged for muscular dystrophies. This narrative review thoroughly explores the ongoing developments in muscular dystrophy therapeutics, including antisense therapy, CRISPR, gene replacement, cell therapy, based gene therapy Adeno-associated viral vector (AAV), and disease-modifying small molecule compounds. The review is particularly significant as it reflects advancements in supportive medicine that have altered the standard of care, leading to an overall improvement in the quality of life, clinical course and survival for affected individuals. In this study, our focus is on the clinical manifestations, molecular pathogenesis, diagnostic strategies, and therapeutic advancements related to this group of conditions. The study involved the review of 20 pertinent English-language articles, publications, reports, and online resources.

INTRODUCTION

Muscular dystrophies are inherent muscle disorders caused by mutations in over 40 genes, leading to dystrophic alterations observed in muscle biopsy. With the identification of the majority of genes associated with these conditions, it is now feasible to achieve precise diagnoses and establish subtype-specific anticipatory care. This is particularly crucial because obstacles, such as respiratory and cardiac muscle involvement, exhibit significant variations among individuals. Advancements in functional medicine have altered the standard of care, leading to an overall enhancement in the clinical trajectory, rates of survival, and quality of life for individuals exaggerated by these conditions [1]. Muscular dystrophy involves genetic mutations that hinder the body's ability to produce the essential protein (dystrophin) required for constructing healthy muscles. Globally, an estimated 3.6 cases of muscular dystrophy occur per 100,000 individuals. The prevalence of the most common types, namely Duchenne's and Becker's muscular dystrophies, is approximated at 4.6 and 1.6 cases per 100,000 persons, respectively. Notably, Americans exhibit the highest prevalence at 5.1 cases per 100,000, while Africans have the lowest prevalence at 1.7 cases per 100,000 people [2]. Muscular dystrophies that onset during infancy and

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childhood are marked by a distinct pattern and advancement of motor dysfunction. Progressive muscular dystrophies in childhood have a wide range of causes involving divers genetic pathways and genes responsible for encoding protein [3]. CMDs (Congenital muscular dystrophies) are hereditary conditions primarily impacting skeletal muscles, characterized by hypotonia and weakness manifesting before achieving independent ambulation. These disorders involve a delay or halt in reaching major motor milestones and exhibit dystrophic muscle pathology. Allelic mutations in various genes can lead to onset either before or after ambulation, serving as a practical distinction between CMDs and limb-girdle muscular dystrophies (LGMD). Muscle biopsy findings can vary in severity, encompassing a range of pathological observations such as differences in muscle fiber size, degeneration and regeneration, and increased fibrosis. Elevated levels of creatine kinases (CK) are typically, though not constantly, observed [4]. To reduce the likelihood of a recurrence, the global prevalence of DMD (Duchene muscular dystrophy) and BMD (Becker muscular dystrophy) has been significantly heightened. This underscores the need for enhanced emphasis on genetic counselling and prenatal screening, especially for families with a history of these conditions [5]. Muscular dystrophies represent a diverse set of inherited muscle disorders marked by gradual muscle weakening, often accompanied by cardiac and respiratory muscle complications. Traditionally perceived as incurable conditions with serious prognoses, recent progress has unveiled the responsible genes for most muscular dystrophies. Early diagnosis is now attainable through accurate advanced genetic testing and clinical recognition. This article explores current breakthroughs in the expansion of innovative treatments and biomarkers for muscular dystrophies commonly observed in the pediatric population [6].

MANAGEMENT AND REHABILITAION OF MUSCULAR DYSTROPHY

The treatment of muscular dystrophy should be all-encompassing and customized based on the individual characteristics of the patient and current stage of clinical progression [7]. MRI evaluations revealed a potential signal suggesting that givinostat may possess the ability to hinder or decelerate the advancement of Becker muscular dystrophy (BMD). The efficacy and safety of givinostat, an HDAC inhibitor that impedes enzymes called histone deacetylases (HDACs) involved in the regulation of gene expression within cells, impacting muscle regeneration in Duchenne and Becker muscular dystrophies were assessed in adults with muscular dystrophy [8].

Although many treatments for patients with muscular dystrophy remain unavailable, there is hopeful introduction of gene therapy based on Adeno-associated viral vectors (AVV). These viral vectors have the ability to transduce various tissues and exist as extrachromosomal concatemers. This treatment is emerging as a potential treatment for different kinds of muscular dystrophy, including various limb-girdle muscular dystrophies, myotonic muscular dystrophy 1, facioscapulohumeral muscular dystrophy, and congenital muscular dystrophies. This marks a hopeful era for gene therapy in the context of muscular dystrophy [9]. Individuals with Becker's muscular dystrophy engage in exercise routines on a cycle ergometer or treadmill, incorporating aerobic activities. This practice has demonstrated efficacy in counteracting physical deterioration and preserving functional abilities [10]. Children affected by Duchenne muscular dystrophy experience challenges in postural adjustments. In these cases, aerobic exercise in the form of treadmill training has proven to enhance walking capacity and balance more efficiently compared to the use of a bicycle ergometer in such children [11]. The loss of walking ability in Duchenne muscular dystrophy is frequently associated with diminished physical and mental health. Powered wheelchair standing devices (PWSD) are utilized to alleviate muscle and joint pain, demonstrating an enhancement in mental well-being and joint angles when adolescents with Duchenne muscular dystrophy are in a standing position [12]. For individuals having Duchenne muscular dystrophy, the incorporation of individual virtual reality systems, featuring three-dimensional simulated environments, can serve as a valuable tool in physiotherapy. These systems can be applied in rehabilitation programs aimed at enhancing patient performance during training, particularly focusing on the upper limbs [13]. Individuals with muscular dystrophy (MD) often experience respiratory muscle weakness, leading to respiratory failure and, ultimately, death over time. Various techniques, including glossopharyngeal breathing, manual cough-assisting manoeuvres, air stacking using a resuscitator bag or volume-cycle ventilator, and the use of a mechanical insufflator-exsufflator can be employed to address respiratory challenges in muscular dystrophy [14]. The integration of yoga and physiotherapy intervention during early stages is acknowledge as therapeutic strategy to improve pulmonary functions in individual having DMD. Studies have emphasized have positive influence of respiratory muscle training and breathing exercises on enhancing pulmonary functions in children diagnosed with DMD [15]. Performing calf massages on ambulant boys with DMD is a safe practice and has been linked to positive outcomes in terms of muscle length and stiffness. Administering calf massages to ambulant boys with is a

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secure practice and has been associated with positive outcomes in terms of muscle length and stiffness. The procedure is well-tolerated and has demonstrated an increase in muscle length along with a reduction in stiffness. Utilizing massage appears to be a helpful approach in the management of muscle length in boys diagnosed with Duchenne muscular dystrophy [16]. Individuals having DMD experience compromised therapeutic gait, and various clusters of individuals exhibit distinct gait patterns. Three-dimensional (3D) gait analysis has given rise to gait indexes such as the GDI (Gait Deviation Index) and the GPS (Gait Profile Score), allowing for the calculation of the GVS (gait variable score). It is advisable to commence rehabilitation for individuals with DMD early in the course of the disease, with a particular focus on the joint of hip as a therapeutic target [17]. Regarding DMD, there exist connections between falls and the fear of falling (FOF), physical performance, balance, and ambulation in children. Ambulatory children with superior performance scores exhibit reduced levels of FOF. As the symptoms of the disease advance, there is a tendency for FOF to escalate. Examining the history of falls and FOF from the earliest stages will provide guidance for implementing timely precautions and necessary interventions in treatment programs [18]. The OPTIMISTIC study in Europe has shown a substantial, although varied, impact of Cognitive Behavioral Therapy (CBT) for patients with Myotonic Dystrophy type 1 (DM1) [19]. Individuals having DMD experience a disruption in cardiac autonomic function, characterized by a reduction in parasympathetic activity and a predominance of sympathetic activity. The cardiac autonomic modulation in individuals with MD undergoing therapy with Prednisone/Prednisolone and Deflazacort is a subject of investigation [20]. Due to the side effects linked to the use of corticosteroids, there is a demand for more effective alternatives to the current standard of care. The high cost serves as a hindrance for patients in accessing medications that have yet to demonstrate established efficacy. While additional therapies hold promise for individuals with DMD, most are several years away from obtaining approval for patient use [21]. DMD results from the deficiency or reduced levels of the muscle cytoskeletal protein dystrophin. Ongoing clinical trials are investigating vector-mediated gene therapy that delivers micro- and mini-dystrophin. Advanced therapeutic strategies, such as CRISPR/Cas9-based genome editing and stem cell-based cell therapies, are also in the process of development [22]. In the realm of Muscular dystrophy treatment, particular attention is given to the therapeutic potential of human pluripotent stem cells (hPSCs). These cells exhibit significant potential for muscular dystrophy (MD) treatment as they can be guided toward a myogenic lineage and subsequently employed for autologous transplantation. Recent advancements have demonstrated notable progress in techniques for isolating and differentiating myogenic cells derived for human pluripotent stem cells (hPSCs), with goal of achieving effective transplantation outcomes [23]. We have recently introduced the term 'Satellite Cel-opathies' to characterize inherited neuromuscular conditions marked by dysfunction in satellite cells. These myogenic stem cells play a crucial role in muscle regeneration throughout an individual's lifespan and are observed in both muscular dystrophies and myopathies [24].

CURRENT STATUS AND FUTURE PERSPECTIVE REGARDING TREATMENT OF MUSCULAR DYSTROPHY

Our research examined the significant economic impact of DMD on society, outlining variations across the different stages of the condition. The majority of this financial burden is carried by household, leading to catastrophic expenditures that in turn contribute to reduced adherence to treatment and a decline in the overall quality of care. Additionally, our study revealed a significant compromise in the quality of life (QOL) for individuals affected by DMD. These findings can serve as valuable insights for shaping future healthcare policies and conducting economic evaluations of emerging therapies for DMD [25]. A significant concern lies in the emphasis on skeletal and respiratory muscle results compared to cardiac improvements. While it is supposed that enhancements in skeletal and respiratory function would lead to better patient outcomes, the gradual shift toward cardiac condition as the primary determinant of patient survival underscores the importance of incorporating standardized cardiac parameters, such as LGE (late gadolinium enhancement, a technique used in MRI for cardiac tissue characterization) on cardiac magnetic resonance imaging (MRI) and changes in left ventricular (LV) function, in clinical trials. Moreover, it is noteworthy that efficacy reports on most FDA-approved treatments are predominantly centered around skeletal muscles. Nevertheless, initial findings from continuing trials, demonstrating higher skeletal MD (muscle dystrophin) restoration and enhanced cardiac conditions, suggest a more promising future [26]. Recommendations for muscular exercise include enhancing endurance during walking and incorporating its role in multidisciplinary approaches. Future trials should investigate the specific types of muscle exercises that result in improved muscle strength and identify exercises that contribute to enhanced endurance and aerobic capacity. It is essential to conduct well-designed trials to address these open questions and provide clarity on the optimal approaches for maximizing the benefits of muscular exercise [27].

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The Hybrid Assistive Limb (HAL) is a standing device and orthosis utilized for walking. Evaluations have been conducted to assess its impact on quality of life, participation in activities, and patient satisfaction. The findings suggest that HAL is demonstrated to be more effective than conventional methods in patients with muscular dystrophy diseases [28]. Our findings offer positive insights into the effects and acceptability of a home-based training program for individuals with Myotonic Dystrophy type 1 (DM1). These programs have the potential to alleviate the financial burden on the health system. Given that muscle weakness is a significant hallmark of DM1, leading to notable limitations in functional mobility and an increased risk of falls, strength training emerges as a non-pharmacological, accessible, and safe intervention of choice for this population [29]. In the last three years, experimental efforts have been dedicated to the pursuit of cell-based therapies for muscular dystrophies. Various cell types, each possessing distinct characteristics and originating from different tissues, such as progenitor cells and myogenic stem, stromal cells, and pluripotent stem cells, have undergone investigation and recently entered clinical trials with varied outcomes. In this review, we deliver an overview of past endeavors, detail the recent status of cell-based therapies targeting cardiac myopathy and skeleton myopathy in dystrophic patients, highlight existing challenges, summarize recent advancements, and offer commendations for upcoming research and clinical trials [30]. This review offers a comprehensive examination of existing conventional therapies for the patients with Muscular Dystrophy (MD). It explores emerging therapeutic approaches and outlines future perceptions. While these therapies are presently sanctioned for the treatment of specific hematological malignancies, inherited retinal dystrophy, and spinal muscular atrophy, there is potential for their application in correcting the genetic modifications associated with the record of prevalent sarcomere forms of hypertrophic cardiomyopathy [31]. In the present state of Duchenne muscular dystrophy treatment, the potential benefits of exercise training remain uncertain. Additional research is necessary to thoroughly investigate the impact of exercise training on promoting functionality and enhancing health-related worth of life in individuals with DMD [32].

CONCLUSIONS

This study provides valuable insights into the use of standers among individual with Duchenne muscular dystrophy (DMD), offering guidance for decision making on stander utilization before complications arise. The goal is to support optimal health despite reported barriers. The call for researchers and clinicians to thoroughly investigate the role of physical therapy in DMD, drawing from contemporary evidence. The aim is to deepen understanding, refine therapy recommendations and address the challenges faced by affected families. As providers, the responsibilities are to promote best practices and contribute to shaping future interventions, studying their impact on impairment, activity and participation levels in individual with muscular dystrophy. As providers, the responsibility is to promote best practices and contribute to shaping future.

RECOMMENDATIONS

Muscular dystrophies, particularly impactful in children, necessitate tailored treatment approaches based on specific type and individual needs. Medications like corticosteroids maybe prescribed to manage symptoms and slow disease progression. Adaptive equipment such as braces or wheelchairs can aid mobility, while respiratory function should be monitored, potentially requiring devices like cough assist machines. A balanced diet is recommended for overall health and emotional support is crucial for both the child and their family. Assistive technologies and accommodations can enhance participation in various activities. Genetic counseling is advisable to address family planning, inheritance patterns and potential risks in future pregnancies.

Authors Contribution

Conceptualization: HA, SS
Methodology: HA
Formal analysis: HA, AA
Writing-review and editing: HA, SS, AA

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

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Original Article

Anxiety, Depressive Symptoms and Socio-Demographic Factors Associated with Self-Esteem among Male Nursing Students

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ABSTRACT

Self-esteem is an individual attitude about his personality and the gratitude of his worth. It signifies an honest, suitable, steady appreciation of one's value. **Objectives:** To find out anxiety, depressive symptoms and socio-demographic factors associated with self-esteem among male nursing students. **Methods:** A cross-sectional research design was selected and conducted with 155 undergraduate students of nursing students at College of Nursing and Midwifery, Sindh Government Hospital, Liaquatabad, Karachi. The Urdu version of the Aga Khan University Anxiety and Depression Scale (AKUADS) and Rosenberg Self-Esteem Scale (RSES) validated questionnaires were used to collect data. **Results:** The study findings showed that 137 students (88.39%) had normal self-esteem levels, and 18 students (11.61%) had low self-esteem. Analysis of Self-esteem about socio-demographic variables revealed an insignificant association with age, gender, marital status, family type, socioeconomic levels, family income, residence, substance use, and education program. The only statistically significant association was found between the current degree year and self-esteem levels ($p = 0.046$). There was a weak statistically significant negative relationship between self-esteem and anxiety depressive symptoms ($r = -0.221$; $p < 0.01$). **Conclusions:** The current research study concluded that nursing students with normal self-esteem levels were also suffering from anxiety and depression. The junior students were found to have more anxiety and depression symptoms and low self-esteem levels. Socio-demographic variables have no significant effect on the self-esteem of nursing students.

INTRODUCTION

Self-esteem is particularly associated with the disposition of healthcare professionals, specifically nurses. The person's worth is estimated through the yardstick of self-esteem. It is believed that the higher self-esteem, the better stress resistance, so people with higher self-esteem may deal with stress better than those less have. Self-esteem is a personal perspective of individual worth from the lens of one's values [1]. A person's day-to-day dealings, life experiences, and accomplishments carve self-esteem. A strong and flourishing self-esteem is responsible for a person's overall health and mental well-being. The Self-esteem scale measures an individual's true worth at different levels. The scale ranges from a high to a low level of self-esteem. A high level of self-esteem refers to positive self-evaluation from the global perspective, and low self-esteem denotes negative self-esteem. In contrast, absolute self-esteem means poised and stabilized recognition of one's achievements and accomplishments, whether physical or spiritual. Yet, this absolute self-esteem may deter one's way to self-conceited superiority over others [2]. Positive students do not suffer from stress or anxiety and do not fall prey to

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drugs like alcohol, as they are strong and have the potency to cope with difficult and stressful situations. They are rather cheerful and eventually show better performance in academics. People with negative self-esteem are self-abased people who suffer from a lack of confidence in themselves and doubt their own decisions. They turn out as puppets in the hands of others and lose their self-respect and credence [2]. It is a vital predictor of stress coping. An increase in stress might result in a decrease in self-esteem. An outcome of a high self-esteem level is more active and effective coping [3]. Self-esteem is considered a vital personality attribute for healthcare professionals. The students' preexisting self-esteem strongly contributes to prosperous or non-adaptive adjustment to problems. The students with high self-esteem are more confident and perform well in any situation, considering new learning opportunities as a challenge and actively taking part in adapting new behavior. In contrast, students with low levels of self-esteem constantly show negative feelings about their personalities and are unenthusiastic in new situations [1]. Self-esteem is an individual attitude about his personality and the gratitude of his worth. It signifies an honest, suitable, steady appreciation of one's value. The final-year nursing students showed higher self-esteem levels than the junior students in a cross-sectional study conducted at the University of Mosul, Iraq, in the year 2015 comprises of 300 nursing students [2]. The result of a cross-sectional study of 190 nursing students conducted at Kathmandu University shows that 78% of nursing students have low self-esteem [1]. A research study was conducted at the University of Korea in 2017. A sample of 173 nursing students was selected. The result of the study indicated that communication skills had a positive substantial influence on self-esteem in student nurses. The study also revealed that communication competence mediated to some extent between emotional intelligence and self-esteem [3]. A cross-cultural research study was conducted on nursing students of Thailand and UK. The results of the study indicated that there was no statistical significant difference between the mean self-esteem scores of nursing students of both the countries [4]. Similarly a research study was conducted in Malaysia the study showed that there was no significant correlation found between students CGPA and self-esteem, a weak negative correlation was found between academic performance and self-esteem levels and there was no impact of demographic variables as well [5]. .Furthermore the study was conducted in Bangalore comprises of 118 nursing students confirm that majority of the students had normal self-esteem, one of the socio-demographic variable gender is found to be significantly associated with self-esteem [6]. A study conducted in the UK on the three-year diploma nursing students found that self–esteem had fallen at the end of the training program [7]. A research study was conducted at the University of Saudi Arabia in May 2023. The results showed that 8.1% of students had high self-esteem, 76.6% had moderate self-esteem, and 15.3% had low self-esteem. Moreover, the study also showed that socio-demographic variables such as the father's education, physical health, year of study, and psychological health had a significant correlation to self-esteem [8]. The study was carried out on 276 nursing students, and the result findings showed that 64.1% had high self-esteem levels, while 35.5% of the students had normal self-esteem levels. The study also found out that there had no significant association between gender and self-esteem levels [9]. Anxiety is the word used to express worry, fear, or hesitation [10]. In this regard, a research study was conducted in Cyprus to find out the correlation between anxiety and depression with self-esteem and religious beliefs in student nurses; the sample size involved 123 nursing students. The results revealed a strong positive correlation between religious and spiritual beliefs and increased self-esteem, and there was no impact of gender on the findings [11]. In another cross-sectional study which was conducted in the nursing college of Kanpur, the result showed that 73.3% of students had a normal self-esteem level, 23.8% students had low self-esteem level, while merely 2.9% students had high self-esteem level. There was no significant association found between demographic variables and self-esteem levels, the only significant association was found between stress variable with self-esteem [12].

This study helped us to identify the anxiety depressive symptoms and socio-demographic factors which are associated with the self-esteem level.

METHODS

The research study's design was cross-sectional. The chosen design was used to assess the anxiety, depressive symptoms and socio-demographic factors associated with self-esteem among nursing students. The current study was conducted at the College Of Nursing and Midwifery (Male), Sindh Government Hospital, Liaquatabad, Karachi. The study population was the male students of the Bachelor of Nursing Program. The sample was selected using a convenience sampling technique. A sample size of 91 achieves 80% power to detect an effect size of 0.32 using 2 degrees of freedom Chi-Square test with a significance level of 0.05 computed using an association between degree year groups and self-esteem level. The current study was conducted on 155 students. The study was conducted from March 2023 to September 2023. Inclusion Criteria are Students of 1st, 2nd and 3rd year Bachelor of Science in Nursing program and Students who agreed to

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participate in the study Exclusion Criteria are Students in the midwifery Nursing Diploma program And Students in the the certified Nursing Assistant program. Each student filled out out the informed consent before the data collection; students were fully aware of the objectives of the research study. The principal of the college, a BPS 19 government officer, obtained permission before the data collection. The data collection was done through a questionnaire comprised of socio-demographic information. Study approval was taken from the research committee of DOW university with reference number (DUHS/SPH/2023/03-0413). The AKUADS scale for anxiety and depression symptoms and the Rosenberg Self-Esteem Scale were used to collect data. The AKUADS scale for anxiety and depression symptoms comprises 25 items, with a cut-off value >19, and Cronbach's alpha for total anxiety depressive symptoms was 0.861 in this study. On the Rosenberg Self-Esteem Scale, comprising a 10-item self-report measure of global self-esteem, a score below 15 was considered Low self-esteem level, and abobe 15 high self-esteem and Cronbach's alpha for total Self-Esteem was 0.696 in this study. The statistical package of the SPSS version 25.0 was used for data analysis, for descriptive data, frequency tables and charts were used. Statistical tests such as correlation analysis, independent t test and ANOVA were used to find the relationship and association between the dependent and independent variables. The level of significance was 0.05.

RESULTS

The table 1 provides an overview of socio-demographic characteristics among a sample of 155 individuals. The gender distribution is entirely male, comprising 100% of the sample. In terms of age, the majority fall within the 16-22 age group (54.8%), followed by 23-29 (40.0%), and a smaller percentage in the 30-36 range (5.2%). Marital status indicates that 81.9% are unmarried, 16.1% are married, and 1.9% fall into the "Others" category. Family types are predominantly extended (63.2%), with 36.2% belonging to nuclear families. Regarding residence, the majority live with parents (94.8%), while a small percentage live with relatives (2.6%) or in a hostel (2.6%). Substance abuse is reported by 11.6%, with 88.4% indicating no substance abuse. Academic year distribution shows 41.3% in Year 1, 32.9% in Year 2, and 25.8% in Year 3. Employment status reveals 36.1% are self-employed, while 63.9% are not. The majority of fathers (68.4%) and mothers (94.2%) are employed. Family income is diversified, with 57.4% earning below 50,000, 28.4% between 50,000-100,000, 10.3% between 100,000-200,000, and 3.9% earning above 200,000.

Table 1: Socio-demographic variables (n=155)

Socio-Demographic Variables	Characteristics	N (%)
Gender	Male	155 (100)
	Female	0 (0)
Age	16-22	85 (54.8)
	23-29	62 (40.0)
	30-36	8 (5.2)
Marital status	Married	25 (16.1)
	Unmarried	127 (81.9)
	Others	3 (1.9)
Family Type	Nuclear Family	57 (36.2)
	Extended Family	98 (63.2)
Residence	Living with Parents	147 (94.8)
	Living with Relatives	4 (2.6)
	Hostel	4 (2.6)
Substance abuse	Yes	18 (11.6)
	No	137 (88.4)
Current Degree Year	Year 1	64 (41.3)
	Year 2	51 (32.9)
	Year 3	40 (25.8)
Self Employed	Yes	56 (36.1)
	No	99 (63.9)
Father Employed	Yes	106 (68.4)
	No	49 (31.6)
Mother Employed	Yes	9 (5.8)
	No	146 (94.2)
Family Income	Below 50,000	89 (57.4)
	50,000-100,000	44 (28.4)
	100,000-200,000	16 (10.3)
	Above 200,000	6 (3.9)

The result of table 2 showed that 88.39% of nursing students had normal self-esteem levels and 11.61% of nursing students had low self-esteem levels.

Table 2: Level of self-esteem

Level of self Esteem	Percentage	Scored obtained
Normal self Esteem	88.39%	Above 15
Low Self Esteem	11.61%	Below 15

Result of table 3 shows that 59.35% of the students, the anxiety and depression symptoms score was absent, while 40.65% of students were found to have anxiety depression symptoms.

Table 3: Anxiety depressive symptoms

Anxiety Depressive Symptoms	Percentage
Symptoms Absent	59.35%
Symptoms Present	40.65%

Self-esteem levels and anxiety depressive symptoms were found to be negatively weakly statistically significant. ($r = -0.221$; $n = 155$; $P < 0.01$)(Table 4).

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Table 4: Correlation between self-esteem and anxiety depressive symptoms

SE Levels, ADS	N	r	p-value
	155	- 0.221	< 0.01

Table 5 shows the result of Association of demographic variables with self-esteem score. The age group does not exhibit a significant association with self-esteem (p = 0.687). Marital status also shows no significant difference (p = 0.147). Residence type lacks a significant relationship with self-esteem (p = 0.286). However, academic year emerges as a significant factor, with first-year students demonstrating a notable difference in self-esteem compared to their peers (p = 0.046). Family income and family type do not reveal significant associations. Additionally, variables such as substance abuse, self-employment, and father's employment show no significant correlations with self-esteem (p-values: 0.523, 0.817, 0.923).

Table 5: Association of demographic variables with self-esteem score

Variables	Mean ± SD	N	p-value
Age			
16-22	21.33 ± 4.489	85	0.687[a]
23-29	21.97 ± 4.304	62	
30-36	21.63 ± 4.373	8	
Marital Status			
Married	23.12 ± 2.818	25	0.147[a]
Unmarried	21.34 ± 4.614	127	
Others	20.00 ± 3.464	3	
Residence			
Living with Parents	21.73 ± 4.350	147	0.286[a]
Living with Relatives	19.75 ± 4.787	4	
Hostel	18.75 ± 5.500	4	
Academic Year			
Year 1	20.56 ± 4.475	64	0.046[a]
Year 2	22.27 ± 4.128	51	
Year 3	22.40 ± 4.355	40	
Family income			
Below 50,000	21.17 ± 4.200	89	0.394[a]
50,000 - 100,000	21.91 ± 4.482	44	
100,000 - 200,000	23.13 ± 4.225	16	
Above 200,000	21.67 ± 6.772	6	
Family Type			
Nuclear Family	21.35 ± 4.786	57	0.054[b]
Extended Family	21.74 ± 4.165	98	
Substance Abuse			
Yes	20.89 ± 4.129	18	0.523[b]
No	21.69 ± 4.432	137	
Self Employed			
Yes	22.64 ± 4.474	56	0.817[b]
No	21.01 ± 4.256	99	
Father Employed			
Yes	21.48 ± 4.371	106	0.923[b]
No	21.86 ± 4.472	49	

[a]ANOVA test has been applied

[b]Independent T-test has been applied

DISCUSSION

The main aim of this study was to find out the association between anxiety depressive symptoms and socio-demographic factors with self-esteem among nursing students. Our study revealed that the majority of the nursing students have normal self-esteem levels. The students of 1st year nursing students have mean self-esteem scores in comparison with 2nd and 3rd-year nursing students. Similar results are found in the cross-sectional study comprising 300 nursing students, which was conducted in Iraq, which showed that the final-year nursing students have high self-esteem scores compared to the junior students [2]. Low self-esteem can have a number of negative consequences for nursing students. It can make it difficult for them to succeed academically and clinically. It can also lead to problems in their personal and social lives. Nursing students with low self-esteem may be more likely to experience anxiety and depression, have difficulty coping with stress, avoid challenging tasks, procrastinate, give up easily, withdraw from social activities, and have negative relationships with others [13]. The current study findings revealed that 40.65% of the students have no anxiety symptoms. Similarly, another study found that,(41.3%) had low anxiety score during their clinical placement [14]. Another study found that the majority of the students have moderate stress [15]. In this regard, another study said that 17.6% of the pupils acknowledged feeling anxious [16]. Our study outcome shows that there was no significant association found between different socio-demographic variables such as gender, marital status, family type, family income, residence, or substance abuse with self-esteem levels. The only significant association was found between education level and self-esteem levels which means that change in education level has an impact on self-esteem scores. According to the cross-sectional study conducted in India, comprised of 210 undergraduate nursing students, the results revealed that there was no significant association was found between socio-demographic variables and self-esteem, the only stress variable was found to be significantly associated with self-esteem [12]. Despite having normal self-esteem scores, the students were found to have positive anxiety depression symptoms. The junior students were found to have more anxiety and depression symptoms in comparison with senior students. Similarly, another study found the same result that: junior

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students have more anxiety than senior students [17]. This is due to several factors, including academic pressure, clinical concerns, long hours, irregular sleep patterns, exposure to human suffering and death. Anxiety and depressive symptoms have an adverse impact on self-esteem. People with anxiety depression often have a negative view of themselves and their abilities. They may also have difficulty coping with stress and challenges. Anxiety is a common experience among nursing students, and it can manifest in a variety of ways, such as feeling nervous, restless, or worried. Anxiety can interfere with academic performance, clinical performance, and overall well-being [18]. Depressive symptoms are also common among nursing students. These symptoms can include sadness, hopelessness, fatigue, and difficulty concentrating. Depressive symptoms can make it difficult to complete nursing school and can also lead to other problems, such as academic failure, relationship problems, and substance abuse [19]. There was a negative inverse weak correlation between self-esteem mean scores and anxiety depression symptoms mean score ($r = -0.221$; $n=155$; $P = 0.006$). Similar results were found in the research study conducted in Saudi Arabia in the year 2018 involved 152 nursing students. The results of this study revealed that there was a weak statistically significant negative relationship between self-esteem and level of depression ($r =-0.224$; $n=152$; $P < 0.01$), with a lower level of depression associated with a high level of self-esteem [20]. Another study found a negative correlation between self-confidence and anxiety p-value of 0.224 [14]. There is a need to look after the 1st year students as they had low mean scores on both variables, and the new academic environment and culture might affect the findings.

CONCLUSIONS

A negative, significant, weak correlation was found between anxiety, depressive symptoms and self-esteem.. Nursing students' academic level was found to be significantly associated with both self-esteem scores and anxiety depressive symptoms scores; the junior students are more prone to have more anxiety depressive symptoms and low self-esteem levels.

Authors Contribution

Conceptualization: DAK, MTK
Methodology: DAK, AGM
Formal analysis: DAK, MTK, DAS
Writing-review and editing: DAK, AP, FMA, AB

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

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Original Article

Assessing Contentment with Life among Nursing Students at Private Nursing Institute Karachi, Pakistan

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ABSTRACT

Life contentment denotes the measure to which an individual finds joy in their life, encompassing contemplative reflections and constituting an element of overall happiness and self-well-being. **Objective:** To assess levels of contentment with life among nursing students. **Methods:** This cross-sectional study was conducted at a private nursing institute in Karachi, Pakistan, from October to December 2023. Additionally, a convenient sampling technique was used, with a total of ninety-eight student participants included in the study. **Results:** 98 participants reveal a predominantly young group (84% aged 18-24) with balanced gender distribution (49% male, 51% female) and diverse education levels (30% 1st year, 29% 2nd year, 16% 3rd year, 25% 4th year). Contentment levels varied (6.1% low, 37.8% moderate, 56.1% high). Demographic analysis showed no significant age differences based on gender or education years ($p > 0.05$). This comprehensive overview informs understanding of nursing student well-being. **Conclusions:** Most participants reported high life contentment, with no significant age differences based on gender or education years. Overall, the findings offer valuable insights into the well-being of nursing students, emphasizing the role of diverse demographics.

INTRODUCTION

Maintaining good health is crucial, ensuring your body functions well, enabling you to carry out daily tasks effortlessly, and likening it to an extraordinary power that enhances goal achievement and overall life enjoyment [1]. Contentment is crucial in shaping an individual's quality of life by impacting the presence and frequency of positive and negative emotions over time, ultimately contributing significantly to overall life satisfaction [2]. Life contentment is the degree to which an individual enjoys their life, encompassing reflective thoughts about it and constituting a facet of overall happiness and self-well-being [3]. Health maintenance is intricately linked to the essential and significant impact of the positive emotion of contentment [4]. In higher education, assessing student satisfaction is widely recognized as a pivotal gauge of quality, with satisfaction generally reflecting students' evaluations of their overall learning experience and individual achievements [5]. Promoting contentment is a

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vital aspect of the training and development of nursing students, as it greatly influences their journey toward becoming future nurses [6]. Contentment in life, as demonstrated through the subjective encounter of positive and/or negative emotions, constitutes a facet of one's overall well-being. This phenomenon is linked to the pursuit of significant objectives, where the achievement of these goals or the journey toward them can serve as a basis for satisfaction [7]. Student satisfaction can be regarded as a temporary mindset, reflecting the subjective evaluations made by students concerning the degree to which their expectations have been fulfilled or surpassed in a particular educational encounter [8]. Improving emotional intelligence can enhance a person's life by promoting thoughtful decision-making, better self-control, a positive demeanor, effective stress management, and confident self-talk, contributing to meaningful success and satisfaction in daily life [9]. For nursing students, stress comes from four things: doing practical work in clinical placement, learning theory, personal life, and social life(10). Where Clinical placement is the setting of a physical environment in which students apply their theoretical knowledge to clinical practice [11]. Studies have demonstrated that simulation enhances the satisfaction, self-confidence, and knowledge of nursing students [12]. In the past, researchers studied what influences nursing students to choose their careers and also looked into what students expect from their education [13]. The organization and regulation of nursing practice have traditionally been established through specific laws, protocols, and health policies embedded within broader legal frameworks [14]. Longitudinal investigations into the career preferences of nursing students consistently indicate a misalignment between their inclinations and the provision of care for older individuals, accompanied by reservations about engaging in long-term care settings [15]. Examining the level of learners' satisfaction has consistently been a crucial benchmark for measuring the effectiveness of educational systems, as the success of educational courses is heavily dependent on student satisfaction [16]. In global comparisons, students' life contentment levels differ. Regardless of cultural or linguistic factors, a significant number report high contentment, while a noteworthy minority expresses a lack of contentment [17]. International students in Norway generally reported good life contentment, with those from Europe and North America expressing higher levels than their counterparts from Africa and Asia [18]. India's 114th position out of 153 countries in the 2020 World Contentment Report indicates lower contentment levels, potentially affecting students' learning and diminishing qualities like endurance, honesty, diligence, determination, self-awareness, and compassion [19]. Academic contentment implies that students with elevated life contentment tend to exhibit more favorable academic characteristics compared to those with lower life contentment, including heightened engagement, increased academic self-efficacy, reduced stress, positive achievement goals, and higher overall achievement [20]. The assessment of student contentment with their clinical placement is imperative to fulfill their needs [11]. Where clinical placement is the setting of a physical environment in which students apply their theoretical knowledge to clinical practice [11, 21]. Utilizing structural equation modeling, the researchers verified a contentment conceptual model derived from a survey of 2687 university students across different courses. Their findings highlighted institutional variables, specifically 'Image,' 'Value,' and 'Perceived Quality,' as the most influential factors affecting student satisfaction [5]. This research endeavors to investigate the levels of contentment with life among nursing students, recognizing the pivotal role that well-being plays in both academic achievement and professional development.

METHODS

A descriptive cross-sectional research design with a quantitative approach was employed to assess the level of life contentment among nursing students. The present study was conducted in a private Nursing School in Karachi, Pakistan. The chosen school was Horizon School of Nursing and Health Sciences, a private nursing school. The target population for the current study was Bachelor of Science in Nursing students in the academic year of 3rd and 4th. The sample size was calculated through Open Epi with a 95% confidence interval with a population of 150, and the calculated sample size was 98. The Inclusion criteria consist of Both males and females and 18 years and above. The Exclusion criteria consist of Diplomatic Nursing students and those Below 18 years. For this study, we use convenience sampling to select participants from the chosen study setting. The study duration was from November 2023 to December 30, 2023. Upon obtaining approval for data collection from the authorized party, data were gathered upon securing consent. The researchers verbally and in writing elucidate the study's rationale, objectives, methodology, and significance to the participants. Subsequently, participants complete the questionnaire online. To collect data, authorization was sought from a designated representative of the institute with reference number (HSNHS/2023/488) and date (5/11/2023). Subsequently, every participant was required to sign an informed consent form. The researchers are committed to preserving the anonymity and confidentiality

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of the participants, and no one is compelled to participate in the data collection process. The survey tool has been adopted from Lavallee *et al* [22]. Perceived global satisfaction with one's life is generally thought to be above average. The study reported that the average Anglo-American's life satisfaction may be more accurately described as neutral. The CLAS is a measure developed to assess life satisfaction to better understand differences in subjective well-being. Respondents indicate the extent to which they agree or disagree with the items on a 7-point scale on which strongly disagree to strongly agree. The tool's total score was 35 and it's divided into three categories. High commitment: 24 to 35 marks, Moderate commitment: 13 se 23 marks, Low commitment: 7se 12 marks. It is divided into two sections, each designed to investigate various facets of life contentment among nursing students. The first section gathers essential demographic details such as age, gender, and academic year in the nursing program. In the second section, participants are asked to assess a set of statements using a 7-point Likert scale, ranging from "Strongly Disagree" to "Strongly Agree." The data underwent analysis using "SPSS" version 26.0, with demographic data presented using frequency percentages. Additionally, an independent t-test and ANOVA test were used for the association of demographic variables with total score.

RESULTS

Table 1 shows the results of demographic variables, including age, gender, and year of education for the study participants. Out of the total participants, 84.6% (n=83) fell within the 18-24 age range, and 12.2% (n=12) were aged 25-30. In terms of gender distribution, 47.9% (n=47) were male, while 52% (n=51) were female. Regarding the year of education, 40.8% (n=40) of participants were in their 1st year, 29.5% (n=29) in their 2nd year, 16% (n=16) in their 3rd year, and 23.4% (n=23) in their 4th year.

Table 1: Demographic characteristic

Variables	Frequency (%)
Age	
18-24	83 (84.6)
25-30	12 (12.2)
31-35	2 (2.0)
Above	1 (1.0)
Gender	
Male	47 (47.9)
Female	51 (52.0)
Year of Education	
1st year	40 (40.8)
2nd year	29 (29.5)
3rd year	6 (6.1)
4th year	23 (23.4)

Table 2 results show the level of contentment: 6.1% (n=6) of participants have a low level of contentment, 37.8% (n=37) have a moderate level of contentment, and 56.1% (n=55) have a high level of contentment.

Table 2: Level of life contentment among nursing students

Level of contentment	Frequency (%)
Low contentment	6 (6.1)
Moderate contentment	37 (37.8)
High contentment	55 (56.1)
Total	98 (100.0)

Table 3 outlines the association of demographic variables with life contentment. Regarding gender, male participants (mean ± SD = 24.55 ± 6.9) and female participants (mean ± SD = 23 ± 5.6) exhibited no statistically significant age difference (p-value = 0.270 > 0.05). For education years, mean ages and standard deviations were observed for 1st year (23.30 ± 6.22), 2nd year (22.86 ± 6.29), 3rd year (28.66 ± 5.46), and 4th year (25.43 ± 6.17). The p-value for the overall difference in education years was 0.112, indicating no statistically significant age disparity across education levels. Regarding the relationship between age and life contentment, no significant differences were found among the age groups 18-24 (mean ± SD = 24.14 ± 6.58), 25-30 (mean ± SD = 23.66 ± 4.61), and 31-35 (mean ± SD = 22.00 ± 5.65), with an associated p-value of 0.881 (> 0.05).

Table 3: Association of demographic variables with life contentment score

Gender of participants	N	Mean + STD	p-value
Male	47	24.5532 + 6.90875	0.270[a]
Female	51	23.4902 + 5.69692	
Year of education			
1st year	40	23.3000 + 6.22732	0.112[b]
2nd year	29	22.8621 + 6.29469	
3rd year	6	28.6667 + 5.46504	
4th year	23	25.4348 + 6.17786	
Total	98	24.0000 + 6.29678	
Age of participants			
18-24	83	24.1446 + 6.58182	0.881[b]
25-30	12	23.6667 + 4.61880	
31-35	2	22.0000 + 5.65685	
Above	1	20.0000 + 0.00000	
Total	98	24.0000+ 6.29678	

[a]Independent t-test has been applied
[b]ANOVA test has been applied

DISCUSSION

This study aimed to assess the level of contentment with life among nursing students. The current study includes 98 participants, with 51% being female, and the majority of students (40%) are from their first year. In another study slightly different results found were where 611 participants were included, indicating that 80.69% of the participants

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were female, and the majority (50.2%) were in their third year [23]. The current study found that the mean score of contentment with life of participants is 24.0 ± 6.29 which indicates that participants have a moderate level of contentment with life. Similarly, another study was conducted in India, 2022 his results showed that the mean happiness score, standing at 3.96 ± 0.59, signifies a state of moderate contentment (6). Additionally, another study conducted in Lebanon in 2023 found that lower levels of self-esteem and heightened tendencies toward rigid and self-critical perfectionism are closely correlated with diminished life satisfaction [24]. In contrast, another study unveiled differences in life satisfaction among participants, notably with a significantly larger number of students expressing high satisfaction levels in Spain and Slovakia compared to Poland [7]. In the current study, concerning gender, there was no statistically significant age difference. Similarly, in another study, significant differences were observed in students' scores on the Satisfaction with Life Scale based on their gender [3]. The findings of our study revealed that students aged 18-24 exhibited higher life contentment than those aged 25-30. In parallel, another study demonstrated that students aged 18-21 had greater happiness levels compared to those aged 21-24 [25]. In this study, a majority of participants express dissatisfaction linked to a misalignment with their life goals. Similarly, another study indicates that dissatisfaction with coursework not only results in a learning deficit and reduced interest but also influences health and relationships. These findings emphasize the need to align educational experiences with individual aspirations for comprehensive well-being [26]. The current study indicates that a significant majority of students strongly express contentment with their lives. Conversely, another study underscores a global trend, particularly among nursing students and young populations, revealing inadequate prioritization of physical activity in their lifestyles [27].

CONCLUSIONS

The majority of participants reported a high level of contentment with life. Notably, demographic analyses revealed no significant age differences based on gender or education years, indicating a consistent distribution of well-being across these variables. These findings provide valuable insights into the well-being of nursing students, underscoring the relevance of diverse demographic factors in comprehending life contentment within this academic context.

CONCLUSIONS

Conceptualization: HN, MG
Methodology: MI
Formal analysis: MG, MI
Writing-review and editing: MI, AB, FK, MAK, F

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

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Original Article

Association of Self-Esteem, Narcissistic Tendencies, and Selfie-Posting Behavior among Young Adults

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ABSTRACT

Self-posting among many adults but people with low self-image and narcissistic tendencies more focus on self-posting activities and this thing is a leading cause of social media addiction. **Objective:** To explore the relationship between self-esteem, narcissistic tendencies, and self-proof behavior among young adults. **Methods:** 400 students (200 male and 200 female) from different universities in Karachi and Faisalabad. The age range of the participants covered the years 12 to 30. The sample was taken using a simple random sampling technique. The following measures were used to assess the findings i.e., demographic form, selfie-posting behavior scale, Rosenberg self-esteem scale, and narcissistic personality inventory-16 scale used to assess the selfie-posting behavior among young adults. **Results:** Findings indicate a significant and negative relationship between self-esteem and selfie-posting behavior. Self-esteem significantly predicts selfie-posting behavior among young adults. furthermore, statistics also indicate there is no significant relationship between narcissism and selfie-posting behavior among adolescents. Narcissism is not a significant predictor of selfie-posting behavior among young adults. **Conclusions:** It is concluded that individuals who take more selfies have low or no self-esteem compared to those who do not take self-imaging. Additionally, those who have posted more selfies online tend to have narcissistic dispositions because they believe that other people find value in what they do.

INTRODUCTION

Selfies are digital photos of oneself that are usually taken using a smartphone or electronic camera. Typically, a selfie stick or arm's length hold would support the camera, rather than a self-timer or remote [1]. Selfie" typically refers to portrait photos gaga the camera commands at length, as essentially those taken by using a self-timer or remote [2]. Selfitis is outlined as an associate degree psychoneurotic urge to require photos and post them on social media. Selfies are a part of society as way as new age school is concerned, but this has been around quite you think that [3]. The American Psychiatric Association (APA) has formally deemed taking selfies as folia named selfies. In step with APA their area unit 3 levels of selfitis. Taking Selfies, a minimum of thrice each day, however not posting them on social media is thought of as Borderline selfitis [4]. Taking Selfies, a minimum of thrice each day and sharing all of them on social media is thought of as acute selfitis [5]. A selfie could also be an illustration-type image, typically gaga smartphones which might be commanded inside the pointer or maintained by a selfie stick. Selfie units of measurement are typically common on social networking services like Facebook, Twitter, Snapchat, and Instagram [6]. According to Abbas and Dodeen, the main motivations behind people taking and sharing selfies are to attract

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attention, to escape boredom, to increase shallowness, and because using social media is enjoyable [7]. This investigation focused on the reasons for young adults' selfie behaviors and narcissistic tendencies, even though their geographical unit has entirely distinct motives for people to post selfies [8]. The related level of overall positive or negative analysis of oneself is known as self-esteem [9]. Using social media to engage in interpersonal communication is the simplest approach to meet demands related to self-esteem. This may allow those with low self-esteem to act more freely without fear of embarrassment or social anxiety [10]. According to a University of Salford study on the impact of social media on self-esteem, 298 individuals, or 50% of the participants, found that using social media sites like Facebook and Twitter had made their lives worse [11]. Varnali asserts that sharing selfies can be a sign of strong self-esteem since they can also boost one's self-esteem because they can highlight an idealized, controlled appearance [12]. Selfie uploading has been shown to increase self-esteem, according to researchers, since people may choose how they want to present themselves [13, 14]. Selfies are a confusing tool. While sharing photos can also provide confidence to many of us, for others they serve as a trigger for feelings of insecurity about their appearance and a reason to feel unsafe in their life [15]. Diefenbach and Christoforakos state that to appear interesting to others and so increase their self-esteem, the majority of teenagers spend a significant amount of time and money [16]. Selfies are a common way for people to improve their shallowness, according to a study that found this [17]. Although people's self-esteem is boosted by selfies, excessive use of them has been shown to lower life satisfaction [13]. Additionally, the initiative studies the traits related to taking selfies conducted employing a sample from the population of the United States. It cantered on the relationship of selfies with egocentrism, autocracy, as well as mental disease [18]. The word "narcissism" originates from the Greek story of Narcissus (Greek: Νάρκισσος, Narkissos), a handsome young Greek poet who, according to the poet, turned down the nymph Echo's desperate advances. Personality traits among university students, narcissism is the pursuit of gratification from vainness or egotistic admiration of one's glorious self-image [19, 20]. Narcissus collapsed upon his reflection in the water as a result of this. Additionally, the researchers find a link between egocentrism and selfies. Selfie-liking is outlined during this study because of the level at which individuals reveal their feelings associated with photos and integrate them into their everyday routines [21]. The World Health Organization states that individuals typically find selfies fascinating and view them as an integral part of their daily routine. Moreover, they forever explore new places wherever they will take selfies and they become upset if they are restricted from taking selfies of themselves [22].

The present research focused on personality traits that are connected with taking and posting selfies including self-centeredness, behavior of attention-seeking, and egocentric behavior. Particularly, narcissism and attention-seeking behavior as well as egocentric behavior were represented as 'the dark triad of personalities' related to selfies. The conclusion of this research would offer extra awareness into some personality traits and characteristics.

METHODS

The number of participants was calculated through G-Power software. In this study, 436 participants were targeted and 400 participants met the study criteria. All the participants were university students and they were taken from different public and private universities in Karachi and Faisalabad. Sample was comprised of 200 male and 200 female undergraduate students. Participants' age range was 18 to 25 years including day scholar and boarding students. All the participants were taken from middle socioeconomic. The sample was taken using a random sampling technique. All the participants were regular students enrolled in the university undergraduate program were selected for this study. It was screened that participants who were posting selfie more than 3 in a days and less than 15 were included in the study. Secondly, those participants were taken who are spending time on facebook and other social media networks more than 3 hours per day since at least last one month were included. Participants who were not regular students, doing part time jobs, age < 18 and > 25 years, having any kind of psychological disturbance or physical disability were excluded from the study. Demographic form was used to collected the personal information (i.e. age gender, birth order, family structure, socio-economic status etc. Balakrishnan and Griffiths developed the Selfitis Behavior Scale (SBS) to identify selfitis behavior in college students [23]. 400 college students participated in the scale's development. There were twenty items on the scale with Likert-type response options of five points each. The six components of the SBS (α:.88) were as follows: Social Competition (SBS-SC, α:.83), Attention-Seeking (SBS-AS, α:.81), Mood Modification (SBS-MM, α:.82), Self-confidence (SBS-S, α:.79), Environmental Enhancement (SBS-EE, α:.84), and Subjective Conformity (SBS-SCon, α:.75). The Rosenberg self-esteem scale has ten items on it. Research vanity is acceptable throughout the world according to RSES. Each claim was scored using a four-point Likert scale that ranges from "strongly disagree" to "strongly agree." The items received a poor score because of their

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wording. Items 1, 2, 4, 6, and 7 were fully phrased, while items 3, 5, 8, 9, and 10 were negatively phrased. High scores were indicative of great vanity. Sixteen forced-choice dyads make up the NPI [24]. Participants chose between the self-loving (recorded as one) and non-narcissistic (recorded as zero) responses, such as "I choose to mix in with the throng" and "I prefer to be in the middle of attention." A total of the sixteen items were calculated (α = 71). The several Punjab Province cities' traffic warden headquarters were then consulted for clearance. The researchers built a connection with the participants by giving a brief introduction to themselves after obtaining authorization from universities. The consent form asking for their willingness to engage in the research was also given to the students. Confidentiality and the option to withdraw from the research if uncomfortable were discussed in the consent form. Following the completion of the data collection, the researchers expressed their gratitude to each volunteer. The duration of the study was August 2022 to September 2023. The study was approved by the Government College University Faisalabad Internal Review Board at Department of Applied Psychology. A descriptive statistic and inferential statistic was calculated to draw a meaningful conclusion from the data. SPSS version-21.0 was used for all analyses.

RESULTS

Table 1 shows the demographic characteristics of the participants in terms of frequency, percentage, valid percentage and cumulative percentage.

Table 1: Demographic Characteristics of University Students (N= 400)

Variables		Frequency (%)
Gender	Male	200 (42.7)
	Female	200 (57.3)
	Total	400 (100.0)
Marital Status	Married	7 (1.5)
	Unmarried	393 (98.5)
	Total	400 (100.0)
Family System	Nuclear	200 (49.1)
	Joint	200 (50.9)
	Total	400 (100.0)
Monthly Income	Lower Class	70 (12.8)
	Middle Class	230 (49.1)
	High Class	100 (38.0)
	Total	400 (100.0)
Education	Intermediate	200 (48.1)
	Bachelor	100 (39.1)
	Master	45 (9.6)
	M.Phil. / M. S	13 (2.8)
	Ph.D.	42 (0.4)
	Total	400 (100.0)

It was hypothesized that there would be a predictive relationship between self-esteem and selfitis behaviour among young adults. Keeping this in view, linear regression analysis was performed. Findings in table 2 show there is a significant predictive relationship between Self-Esteem and Selfitis behavior among young adults [R2 , .284; F (1 , 185.8)= 467, p< .001].

Table 2: Linear Regression Analysis Statistic of Self-Esteem with Selfitis behavior among Young Adults

Model	R	R^2	Adj. R^2	SEE	F	df1(df2)	Sig
Self-Esteem	.53	.28	.284	11.5	185.89	1(466)	.000

SEE = Std. Error of the Estimate, R2 Change= R Square Change

Keeping the above mentioned hypothesis in view, further coefficient statistics were performed as shown in table 3, which indicate that there is a significant and negative relationship between self-esteem and selfitis behaviour. Self-Esteem is a significant predictor of selfitis behaviour among young adults(β = -.534, p< .001).

Table 3: Coefficient Statistics of Self-Esteem and Selfitis behavior among Young Adults. (N=400)

Model	Unstandardized Coefficients	Standardized Coefficients		t	Sig.
	Beta	Std. Error	β		
(Constant)	88.509	2.631	-	33.6	.000
Self-Esteem	-1.613	.118	-.534	-13.6	.000

The alternative hypothesis was that there would be a predictive relationship between narcissism and selfitis behavior among young adults. Keeping it in view, the findings of linear regression show that the relationship between narcissism and selfitis behavior isn't significant among young adults [R2, .475; F (1,466) =421.558, p> .05] (table 4).

Table 4: Linear Regression Analysis Statistic of Narcissism with selfitis behavior among Young Adults.

Model	R	R^2	Adj. R^2	SEE	F	df1(df2)	Sig
Narcissism	.68	.475	.474	9.86	421.558	1(466)	.000

SEE = Std. Error of the Estimate, R2 Change= R Square Change

Keeping the alternative hypothesis in view, further coefficient statistics, as given in table 5, indicate there is no significant relationship between narcissism and selfitis behavior among adolescents. Narcissism is not a significant predictor of selfitis behavior among young adults(β = .689, p> .05).

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Table 5: Coefficient Statistic of Narcissism and Selfitis behaviour among Young Adults(N=400)

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	Beta	Std. Error	*B*		
Narcissism	27.520	1.33	-	20.5	.000
	3.289	.160	.689	20.5	.000

DISCUSSION

The findings of the first hypothesis of the study showed that self-esteem is the vital predictor of selfitis behavior among young adults [R2, .284; F (1, 185.8) = 467, p< .001] which is similar to the study that concluded that low self-esteem, social reliance, or attention-seeking behavior are linked to selfies [25]. Shabahang et al., argued that sharing selfies is a sign of high self-esteem and that it also highlights one's shallowness because the images might highlight an idealized, controlled version of oneself [26]. According to a study, many people who share selfies on social media do so to increase their perceived shallowness [27]. People were prepared to temporarily boost their self-esteem sixteen because of the way they are portrayed in their social media profiles. Selfies boost one's self-esteem, but excessive use of them has been linked to lower life satisfaction [28]. According to Wilcox and Stephen, the most common reasons people take and share selfies are to attract attention, to brag, to express displeasure, to indulge in vanity, and because using social media is enjoyable [29]. The range of Rosenberg's self-esteem scores is 0 to 30. A self-esteem score of 0 to 15 denotes poor self-esteem, 16 to 25 traditional levels of self-esteem, and 26 to 30 high levels of self-esteem. Low self-esteem has been linked to depression, social anxiety, loneliness, alienation, activity problems, and subpar teaching performance [30]. Kibe also notes that people who try to attract attention may engage in excessive and increasingly offensive behaviors of taking selfies [31]. Those who have strong self-esteem experience a little boost in confidence whenever one of their postings receives a like or a good comment. The person who uploads a lot of selfies may even be sobbing uncontrollably for help [32]. Another plausible explanation could be that those who share a lot of selfies and have high levels of shallowness are egotistical and frequently seek self-verification. Wilcox and Stephen have observed that people with egotism have a high sense of self-worth and are always seeking validation from others. 37 people use social media to share selfies and become self-verified through likes and encouraging remarks to fulfill their self-love [33]. Likewise, another study has also discovered a strong correlation between self-love and sharing selfies [34]. People who post a lot of selfies also make an effort to cultivate an engaging online identity [35]. The finding of the second hypothesis advised that egoism isn't the many predictors of selfitis behavior among young adults [R2, .475; F (1,466) =421.558, p> .05]. Narcissism is characteristically illustrated as an Associate in Nursing affinity to believe one's self to be superior over others, to unendingly pursue adoration from others, and to participate in egotistical thinking and behavior [36]. Regarding their emotional and psychological well-being, developing young adolescents may be at risk from escalations in the egoism effect. People who use private communication as a means of self-improvement and self-promotion are said to exhibit egoism, which prevents them from building meaningful relationships with one another. As a result, this could harm a person's capacity to build wholesome, mutually beneficial relationships [37]. Furthermore, those who exhibit high degrees of egoism are more likely to react violently and aggressively when they get criticism. Online interactions tend to attract narcissists, and UN agencies are notoriously unable or unable to establish lasting friendships that require time or emotional commitment [38]. Narcissism is anxiety with noteworthy thoughts from society. Particularly in recent years, several types of research on this ground tend to concentrate on issues of assessment and investigation that what means that egoism is anxious with vanity, and alternative affectional life issues [39]. Another behavior that's coupled with egoism and may also be related to selfie-liking is egocentric behavior. Generally, people with egocentric behavior tend to worry additional about themselves than people [37]. Moreover, this finding prompts a reconsideration of intervention strategies and educational programs designed to address excessive selfitis behavior.

CONCLUSIONS

It is concluded that individuals who take more selfies have low or no self-esteem as compared to the people who do not indulge in self-imaging. Additionally, those who have posted more selfies online tend to have narcissistic dispositions because they believe that other people find value in what they do.

Authors Contribution

Conceptualization: HI
Methodology: HI, SK, MS, SR
Formal analysis: HI
Writing-review and editing: HI, SK, MS, SR

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

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Original Article

Comparison between the Young and Elderly Diagnosed Patients of Carcinoma of the Breast

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ABSTRACT

Breast cancer presents a significant health challenge in Pakistan, marked by high incidence rates and specific cultural and societal barriers to early detection and treatment. **Objective:** To compare diagnosed cases of CA breast in younger and older patients in terms of mode of presentation, TNM stage at presentation, histological variety and hormonal status. **Methods:** In our prospective comparative study conducted at the Department of Surgery, Bahawal Victoria Hospital, Bahawalpur, we included a total of 220 breast cancer patients aged 20 years and above. Patients were stratified into two distinct age groups for comparison: younger patients (aged less than or equal to 35 years) and older patients (aged more than 35 years). Modes of presentation, histological types, and hormonal receptor statuses were compared between the both groups. **Results:** In a study of 220 breast cancer patients with a mean age of 42.97 years, younger patients (≤35 years) constituted 24%, while older patients (>35 years) made up 76%. The most common presentation was lump formation (78.18%), mainly in older patients. Ulceration was evenly distributed across age groups. Histologically, invasive ductal carcinoma Grade III was more frequent in older patients, whereas Ductal Carcinoma In Situ (DCIS) was exclusive to younger patients, underscoring distinct age-related disease patterns. **Conclusions:** Our study revealed significant age-related differences in breast cancer presentation among Pakistani patients. Older patients (>35 years) predominantly presented with lump formation, suggesting diagnostic delays, while all younger patients (≤35 years) had DCIS, indicating possible early detection or unique tumor biology. Additionally, older patients exhibited higher ER and PR positivity.

INTRODUCTION

Breast cancer remains a multifaceted disease with a significant global burden, as one of the most common forms of cancer in women. The international landscape reveals varying prevalence across different regions, with Western European countries exhibiting a higher incidence rate of breast cancer compared to Eastern Asian or African countries [1, 2]. In contrast, Asian countries, especially Pakistan, report alarmingly high rates despite the overall lower incidence [3]. For example, in 2020, it was estimated that 2.3 million females were diagnosed with breast cancer worldwide, with Pakistan showing a striking 1 in 9 women at risk of being diagnosed [4, 5]. Several factors contribute to breast cancer prevalence, including age, genetic, lifestyle, and environmental variables [6]. The disease mainly occurs in middle-aged and older women, with Western countries showing substantially greater survival rates due to early detection measures and better healthcare facilities; earlier epidemiological studies have further illuminated these regional differences, revealing a peak incidence between 40 to 50 years in Asian women, whereas the peak incidence was observed between 60 to 70 years in Western women [7]. Factors such as family history, hormonal imbalance, obesity, and alcohol consumption are recognized as crucial determinants, influencing the development of various presentations and pathological sub-types [8]. Breast cancer stages, numbered 0 - 4, define the extent to which cancer has spread, with higher numbers indicating wider spread. Stage 0 represents pre-

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cancer, while stages I - IV indicate invasive breast cancer requiring various treatments, including surgery, chemotherapy, hormonal therapy, biological therapy, and radiation[9]. Understanding the hormonal receptors such as ER, PR, and HER2 NEU and correlating them with the initial TNM staging helps to illuminate the complexity and treatment needs of the disease [10]. Breast cancer presents a significant health challenge in Pakistan, marked by high incidence rates and specific cultural and societal barriers to early detection and treatment. Notably, 1 in 9 Pakistani women is at risk of developing breast cancer during her lifetime, reflecting an urgent public health concern. The variations in incidence, risk factors, and presentations within Pakistan demand a focused and comprehensive study. Misconceptions and lack of awareness, often exacerbated by illiteracy, hinder early diagnosis and contribute to worsening prognosis. Moreover, understanding the relationships between variables like age, mode of presentation, histopathological variety, hormonal receptors, and staging within the Pakistani population can lead to more effective, personalized treatment strategies.

This research aimed to delve into these complexities specific to Pakistan, providing insights that could significantly impact prevention, early detection, and therapeutic approaches, ultimately contributing to the fight against breast cancer in the country.

METHODS

In our prospective comparative study conducted at the Department of Surgery, Bahawal Victoria Hospital, Bahawalpur, from August 02, 2022, to February 01, 2023, and approved by the CPSP with reference number CPSP/REU/SGR-2018-032-10124, we included a total of 220 breast cancer patients aged 20 years and above, selected using a non-probability sampling technique. Patients were stratified into two distinct age groups for comparison: younger patients (aged less than or equal to 35 years) and older patients (aged more than 35 years). This stratification was based on their age at the time of diagnosis, allowing for a focused comparative analysis between these two demographics. Our inclusion criteria targeted patients who were newly diagnosed with breast cancer during the study period, those who received treatment and followed up at the designated department, and those who provided informed consent. Essential for inclusion was that these patients had complete medical records, detailing the mode of presentation, TNM staging, histological type, and hormonal receptor status. The Operational Definitions were set as follows. Breast cancer refers to any case diagnosed as malignant neoplasm of the breast, as confirmed by histopathological examination. TNM Staging is the classification of cancer based on the size and extent of the primary tumor (T), involvement of regional lymph nodes (N), and presence of distant metastasis (M), as per the American Joint Committee on Cancer (AJCC) guidelines. Histological Type refers to the specific type of breast cancer as identified through histopathological analysis, including but not limited to invasive ductal carcinoma, invasive lobular carcinoma, and ductal carcinoma in situ (DCIS). Hormonal Receptor Status involves the determination of estrogen receptor (ER), progesterone receptor (PR), and human epidermal growth factor receptor 2 (HER2) status in the tumor tissue, identified through immunohistochemistry or other relevant tests. Conversely, we excluded patients with a history of breast cancer or other malignancies prior to the study period, those with incomplete medical records, individuals unwilling or unable to provide consent, patients non-compliant with treatment or follow-up, and those diagnosed with metastatic breast cancer at the outset. This rigorous selection process ensured a representative and well-defined participant group for each age category. Upon breast cancer diagnosis, eligible patients aged 20 years and above were identified. The study's objectives, procedures, and confidentiality concerns were thoroughly explained to potential participants, followed by the collection of informed consent. Initial data collection involved gathering demographic information and specific breast cancer diagnosis details, including the mode of presentation, TNM staging, histological type, and hormonal receptor status, through a comprehensive review of medical records. Participants in both age groups were then followed up at regular intervals according to their treatment schedules. During each visit, updates on their treatment progress and any changes in health status were recorded. All data were meticulously entered into a secure, electronic database, ensuring the confidentiality and integrity of the information. This process was crucial in capturing the evolving clinical profile and treatment responses of the participants across both age groups, forming the foundation for an in-depth comparative analysis. We used SPSS version 24.0 to analyze all the data. We calculated the mean and standard deviation for age, and determined frequencies and percentages for the younger (≤35 years) and older (>35 years) age groups, modes of presentation, histological types, and hormonal receptor statuses. To compare these factors between the younger and older groups, we applied the Chi-square test or Fisher's Exact Test, as appropriate. We considered a p-value of less than 0.05 as statistically significant.

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RESULTS

Total 220 patients with breast cancer were selected. Mean age was 42.97 ± 13.26 years. Among 220 selected patients, the younger age group (≤35 Years) comprised 53 patients, accounting for 24% of the total. In contrast, the older age group (>35 Years) constituted a significantly larger proportion, with 167 patients representing 76% of the cohort. Table 1 reveals distinct patterns in the mode of presentation between the two age groups. Lump formation, the most common presentation, is significantly more prevalent in older patients (76.2%) compared to younger ones (23.8%). This could indicate a tendency for delayed detection or diagnosis in older age groups. Ulceration, representing an advanced symptom, is equally prevalent in both groups (50% each), suggesting similar progression rates regardless of age. Notably, nipple discharge and skin changes are exclusive to older patients, hinting at age-related biological differences in tumor behavior. The stark contrast in presentation types, underscored by a p-value of 0.000, underscores the necessity for age-specific clinical vigilance.

Table 1: Comparison of mode of presentation between both groups(n=220)

Mode of presentation	Age group		Total	p-value
	≤35 Years	>35 Years		
Lump	41(23.8%)	131(76.2%)	172(78.18%)	0.000
Ulcer	12(50.0%)	12(50.0%)	24(10.91%)	
Any other	0	24(100.0%)	24(10.91%)	
Total	53(24.1%)	167(75.9%)	220(100%)	

Table 2 illustrates a significant variation in histopathological types between the age groups. Invasive ductal carcinoma (IDC) Grade III, a more aggressive form, is predominant in older patients (68.8%) compared to younger ones (31.3%), implying a potential shift in tumor aggressiveness with age. Interestingly, younger patients show a 100% prevalence of DCIS (Ductal Carcinoma In Situ), a non-invasive form, indicating potential early detection or differing tumor biology. In contrast, IDC is notably higher in older patients (85.6%), suggesting an age-related increase in invasive forms. These findings, with a significant p-value of 0.000, highlight crucial age-related differences in breast cancer pathology.

Table 2 Comparison of histopathological variety between both groups(n=220)

Histopathological variety	Age group		Total	p-value
	≤35 Years	>35 Years		
Invasive ductal CA grade III	30(31.3%)	66(68.8%)	96(43.64%)	0.000
DCIS	6(100.0%)	0	6(2.73%)	
IDS	17(14.4%)	101(85.6%)	118(53.64%)	
Total	53(24.1%)	167(75.9%)	220(100%)	

Table 3 compares the hormonal receptor status across age groups. ER and PR positivity is considerably higher in older patients (ER: 68.8%, PR: 68.8%) compared to younger ones, indicating a possible link between hormonal receptor positivity and increasing age. This difference could influence treatment strategies, as hormonal therapies are more effective in ER/PR-positive cases. HER2 NEU positive status, however, shows no significant age-related difference, suggesting that HER2 NEU expression may be independent of age. These variations, particularly with significant p-values for ER and PR (0.011 and 0.029), underscore the complexity of hormonal influences in breast cancer.

Table 3: Comparison of hormonal status between both groups(n=220)

Hormonal Status	Age group		Total	p-value
	≤35 Years	>35 Years		
ER Status				
ER Positive	35(31.3%)	77(68.8%)	112(50.91%)	0.011
ER Negative	18(16.7%)	90(83.3%)	108(49.09%)	
PR Status				
PR Positive	30(31.3%)	66(68.8%)	96(43.64%)	0.029
PR Negative	23(18.5%)	101(81.5%)	124(56.36%)	
HER2 NEU Status				
Positive	17(19.1%)	72(80.9%)	89(40.45%)	0.154
Negative	36(27.5%)	95(72.5%)	131(59.55%)	

Table 4 details the TNM staging at presentation, providing insights into disease extent at diagnosis. Early stages like T1s N0 M0 are predominantly seen in younger patients, indicating potential early detection or slower progression in this group. Conversely, more advanced stages such as T4b N2 M1 are exclusive to older patients, reflecting possibly delayed diagnosis or faster progression in older age. The presence of diverse stages across both groups emphasizes the heterogeneity of breast cancer and the need for tailored diagnostic and therapeutic approaches.

Table 4: TNM stage at presentation

TNM stages	Age group		Total
	≤35 Years	>35 Years	
T1 N1 M0	0	6	6
T1s N0 M0	6	0	6
T2 N1 M0	12	36	48
T3 N0 M0	0	6	6
T3 N1 M0	12	12	24
T3 N2 M0	5	12	17
T3 N2 M1	0	5	5
T3 N3 M0	0	6	6
T4 N2 M1	6	0	6
T4a N2 M0	0	6	6
T4a N2 M1	0	12	12
T4b N1 M0	0	12	12
T4b N1 M1	0	6	6

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T4b N2 M0	0	18	18
T4b N2 M1	0	6	6
T4c N1 M0	6	0	6
T4c N1 M1	6	0	6
T4c N2 M0	0	6	6
T4c N2 M1	0	6	6
T4c N3 M0	0	6	6
T4d N2 M1	0	6	6
Total	**53**	**167**	**220**

DISCUSSION

In this study, the greater number of older patients (>35 years) compared to younger ones reflects the prevalent trends of breast cancer occurrence in Pakistan, where increased age is a significant risk factor. This selection was guided by the natural epidemiology of breast cancer, which shows a higher incidence and detection rate in older populations. Challenges in recruiting an adequate number of younger patients, given their lower incidence rate, contributed to this age disparity. Despite this, our statistical analysis has been carefully adjusted to account for these differences, ensuring the validity of our conclusions. This study's design paves the way for future research to further investigate age-related variations in breast cancer, ideally with more balanced age group representation. Our study's observation of a higher incidence of breast cancer in older Pakistani patients (>35 years) aligns with the findings of Zeeshan *et al.*, which also reported higher-grade tumors and more aggressive triple hormone receptor–negative phenotypes in younger patients [11]. However, unlike Zeeshan et al., who found a significant incidence of metastatic disease in younger patients, our study noted a prevalence of early-stage disease in this demographic. This discrepancy could suggest varying disease progression rates or differences in early detection effectiveness across regions. The study performed by Abdel-Razeq *et al.*, in developing countries echoes our findings in terms of the younger age at breast cancer diagnosis [12]. Both studies observed more aggressive pathological features in younger patients. However, unlike our study, Abdel-Razeq *et al.*, found older patients more likely to present with advanced-stage disease. This contrast highlights potential differences in healthcare access and screening practices between our study population and the reported cohort. Fernandopulle *et al.*, documented a high prevalence of invasive carcinomas in younger patients, which partially contrasts with our study's finding of 100% DCIS in this age group [13]. This difference might reflect variations in genetic predispositions, environmental factors, or diagnostic approaches between Singapore and Pakistan. The study of a large cohort in the National Cancer Database performed by Plichta *et al.*, showed younger women more likely to have higher-stage tumors and receive aggressive treatments, similar to our findings [14]. The high prevalence of HR+/HER2- tumors in older women in their study complements our observation of higher ER and PR positivity in this age group, suggesting age-related hormonal influences in tumor biology. Tzikas *et al.*, found more aggressive tumors and a higher Ki67 in younger patients with triple-negative breast cancer, a finding not entirely paralleled in our study [15]. While we did observe aggressive features in younger patients, the stark difference in Ki67 and histopathologic grade highlights potential biological or environmental factors influencing tumor aggressiveness that may vary between regions. Rudra *et al.*, identified higher rates of locoregional and distant recurrence in younger patients, aligning with our observation of aggressive disease features in this demographic [16]. This similarity underscores the need for vigilant monitoring and tailored treatment strategies for younger breast cancer patients, especially in underrepresented groups. Schaffar *et al.*, focusing on young women, found a high prevalence of luminal A and B molecular subtypes, which contrasts with our study's finding of a significant triple-negative disease in younger patients [17]. This contrast may be attributed to ethnic differences, as well as variations in environmental and lifestyle factors between Switzerland and Pakistan. Alwan *et al.*, highlighted significant differences between Iraqi and British breast cancer patients, with Iraqi women presenting younger and with more advanced stages, similar to our findings [18]. This similarity points to a broader trend in breast cancer presentation in developing countries, potentially influenced by socioeconomic and healthcare system factors. The study performed by Latif *et al.*, in Karachi, Pakistan, also found a higher prevalence of breast cancer in younger women presenting at advanced stages, aligning with our findings [19]. This consistency within the same country underscores the need for targeted breast cancer awareness and screening programs in younger Pakistani women. Moreover, recent findings underscore the complex relationship between menopausal hormone therapy (MHT) and breast cancer incidence in older women. Studies have revealed that while estrogen therapy alone may reduce breast cancer incidence for women with a prior hysterectomy, estrogen plus progestin therapy increases breast cancer risk, persisting over two decades. This highlights the need for a nuanced understanding of hormone therapy impacts in older women, which may also have implications for our study's observations in the older patient group [20].

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CONCLUSIONS

Our study underscores the nuanced variations in breast cancer presentation among Pakistani patients across different age groups. We observed a higher prevalence of breast cancer in the older age group (>35 years), predominantly presenting with lump formation, indicating potential delays in diagnosis. In contrast, younger patients (≤35 years) exhibited a 100% prevalence of Ductal Carcinoma *In Situ* (DCIS), suggesting earlier detection or distinct tumor biology. Notable differences were also evident in histopathological types and hormonal receptor status, with older patients showing higher ER and PR positivity. These findings emphasize the need for age-specific approaches in breast cancer diagnosis and treatment, highlighting the importance of tailored strategies to improve early detection, effective management, and outcomes in breast cancer care across varying age demographics.

Authors Contribution

Conceptualization: RK
Methodology: RK
Formal analysis: UJ
Writing-review and editing: RK, AUR

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Conflicts of Interest

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Original Article

Diagnostic Accuracy of Gastroscopy with Narrow Band Imaging for the Diagnosis of *Helicobacter Pylori* Gastritis

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ABSTRACT

Helicobacter pylori infection promotes stomach cancer and chronic gastritis globally. Endoscopic features that may identify *H. pylori* are being explored. **Objective:** Narrow Band Imaging (NBI) is used to identify and treat *H. pylori* gastritis before biopsy since most patients are lost to follow-up or follow-up is too late. *H. pylori* gastritis may be treated early to improve quality of life and gastrointestinal concerns. **Methods:** This cross-sectional study at Department of Gastroenterology, Liaquat National Hospital, Karachi, conducted between 1st March 2022 till 28th February 2023, included 150 patients. Patients with gastritis on endoscopy were evaluated for the presence of *H. pylori* with Narrow band Imagining. Findings were compared with histopathology as gold standard. **Results:** Mean age of the patients was 41.87 ± 12.5 years. Male participants were 71 (47.3%). The most common admission complaints were nausea, appetite loss, and abdominal distension. The diagnostic accuracy of NBI for the detection of *H. pylori* was 85% sensitivity, 88% specificity, 88% positive predictive value, 87% negative predictive value and overall accuracy of 88%. NBI endoscopy was cheaper and took less time to diagnose (27 minutes vs. 37 minutes). NBI endoscopy is more effective and cost-effective than standard gastroscopy. Conclusions: The data confirm the high incidence of *H. pylori* in gastrointestinal patients. NBI endoscopy is more effective and cost-effective than standard gastroscopy.

INTRODUCTION

Helicobacter pylori is a bacterium with a helical structure and a negative gram stain, which has infected around 31% of the world's population [1]. *H. pylori* is capable of inducing gastritis, atrophic gastritis, as well as gastric and duodenal ulcers [2, 3]. *H. pylori* has carcinogenic properties and is often linked to the development of stomach cancer and gastric mucosa-associated lymphoid tissue B cell lymphoma (MALTOMA) [4, 5]. Gastric cancer ranks as the fifth most prevalent cause of cancer worldwide, affecting 6 out of every 100,000 male and 3.6 out of every 100,000 females in Pakistan [6]. Patients infected with *H. pylori* exhibit symptoms such as stomach discomfort, bloating, burping, nausea, loss of appetite, lack of sleep, changes in mood, and depression. They may also have more serious symptoms such difficulty swallowing, vomiting blood, dark stools, weight loss, and anemia caused by deficiencies in iron and vitamin B12. The presence of *H. pylori* infection is often linked to individuals of low socioeconomic position who live in unsanitary environments [7]. Rural locations see a greater impact compared to metropolitan areas, with less opportunities for early identification and eradication of *H. pylori* [8]. The prevalence of *H. pylori* in Pakistan is 74.4% according to a study [9]. The definitive method for diagnosing *H. pylori* is by an endoscopic biopsy [10], which is considered the most reliable standard. Narrow band imaging (NBI) is a sophisticated endoscopic method that employs blue and green wavelengths to selectively exclude red light, enabling the evaluation of surface patterns and microvascular architecture [11]. This method is noninvasive and used to diagnose *H. pylori* gastritis prior to

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receiving biopsy findings. Magnifying endoscopy is used to investigate the stomach mucosa, allowing for the identification of diseased mucosa by the observation of pit dilatation and the removal of RAC [12]. In their earlier research it was observed that the normal pattern of gastric mucosa is characterized by a honeycomb-like epithelial capillary network (SECN) and the presence of RAC [13]. In contrast, the aberrant pattern of gastritis generated by *H. pylori* is characterized by polygonal swollen mucosa with increased crypt openings. The sensitivity of NBI for *H. pylori* gastritis ranges from 93.8% to 100%, whereas the specificity ranges from 82.2% to 96.2%. The urgent need for effective diagnostic methods for *Helicobacter pylori* gastritis, a prevalent and serious gastrointestinal disease, prompted this work. Diagnostic procedures must be improved since *H. pylori* infection may cause peptic ulcers and stomach cancer. For *H. pylori* gastritis, the research examines gastroscopy with (NBI) diagnostic accuracy. This new endoscopic approach is being tested to increase the accuracy and reliability of *H. pylori*-related gastritis diagnosis.

This research aims to fill a diagnostic gap and improve *H. pylori* treatment.

METHODS

This cross-sectional study conducted at the Department of Gastrointestinal Unit, Liaqat National Hospital, Karachi, between 1st March 2022 till 28th February 2023, included 150 patients. Permission for the conduct was taken from College of Physician and Surgeons Pakistan (Vide no: CPSP/REU/GAS/2019/192/1032, dated 25th February 2022). The inclusion criteria consisted of persons who were 18 years of age or older, had symptoms that indicated a possible *H. pylori* infection, and had a planned gastroscopy. Patients who had previously received therapy for *H. pylori* or had contraindications for endoscopy were not included in the study. Sample size was calculated using OpenEpi software taking prevalence of *H.pylori* as 70.0% with 95% confidence level and 5% of margin of error. Participants were recruited using convenient sampling techniques. Data pertaining to demographics and clinical characteristics were gathered, including factors such as age, gender, and relevant medical background. As part of the first evaluation, all patients had a serological test to detect the presence of *H. pylori*. A typical video gastroscope integrated with NBI technology was used to conduct NBI gastroscopy. The endoscopic observations were documented, with particular attention to the mucosal patterns linked to *H. pylori* gastritis. Biopsies were collected from the suspicious regions indicated by NBI, and the samples were submitted for histopathological analysis. A separate endoscopist, who was uninformed of the NBI results, conducted conventional gastroscopy on the same group of patients. Conventional white light endoscopy was used, and biopsies were collected from regularly sampled regions during gastroscopy. Experienced pathologists, who were unaware of the endoscopic results, completed histopathological investigation of all biopsy specimens. The study evaluated the existence of H. pylori and the severity of gastritis, and the findings were classified according to the Updated Sydney System. The sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), and overall accuracy of NBI gastroscopy were determined by comparing the results to the histopathological findings, which served as the reference standard. A comparative analysis was conducted to evaluate potential disparities in diagnostic efficacy between traditional gastroscopy and other methods. The duration of each endoscopic operation and the time required to get biopsy results were documented. The cost study included the explicit procedure expenses as well as the possible financial benefits linked to the use of NBI for prompt evaluation. The statistical tests utilized in this study were sensitivity, specificity, PPV, NPV, and accuracy. These measurements compared NBI gastroscopy to standard gastroscopy for diagnostic effectiveness. Comparative analysis was used to see whether the two approaches had different diagnostic effectiveness. Additionally, mean, median, and standard deviation were utilized to summarize the research population's demographic and clinical features. The t-test or Mann Whitney U test was employed for continuous variables and the chi-square test for categorical ones. All statistical analyses were done using SPSS version 23, and p-values under 0.05 were deemed significant.

RESULTS

Table 1 indicates that 150 patients were included, with a properly equal distribution across genders. Most patients were between the ages of 31 and 50.

Table 1: Gender and age wise parameters of patients (N= 150).

Parameters	Frequency (%)
Gender	
Male	71 (47.33)
Female	79 (52.67)
Mean ± SD (Years)	**41.87 ± 12.5**
Age Ranges	
18-30 years	33 (22%)
31-40 years	45 (30%)
41-50 Years	39 (26%)
51-60 years	33 (22%)
Total	150 (100%)

Table 2 lists the frequent complaints upon admission that were nausea, loss of appetite, and abdominal distension.

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Table 2: Patient complaints at admission (N=150).

Parameters	Frequency (%)
Nausea	78 (52)
Loss of Appetite	41 (27.33)
Heartburn	44 (29.33)
Regurgitation	37 (24.67)
Belching	43 (28.67)
Bloating	68 (45.33)
RAC	55 (36.66)
Dilation of Pits	72 (48)
Presence of *H. Pylori*	109 (72.66)

Table 3 indicates that the frequency of *Helicobacter pylori* was 60% with p-value = 0.05.

Table 3: *Helicobacter pylori* status in N=150 patients.

Helicobacter pylori Status	Frequency (%)
Positive	90 (60)
Negative	45 (30)
Indeterminate	15 (10)
Helicobacter pylori Prevalence	90 (60)

In table 4, the majority of the patients had *H. pylori* gastritis upon histological analysis.

Table 4: *Histopathological findings in N=150 subjects.*

Histopathological Findings	Frequency (%)
Normal	40 (26.66)
Helicobacter pylori gastritis	75 (50)
Other findings (specify)	35 (23.34)

The gastroscopy procedure using Narrow Band Imaging (NBI) demonstrated in table 5 shows a commendable level of diagnostic accuracy, with a sensitivity of 88% and specificity of 88% as well. The NBI endoscopy shows greater efficacy compared to traditional gastroscopy in terms of accurately identifying real positives and minimizing false positives.

Table 5: *Diagnostic accuracy metrics.*

Diagnostic Test	Sensitivity (%)	Specificity (%)	Positive Predictive Value (%)	Negative Predictive Value (%)	Accuracy (%)
Gastroscopy with NBI	85%	90%	88%	87%	88%
Comparison with Gold Standard	80%	92%	85%	94%	88%

In table 6 many adverse events were of moderate severity, with an incidence rate of 17.33% among patients.

Table 6: Adverse events observed in N=150 patients.

Adverse Events	Frequency (%)
None	120 (80)
Mild (describe)	25 (16.67)
Moderate (describe)	4 (2.67)
Severe (describe)	1 (0.66)

DISCUSSION

The findings of this research provide significant insights into the frequency of gastrointestinal symptoms and the contribution of *H. pylori* to these symptoms. The study cohort exhibited a significant occurrence of *H. pylori*, with a prevalence of 72.66%. This finding aligns with previous research, done by Paghadhar S *et al.*, which has shown *H. pylori* prevalence rates ranging from 50% to 80% in individuals with gastrointestinal symptoms [14]. This indicates that *H. pylori* likely has a substantial impact on the development of gastrointestinal symptoms and emphasizes the need of conducting tests for this bacterium in individuals who exhibit such complaints. The diagnostic accuracy measures for gastroscopy with NBI in this investigation, including sensitivity (85%), specificity (90%), positive predictive value (88%), negative predictive value (87%), and overall accuracy (88%), are similar to the findings of earlier studies progressed by Uppin MI [15]. This further substantiates the dependability of this diagnostic test in identifying gastrointestinal problems, namely in individuals with *H. pylori* gastritis. The study's findings indicate a significant occurrence of *H. pylori* gastritis (50%), aligning with prior research results accomplished by Frazzoni L *et al.*, that has shown prevalence rates ranging from 30-70% [16]. This underscores the significance of *H. pylori* in the progression of gastrointestinal symptoms and underscores the need for efficacious treatment approaches for this disease. The research found a modest incidence of adverse events (20%), which aligns with prior studies formulated by Alebie G *et al.*, that have also seen a comparable percentage of adverse events [17]. These findings indicate that the diagnostic test and methods used in this investigation were both safe and well-tolerated by the patients. In a meta-analysis conducted by Chen H *et al.*, in 2018, it was shown that NBI endoscopy exhibited greater sensitivity and specificity in identifying stomach lesions when compared to traditional gastroscopy [18]. In a similar vein, research conducted by Pimentel-Nunes P *et al.*, in 2016 showed that NBI endoscopy outperformed traditional gastroscopy in terms of its ability to diagnose stomach lesions. The results of our research provide evidence for the increased accuracy in identifying real positives and decreased occurrence of false positives in NBI endoscopy [19]. Our findings align with prior research in terms of operation duration. In research conducted by Desai M *et al.*, (2021), it was discovered that NBI endoscopy demonstrated a reduced duration for the process when compared to traditional gastroscopy. This might be attributed to the improved vision offered by NBI endoscopy, which enables faster detection of anomalies [20]. Furthermore, earlier studies such as those by Sharma P *et al.*, also provide support for our discovery that NBI

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endoscopy leads to a reduced waiting time for biopsy findings [21]. The cost analysis findings of our study are consistent with other studies. In research conducted by Pimentel-Nunes P *et al.*, it was discovered that NBI endoscopy was more economically efficient than traditional gastroscopy, resulting in a cost reduction of 30-40%. Our research supports the conclusion that patients who undergo NBI endoscopy get a cost reduction of 30,000PKR [19]. This research supports earlier results that *H. pylori* is common in individuals with gastrointestinal symptoms and that gastroscopy with NBI is a reliable diagnostic tool for gastrointestinal diseases. These results emphasize the necessity for improved *H. pylori* gastritis diagnosis and therapy for gastrointestinal patients. Our work adds to the evidence that NBI endoscopy is more accurate, efficient, and cost-effective than traditional gastroscopy for gastrointestinal disorders. These data imply that NBI endoscopy should be the primary gastroscopy approach for suspected gastrointestinal disorders. Further study is required to determine the etiology of symptoms in patients with various histopathological abnormalities and provide more focused treatments.

CONCLUSIONS

This research sheds light on gastrointestinal symptoms and *H. pylori*'s participation in them, despite its limitations. The data confirm the high incidence of *H. pylori* in gastrointestinal patients and the accuracy of gastroscopy with NBI in diagnosing gastrointestinal diseases. These results emphasize the necessity for improved *H. pylori* gastritis diagnosis and therapy for gastrointestinal patients. Our research indicated that NBI endoscopy had more true positives and fewer false positives than traditional gastroscopy. It also took less time and produced biopsy findings quicker and cheaper. These findings show that NBI endoscopy may diagnose gastrointestinal disorders more accurately, efficiently, and cost-effectively than traditional gastroscopy. Further study is required to determine the etiology of symptoms in patients with various histopathological abnormalities and provide more focused treatments. Due to its limited sample size, this research may not be generalizable. The research also only included patients from one center, which may not reflect the variety of gastrointestinal patients in different settings. These results need to be confirmed by bigger, more varied investigations. This research did not investigate the origins of symptoms in patients with additional histopathology results. Further study is required to understand these patients' causes and therapy options.

Authors Contribution

Conceptualization: MMH
Methodology: BR, RK, MMH
Formal analysis: BR, MA
Writing-review and editing: BR, RK

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

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Original Article

Effect of Educational Intervention on Neonatal Nurses Practices Regarding Oral Motor Stimulation on Early Transition from Tube to Oral Feeding in Preterm Infants

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ABSTRACT

Nurses working in neonatal nursery units play a crucial role in assessing the preterm infants feeding readiness cues for initiation of oral feeding and implementing the evidence-based intervention to support the development of feeding skills. **Objectives:** To assess the effect of educational intervention on neonatal nurses' practices regarding oral Motor stimulation on early transition from to oral oral feeding in preterm infants. **Methods:** A quasi-experimental single group study conducted in Children Hospital Lahore from May to July 2023. Pre and post intervention data was collected through the observational checklist from 36 nurses working in Neonatology. Nurses were educated through PowerPoint presentation and direct demonstration on infants. **Results:** Descriptive statistics showed that Majority of nurses were having diploma in nursing, 4-10 years' experience and belonged to 31-45 years age category. In inferential statistics Paired sample t-test revealed that the majority of nurses (100%, n=36) had incompetent practices before training which were improved (91.6%, n=33) after educational intervention with significant p-value<0.05. **Conclusions:** The nurses who received training revealed competent practices so we conclude that educational intervention was effective to improve the nurses' practices.

INTRODUCTION

In low middle income countries (LMIC), approximately 40 to 70 % preterm infants experienced feeding difficulties, about 500000 preterm infants diagnosed with difficulty in sucking and swallowing annually and this rate was increasing nationally [1, 2]. Moreover, 20 to 80% preterm infants who were discharge from intensive care unit still experience difficulty in feeding [3]. One of the discharge criteria of preterm infants from neonatal nursery unit is successful independent oral feeding [4]. Neurological and physiological maturity as well as coordination between oral motor functions are essential for preterm infants to feed independently [5]. However, immaturity of these functions causes the delayed initiation of oral feeding. Until the maturation of organs and their functions preterm infants get feeding by enteral (nasogastric/ orogastric) and parenteral routes [6]. Immature feeding skills are the cause of longer hospital stay [7]. Nurses working in neonatal nursery units play a crucial role in assessing the preterm infants feeding readiness cues for initiation of oral feeding and implementing the evidence-based intervention to support the development of feeding skills [8]. Evidence based interventions are feeding positions that must be semi elevated or side lying [9]. Oromotor stimulation exercises nonnutritive sucking that facilitates the development of oral motor functions for successful initiation of oral feeding [9-11]. Many researches have been

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conducted to assess the preterm infants feeding skills [12]. Factors effecting the development of feeding skills effect of evidence-based interventions on the development of oral feeding skills [13, 14]. Very few studies have been conducted to assess the neonatal nurse's knowledge on implementing the evidence- based interventions and evaluating the preterm infants feeding readiness cues for successful transitioning to oral feeding [15]. According to a study nurse working in neonatal nursery units need knowledge about proper positioning of preterm infants while feeding, nonnutritive sucking, feeding readiness, cue based feeding and oral stimulation exercises [16]. Nurses training about evidence-based nursing interventions that include oral motor stimulation and nonnutritive helps the preterm infants feeding skills development and early transition to oral feeding [17]. It is difficult for nurses working in neonatology department to identify the ideal moment for switching tube feeding to oral feeding in preterm infants. Several characteristics determines whether the premature infant is ready for oral feeding trails or not [18]. These characteristics of oral feeding readiness are Physiological stability including Heart rate, oxygen saturation, temperature, respiratory rate and skin color, Neuro-behavioral maturity including maintaining flexed body posture, being awake and alert, crying for feed and demonstrating the suck- swallow breathing coordination [19-23]. One of the most important elements to assess the infant readiness for oral feeding trails is the trophic feeding tolerance and age of infant that is calculated by mothers last menstrual period [24].

No study has been conducted yet on neonatal nurses training to improve their practices. Improving nurses' practices about the oral stimulation exercise and feeding readiness cues is crucial for safe and successful initiation of oral feeding and to prevent its negative effects on infants and their parents.

METHODS

Single group (pre, post) quasi-experimental study design was used to evaluate the effect of educational intervention about oral stimulation exercise and feeding skills assessment for successful initiation of oral feeding in preterm infants. Study was conducted between May to July 2023 in neonatal nursery unit of Children's Hospital Lahore. Sample size was calculated to be 36 by using total population for small sample size formula

n = Nz^2pq/(E^2(N-1)+z^2pq)

where, N=37; z (confidence level) =1.96; E (+ - error) = 0.03; p= 0.5; q=0.5

Total 36 nurses working in neonatal nursery unit of children hospital with at least 6 months experience were included in study by using purposive sampling technique. Nurses who attended a workshop or training on oral stimulation exercise during last six months were excluded from the study. Nurses received education about Oral motor stimulation application and early feeding skill assessment through power point presentation and direct demonstration on patients during their regular working hours in the class room of Neonatology Unit. Morning staff received training at morning shift and evening staff at evening shift separately. Each training class consisted of 6 nurses and total six classes were conducted for two shifts (6+6,6+6,6+6). Each training class duration was 45 minutes. A form was given the participants including 3 questions about their age, neonatal intensive care experience, and educational level. Observational checklist on neonatal nurses' practices was adopted with "done", "not done" that include 3 main themes and 19 sub points. A pilot study was done on 10% sample for clarity of tool Reliability was checked by Cronbach alpha 0.86. Validity of tool was done by the jury of five experts of neonates. Total 19 items were included under the three main themes, early feeding readiness, engagement in feeding and physiological stability. Researcher marked the responses done (1) not done (0). Scores was categorized >15 or >80% competent and <15 or <80% incompetent. This study was completed in three phases: Pre-Intervention Phase: This phase was started after receiving ethical approval for the study from University of Lahore (Letter No: REC-UOL-425-06-2023) that was issued on dated: June 19th ,2023. An observational checklist was used to assess the nurses' practices about oral motor stimulation, early feeding skills assessment for transitioning to oral feeding by the researcher. The time allocated for this phase was 1 month, as established by the researcher. In intervention phase educational intervention was provided to the nurses. The time allocated for this phase was 2 months in which nurses received 45 min lecture over oral motor stimulation application and early feeding skills assessment. In Post Intervention phase, Researcher re-assessed the nurses' practices about oral motor stimulation in preterm infants for transition to oral feeding by using the observational checklist and allow nurses to be practised on 2-3 neonates while being watched, and if improvements were required the researcher guided them. In statistical analysis SPSS version 25.0 was used to analysed the data. Data were analyzed using descriptive and inferential statistics. Descriptive analysis was used to check the frequency of demographics variable of nurse's practices pre and post intervention. Whereas, inferential analysis (paired sample t-test) was done for the comparison of Pre, post data of nurse's practices.

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RESULTS

Table 1 shows the demographics characteristics of nurses working in neonatal care unit results reveled that nurses age between 31-45 were greater in number (16, 44.4%,) as compare to the age group 26-30 (05, 13.8%). In Nurses level of education, Diploma nurses were greater in number (13, 36.11%), when compare to Generic BScN (2, 5.56%) and Specialization diploma (10, 27.78). Nurses neonatal care experience results reveled that majority of nurses were having 4-10 years' experience (16, 44.44%) as compare to the 1-3 years' experience (10, 27.78%) and 11-25 years' experience (10, 27.78%) respectively.

Table 1: Demographic Characteristics of Nurses Working in Neonatal Unit

Demographic Variables	Category	n (%)
Nurses' Age	22-25	15 (41.6)
	26-30	05 (13.8)
	31-45	16 (44.4)
Education Level	Diploma	13 (36.11)
	Generic BScN	02 (5.56)
	Specialization	10 (27.78)
	Post Rn	11 (30.5)
Neonatal Care Experience	1-3 Years	10 (27.78)
	4-10 Years	16 (44.44)
	11-25 Years	10 (27.78)

Descriptive Statistics analyzed by frequency 'n' and percentage '%'

Results revealed that the majority of nurses (100%, n=36) had incompetent practices before training which were decreased in number after educational intervention (3, 8.3%) and (0, 0%) nurses had competent practices before training which were improved and revealed significant change (33, 91.6%) after educational intervention (table 2).

Table 2: Comparison of Pre and Post Training Competency in Practices

Demographic Variables	Pre-Training	Post-Training	p-value
	n (%)	n (%)	
Incompetent Score	36 (100)	3 (8.3)	0.002
Competent Score	0 (0)	33 (91.6)	

Dependent Sample t-test, Exact. Sig. (2-tailed) p<0.05

Paired sample t-test, a parametric test, was applied for the variable of Nurses Practices to compare pretest and posttest scores. Results revealed the significant improvement in practices scores. Pretest mean scores of checking body in flexed position was 5.83 ± 0.62 that was improved 16.09 ± 0.42 after educational intervention, checking awake state Pretest mean scores were12.09 ± 2.6 that improved after educational intervention, 20.32 ± 1.87. Similarly, Checking Energy for feed pre intervention scores were 10.36 ± 2.83 that improved to 16.78 ± 2.19 with p-value 0.000. Checking Baseline Oxygen saturation >93%e pre intervention mean scores 10.36 ± 2.83 and after intervention mean scores 34.77 ± 4.01, Checking Behavior stress cues during feeding pretest scores 4.85 ± 0.54 post-test scores 15.34 ± 0.62 Doing nonnutritive sucking pre intervention scores 10.09 ± 2.6 that improved after intervention 20.32 ± 1.87, Doing stimulation of lateral boarder of Tongue pre intervention scores12.09 ± 2.6 that improved after intervention 14.32 ± 1.87. Doing cheek stretching in C-shape pattern pretest mean scores 10.36 ± 2.83 that was improved after educational intervention 34.77 ± 4.01 with p-value 0.000. P-value <0.05 was taken as significant (table 3).

Table 3: Comparison of Pre- and Post-Training Practices

Training Practices	Pre-Training	Post-Training	p-value
	Mean ± SD	Mean ± SD	
Checking Body in a Flexed Position	5.83 ± 0.62	16.09 ± 0.42	0.000
Checking Awake State	12.09 ± 2.6	20.32 ± 1.87	0.000
Checking Energy for Feed	10.36 ± 2.83	16.78 ± 2.19	0.000
Checking Baseline Oxygen Saturation	10.36 ± 2.83	34.77 ± 4.01	0.000
Checking Behavioral Stress Cues During Feeding	4.85 ± 0.54	15.34 ± 0.62	0.000
Doing Nonnutritive Sucking	10.09 ± 2.6	20.32 ± 1.87	0.000
Doing Stimulation of Lateral Boarder of Tongue	12.09 ± 2.6	14.32 ± 1.87	0.000
Doing Cheek Stretching in C Shape Pattern	10.36 ± 2.83	34.77± 4.01	0.000

Dependent sample t-test, Exact. Sig. (2tailed) P<0.05

Paired sample t-test revealed the significant improvement in practices scores, pre intervention scores 7.0000 ± 1.74895, that was improved after educational intervention 16.3333 ± 1.02899 with p< 0.001. P-value <0.05 was taken as significant (table 4).

Table 4: Paired Sample T-Test for Comparison of Nurses Practices Before and After the Training

Nurses Practices	Pre-Training	Post-Training	p-value
	Mean ± SD	Mean ± SD	
	7.0000 ± 1.74895	16.3333 ± 1.02899	< 0.001

Dependent sample t-test, Exact. Sig. (2tailed) p<0.05

DISCUSSION

Nurses working in neonatal nursery department require sufficient knowledge and competent practices for supporting preterm infants to initiate their successful independent oral feeding [8]. In many years importance has been given to improve nurses' skills [12]. In this study we evaluate the effect of educational intervention on nurses' practices for successful initiation of oral feeding in

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preterm infants before and after the educational intervention, 3 months after the training significant improvement was observed in nurses' practices scores and suggest that training was effective in improving the nurses' practices. In present study we evaluated nurses' practices about oromotor stimulation for transition to oral feeding in preterm infants before and after training program on this topic, our finding showed a significant improvement in scores two months after the training when compared the scores before the training, hence we conclude that training was effective and it improved the nurses' practices. Similarly, a study performed by Pratiwi *et al.*, was conducted on Turkish neonatal nurses, study finding showed that before the training nurses had insufficient knowledge and incompetent practices (0-7.6%) about oral motor stimulation, cue-based feeding, semi-elevated or side lying positioning during feeding, slow flow nipples usage that was improved after training (20.5- 77%) [8]. The demographic data of studied nurses (Table 1) in present study showed that almost half of the nurses (41.6%) belonged to the age group of 22-25 years, these findings similar to another study by Kritzinger et al., according to the study results, almost 45% nurses belonged to the age group of 20-30 [3]. Pratiwi *et al.*, supported this, revealing that about 60% nurses belonged to the 20-30 years age group [8]. According to the researcher point of view at this age group nurses are more energetic skilled and because of increasing number of graduates at this age group from nursing institutes. Nurses level of education (Table 1) the present study findings showed that 5.56% nurses were having BScN degree. This finding was in contrary with Pratiwi *et al.*, according to study findings more than half (90,75%) of the nurses were having BScN degree holder [8]. Mohamed Arafa *et al.*, study results showed (96,80%) nurses were having BScN degree [25]. According to the researcher point of view, BScN degree program for nurses was started in 2018 this is reason behind the limited number of Generic BScN in NNU and to provide the better nursing care to preterm infants the neonatal care nurses should be university graduates. Regarding to the years of experience (Table 1) in Neonatal nursery unit, the present study findings showed that, 27.78% nurses were having 1-3 years' experience in neonatal care unit. These results were in oppose with Pratiwi *et al.*, the study revealed that about 45% nurses had 1-3 years' experience in neonatal care unit [8]. A study by Abo El Magd Fathi *et al.*, showed 45% nurses were having 1-3 years of NNU experience. According to the researcher it could be the subject characteristics difference in study. The Pretest mean scores of nurse's practices about oral motor stimulation and transition to oral feeding were (7.2778) and post-test mean scores were (16.333) that were statistically significant and higher than pretest scores (p value< 0.001). The present study findings show the changes in the statement of incompetent score to competent scores of neonatal nurses in pretest and post-test about oral motor stimulation and transition to oral feeding in preterm infants. Similarly, a study Beissel *et al.*, finding showed that before the training nurses had insufficient knowledge and incompetent practices (0-7, 6%) about oral motor stimulation, cue-based feeding, semi-elevated or side lying positioning during feeding, slow flow nipples usage that was improved after training (20.5, 77%) with a (p-value (<0.05) [4]. Another study by Pratiwi *et al.*, results showed before training nurses practices scores (6.234, 10%)were that was improved (20.2, 89%) after training with statistically significant difference with a (p value <0.05) [8]. A study by Moon *et al.*, assessed the knowledge and practices of Turkish nurses working in neonatal nursery unit about evidence-based intervention, feeding readiness cues, feeding position semi- elevated or side lying, nipple flow of milk [15]. In present study nurses' practices score was lower when compared to the study because the present study was conducted with small sample size and in a single setting. In feeding readiness cue-based feeding, amount and duration of feeding determined by the physiological and behavioral cues of feeding [10]. In the traditionall feeding method, Initiation of oral feeding depends on the gestational age of infants, duration of feeding and volume of milk (mother milk/ formula) determined the successful transition to independent oral feeding [12]. In traditional method nurses support the infants to finish their prescribed feeding amount by pushing and moving the nipple in mouth this intervention hindered the development of suck swallow and breathing coordination in infants [6]. In opposition, in feeding readiness cue-based feeding when to start and stop the feeding depends on the hunger sign and behavioural stress cues. Cue based feeding facilitates the development of feeding skills and early initiation of successful independent oral feed . Oral motor stimulation exercise as an evidence-based intervention is a stimulation exercise of cheeks lips gums tongue and palate given to preterm infants in order to enhance their feeding skills and facilitate the development of suck swallowing breathing coordination for successful initiation of independent oral feeding during enteral and parenteral feeding [5]. In order to implement evidence-based intervention on preterm infants in some countries, proper training is provided to health care professionals, moreover in developed countries occupational therapist are allowed to implement this stimulation exercise in order to facilitate preterm infants early transition to successful oral feeding [9]. In Pakistan we do not have sufficient occupational therapists, so training is provided to the nurses working in

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neonateology department so that they implement the intervention safely and effectively with minimum adverse effect that could happen with untrained personals. 36 nurses (100%) were not performing the oral stimulation exercise on preterm infants before the training. After two months after 33 nurses (91.6%) were performing the oral stimulation exercise still 6 nurses (16%) were not implementing the all steps of oral stimulation exercise. Nurses 4(11.1%) were not performing the lip stimulation exercise and 2 of nurses (5.5%) were not performing the lateral boarder of tongue massage. A study performed by Pratiwi *et al.*, revealed that about (15%) nurses were implementing evidence based oral stimulation intervention before training and after training more than half of the nurses (88%) started practicing oral stimulation intervention [8]. Similarly, study by Abo El Magd Fathi *et al.*, showed 95% nurses practices improved after training [26]. According to the literature preterm infants neurological and physiological maturity increase with age their suck swallow breathing coordination their feeding performance duration of awake time increase [6]. In opposition of literature in present study before training 32 nurses (88.8%) were not evaluating the suck swallow breathing coordination before and during feeding, two months after training 30 nurses (83%) started evaluating the suck swallow breathing coordination but still 06 nurses (16.6%) were not assessed evaluating suck swallow breathing coordination. Difference in present study with literature was because of small sample size and single centre study. In present study no significant difference were found in nurses age and work experience of neonatology department on their practices before and after training. Still in nurses age between 22-25with 1-3-year experience of NNU improvement of practices were observed two months after the training. This is probably because in this age group nurses are mostly newly graduated and ready to learn something new and improve their practices. A significant difference is seen in the practices of nurses who had higher education than the nurses who had only diploma.

CONCLUSIONS

The study findings present a comprehensive analysis of nurse's practices before and after training. It is concluded that training was effective in improvement of nurse's professional practices for assessing the independent oral feeding skills of preterm infants.

Authors Contribution

Conceptualization: MA, MM
Methodology: SN
Formal analysis: SN
Writing-review and editing: SN, MA, MM
All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

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Original Article

Frequency of Urinary Tract Infection among Neonates with Persistent Jaundice at Lady Reading Hospital, Peshawar

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ABSTRACT

Jaundice refers to yellow-orange discoloration of the skin and sclera, resulting from an excessive accumulation of bilirubin in the dermis and mucous membranes. Indirect neonatal hyperbilirubinemia is a prevalent and frequent etiology of jaundice, leading to the hospitalization of neonates in healthcare institutions worldwide. **Objective:** To determine the frequency of urinary tract infection among neonates with prolonged jaundice. **Methods:** The present study, a cross-sectional design, was carried out at the Department of Pediatrics, Lady Reading Hospital, Peshawar, from June 20th to December 20th, 2022. The study consisted of 87 infants, encompassing both genders, who presented with persistent jaundice. Two samples of clean urine were collected from neonates, with a time interval of many minimums of two hours between each collection. These samples were then sent to the hospital laboratory for diagnosing urinary tract infection. **Results:** The age range of participant neonates in this study ranged from 14 to 28 days, with a mean age of 20.597±4.50 days. The mean duration of complaint was also 18.20±4.077 days, and the mean weight was 2.855±0.27 Kg. The proportion of male patients was 58.6%, while the proportion of female patients was 41.4%. Among these 11.5% were found to have urinary tract infection. **Conclusions:** It is concluded that significant number (11.5%) of patients with persistent jaundice has urinary tract infection. It is likely a potential etiological factor contributing to neonatal unexplained prolonged indirect hyperbilirubinemia.

INTRODUCTION

Jaundice is a medical condition characterized by the yellow-orange discoloration of the skin and sclera, resulting from an excess of bilirubin in the skin and mucous membranes [1]. In neonates' jaundice, indirect neonatal hyperbilirubinemia (INH), is a common finding and frequent reason for neonatal hospitalization worldwide1. Physiologic jaundice typically manifests between days 2 to 4 after birth, reaches its peak around days 4 to 5, and resolves within a two-week period [2]. Physiologic jaundice is not observed within the initial 24-hours period. Likewise, the etiology of pathological un-conjugated hyperbilirubinemia is attributed to heightened bilirubin production, diminished bilirubin clearance, and increased entero-hepatic circulation [3]. Pathological jaundice can manifest within the initial 24 hours of life and is characterized by a rapid escalation in bilirubin levels exceeding 0.2 mg/dl per hour or 5 mg/dl per day [3]. Urinary Tract Infection (UTI) represents one of the most prevalent bacterial infections in childhood [4]. This infection can impact either the upper urinary tract, referred to as pyelonephritis, or the lower urinary tract, referred to as cystitis4. Regrettably, discerning between pyelonephritis and cystitis based on clinical symptoms and signs, particularly in infants and young children, can be challenging, if not unfeasible [5, 6]. Consequently, these two conditions are commonly discussed collectively within

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the context of UTI. The clinician faces substantial obstacles due to the high frequency, recurrence tendency, morbidity association, and difficulties in obtaining an uncontaminated urine specimen [7]. Breastfed infants have a higher prevalence of prolonged jaundice compared to formula milk fed infants, as indicated by previous research [8]. Studies conducted in developed countries, specifically focusing on infants who are not breastfed, have suggested that a thorough investigation should be conducted for formula fed infants with prolonged jaundice [8]. Pashapour et al., conducted a study which revealed a 6% incidence of urinary tract infection in neonates with persistent jaundice [9]. Similarly, Harb et al., conducted a separate study which found an incidence of urinary tract infection in neonates with persistent jaundice as 8.9% [10]. The risk factors for urinary tract infection (UTI) in neonates with jaundice include early (⩽10 days) idiopathic neonatal jaundice, poor response to phototherapy, and prolonged hyperbilirubinemia with an unexplained etiology [1, 2]. Other risk factors include indirect hyperbilirubinemia in the first week of life, unconjugated hyperbilirubinemia, and the presence of unexplained pathological jaundice [2, 3]. Neonates with unexplained indirect hyperbilirubinemia in the first 2 weeks of life should be tested for UTI [5]. It is recommended to screen for UTI in neonates with prolonged hyperbilirubinemia and direct bilirubinemia. Additionally, neonates admitted with indirect hyperbilirubinemia should be evaluated for UTI, as the frequency of UTI is high in this population. The most common pathogens associated with UTI in neonates with jaundice are Escherichia coli and Klebsiella pneumoniae [11].

A comprehensive clinical evaluation is necessary for all infants with prolonged jaundice; yet, the specific criteria and scope of diagnostic procedures remain ambiguous. The identification of predisposing variables in Asian nations, such as Pakistan, is crucial in facilitating prompt diagnosis and treatment of jaundice, leading to enhanced results and decreased complications. For this purpose, we performed this study to ascertain the prevalence of urinary tract infection among early infants exhibiting prolonged jaundice at Lady Reading Hospital in Peshawar.

METHODS

The present study, a cross-sectional design, was carried out at the Department of Pediatrics, Lady Reading Hospital, Peshawar, spanning from June 20th, 2022 to December 20th, 2022. The study included a total of 87 neonates, encompassing both genders, who presented with persistent jaundice. The selection process adhered to strict inclusion criteria. The study used a non-probability consecutive sampling method, and the sample size was determined using the WHO sample size software. A 95% confidence interval, 5% margin of error, and an estimated frequency of urinary tract infection of 6% in neonates with prolonged jaundice were considered [9]. Upon obtaining approval from the ethics committee, IRB No; 128/LRH/MTI dated 28 May 2021, study was commenced and patients who met the predetermined inclusion criteria were enrolled in the study. During study obtained informed consent from the parents, so ensuring confidentiality and confirming the absence of any risks to the patient during their participation. We collected basic demographic data from the patients, including age, gender, duration of complaint, and weight as measured on a weighing scale. Two samples of mid-stream urine were collected from neonates and sent to the hospital laboratory to test for the presence of urinary tract infection. The two samples were acquired at least two hours apart and were free from contamination. All laboratory studies were conducted under the supervision of a consultant microbiologist with post FCPS experience more than five years. Data pertaining to urinary tract infection, as defined operationally was recorded on a specially constructed form. The data were then analyzed using the statistical software SPSS version 21.0. Mean and standard deviation were used to measure quantitative characteristics such as age, duration of complaint, and weight. The frequency percentages of categorical variables, such as gender and urinary tract infection, were assessed.

RESULTS

The age range of patients in this study ranged from 14 to 28 days, with a mean age of 20.597 ± 4.50 days. The mean duration of complaint (jaundice) was also 18.20 ± 4.077 days, and the mean weight was 2.855 ± 0.27 Kg, as indicated in table 1.

Table 1: Mean ± SD of patients according to age, duration of complaint and weight n=87

Demographics	Mean ± SD
Age (days)	20.597±4.50
Duration of complaint (days)	18.20 ± 4.077
Weight (Kg)	2.855 ± 0.27

The distribution of patients by gender is presented in table 2, with males accounting for 58.6% and females comprising 41.4% of all included patients.

Table 2: Frequency and percentage of patients according to gender (n=87)

Gender	Frequency (%)
Male	51 (58.60)
Female	36 (41.4)
Total	87 (100)

A 11.5% was observed among patients to have urinary tract infection, as indicated in table 3.

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Table 3: Frequency and percentage of urinary tract infection in neonates with persistent jaundice (n=87)

Urinary Tract Infection	Frequency (%)
Yes	10 (11.5)
No	77 (88.5)
Total	87 (100)

A total of 87 patients with persistent neonatal jaundice were studied and of them 11.5 % were found to have UTI.

DISCUSSION

Jaundice is widely recognized as a common disease in neonates. Approximately 60% of newborns born at full-term experience the development of jaundice [16]. Indirect hyperbilirubinemia is a prevalent phenomenon that is associated with a wide range of physiological and pathological situations. Infants in the neonatal period who have urinary tract infections (UTIs) may exhibit solely the symptom of jaundice. Urinary tract infection (UTI) investigations have been incorporated into the standard diagnostic evaluation of jaundice. The controversy surrounding the investigation of urinary tract infections (UTIs) in neonates with unexplained indirect hyperbilirubinemia of large magnitude has been noted [17]. Our study revealed that the prevalence of urinary tract infections (UTIs) among the infants with persistent jaundice in our sample was found to be 11.5%. The previous research has reported a range of 5.8% to 21% as the incidence rate of urinary tract infection (UTI) in infants with jaundice [18]. In prospective research conducted by Shaimaa S. Abdelrheem *et al.*, the incidence of urinary tract infection (UTI) in infants with jaundice was observed to be 25.7% [19]. The study conducted by 20. Deger I *et al.*, revealed a lower but significant incidence of urinary tract infection (UTI) of 8% in large number of neonates admitted with indirect hyperbilirubinemia in a single center study [20]. According to a study conducted by Özcan *et al.*, the incidence of urinary tract infection (UTI) was found to be 16.7% [18]. Tawfeek *et al.*, in her study that UTI was the 3rd most common etiology of jaundice in neonates with persistent jaundice [21]. The first and common most risk factor was breastfeeding 32.7%, followed by ABO incompatibility 22%. The incidence of UTI was 20%. Similarly, 22. Aygün *et al.*, work shows breastfeeding, blood group incompatibility and urinary tract infection being the common causes of prolonged neonatal jaundice. The prevalence of these causes was 73%, 13% and 8% respectively [22]. Demographics of our patients were comparable to other studies. The age range of patients in our study ranged from 14 to 28 days, with a mean age of 20.597 ± 4.50 days. Tawfeek *et al.*, reported age range of 14 to 49 days with mean age of 19.3 ± 5.3. The mean duration of complaint in our study was also 18.20 ± 4.077 days, and the mean weight was 2.855 ± 0.27 Kg. However, the mean weight of 3.275 ± 0.459 was noted by Tawfeek *et al.*, in her study. The distribution of patients by gender was males as 58.6% and females comprising 41.4% of all included patients. Similar distribution was observed by Tawfeek *et al.*, study comprising of 58% males and 42% females' babies [21]. Regarding the prevalent isolated organisms, it was found that *E. Coli* is the commonest cultured bacteria in urinary tract infections and counted 45.5% in study conducted by Chen *et al.*, *Enterococcus faecalis* (19.3%) was the next commonest followed by *Streptococcus agalactiae* (8.00%) and *Klebsiella pneumoniae* (6.8%). Other less common organisms were enterococcus species, staphylococcus aureus, enterobacter aerogenes, *Serratia marcescens*, *Enterobacter cloacae* and *Citrobacter koseri* [23] Similarly, Sheaf *et al.*, demonstrated coliforms organism being the commonest followed by E. Coli in neonates with UTI [24]. A potential constraint of the research lies in the absence of urine culture for all instances under investigation. Our approach involved doing urine analysis, which encompassed leukocyte esterase (LE) and nitrite tests, as well as microscopic examination to detect the presence of pyuria, for all newborns included in the study. The restriction in question was a result of the local policy in the NICU and microbiology laboratory, which dictates that urine culture should only be conducted in cases of sepsis, abnormal urine analysis, or pyuria. Nevertheless, the utilization of aseptic urinary catheterization technique has been found to enhance the specificity of urine sample collection. Additionally, the inclusion of aggregate urine analysis, which involves assessing the presence of leukocyte esterase (LE), nitrite, or pyuria (> 5 white blood cells per high-power field), has been shown to significantly increase the sensitivity for detecting urinary tract infections (UTIs) in infants below 60 days of age, with a reported accuracy of 99.4% according to a study conducted by Tzimenatos *et al.* [25]. The relationship between urinary tract infection (UTI) and jaundice in neonates is not yet fully understood, and further research is needed to investigate potential reasons [26]. Jaundice seems to be result of direct effect of bacteria, enhanced by its toxins and host response through pro-inflammatory cytokines. These bacteria also secret hemolysin, which cause haemoglobin destruction and it, is then converted to bilirubin by liver enzymes [27].

CONCLUSIONS

Our study concludes that a significant number of patients with persistent jaundice have urinary tract infections. Thus, it can be inferred that UTI may be a contributing factor to the occurrence of unexplained indirect hyperbilirubinemia in neonates. Hence, it is recommended

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that neonates with persistent jaundice be screen for urinary tract infection (UTI) especially neonates with unexplained hyperbilirubinemia.

Authors Contribution

Conceptualization: AK
Methodology: IK, N, SA
Formal analysis: LM, SH
Writing-review and editing: LM, IK , AK

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

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Original Article

Impact of Hearing Aid Use on Listening Skill of Hearing-Impaired Students

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ABSTRACT

Hearing loss affects listening and communication. Listening represents the basis for verbal communication. Literature reveals a research gap as regards listening effort in case of HA users especially students. **Objective:** To determine the impact of hearing aid on listening skills of school going hearing impaired students. **Methods:** This comparative study was conducted from 1st February, 2023 to 30th June, 2023 at Shifa International Hospital Ltd using purposive sampling. Sample of N=66 participant students of both genders, aged 5 years and above with moderate to profound hearing loss for more than three years and using hearing aids. 20 words were presented to the participant first without hearing aids and then with hearing aids and their response was recorded. Data analysis was performed by SPSS version-23.0 and Wilcoxon signed rank test was used to determine any associations and $p<0.05$ was considered significant. **Results:** Results revealed that for unaided condition Median (IQR) score of 54, and IQR of 35 and mean rank 32. In aided condition Median (IQR) score was 80, IQR was 2 and mean rank was 0. The $p=0.000$ suggests a significant difference between the two categories. **Conclusions:** Study concluded that there was substantial improvement in the listening skills of participants with hearing aids on as compared to without hearing aid with children having moderately severe category of hearing loss benefitting the most from hearing aids.

INTRODUCTION

Human ear is responsible for listening and hearing. Hearing is process of the ear in which sound is transmitted to the brain i.e., it is a passive process while listening being an active dynamic process in which transmitted acoustic event is captured by the individual [1]. A person is labelled as having hearing loss (HL) when his hearing threshold is 20dB or worse and according to World Health Organization (WHO), the threshold of hearing is classified as having mild HL (20-40 dB), Moderate (41-60), Severe (61-80dB) and Profound (> 81 dB), with 34 million children suffering from hearing loss which is disabling [2, 3]. Hearing loss affects listening and communication. Listening represents the basis for verbal communication [4]. With different categories of HL representing diverse population of HI students, early identification and assessment of hearing loss can be helpful in early intervention [5]. Listening is an essential for communication being reception state which allows one to understand all that a person hears and provide complete participation in the process of communication. Listening being an integral component of literacy development augments two- way communication and plays a critical role in teaching and learning process [6]. Hearing impairment results in impairment of language, communication, and learning requiring thoughtful

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involvement in research for the betterment of this population [7]. Hearing aids are devices which amplify sound after receiving and pass on amplified sound to the recipient thus helps the hearing impaired to hear better [8]. According to Cubick et al., hearing aids distort spatial perception and reduce speech intelligibility in individuals with normal hearing [9]. Patient experience a pleasurable emotional satisfaction when hearing aid is working and improving their listening skills of the patient and ability to understand what is said, even in case of unilateral hearing aids [10, 11]. A longitudinal study by Holman et al., revealed that HA significantly reduce fatigue which is related to listening [12]. A person with profound degree of hearing loss has great difficulty in hearing and localizing sound even when it's in one ear [13]. Being a part of complex language system in Pakistan it is difficult to learn reading, writing in Urdu and English since it adds more challenges for a typical Pakistani student [14]. HI students face challenges in participating and interacting in classrooms [15]. In developing written expression skills children face many hurdles. Studies have showed that the slow up in the verbal and reading skills development and understanding are visible in the written document. However, identifying and intervening at an earlier stage improves expressive performance of HI students [16]. In achieving a common goal two or more people interact in representing a shared activity is communication with steps like to hear, to listen, to comprehend and eventually to communicate, hence it is a dynamic complex process. When a hearing-impaired student is listening properly then he/she will communicate properly [17]. Experience of HI children and their relation with HA's requires investigation in more depth which also gives a scope for further research in the field which is needed [5]. We need to determine the impact of use of hearing aids or no use of hearing aid on preschool children for speech perception intervention, vocabulary development and listening skills [18]. Available literature indicates that listening effort in case of HA users has shortcomings and needs further research [19].

Hence, current study was conceived to determine the impact of hearing aid on listening skills of school going hearing impaired students. The study is of immense importance due to gap in the literature and it would help act as a base for future studies and help audiologists and speech language pathologists in better managing their patients.

METHODS

This comparative study was conducted over a period of 5 months from 1st February, 2023 to 30th June, 2023 at Shifa International after obtaining ethical approval of research from Institutional Review Board and Ethics Committee, Shifa International Hospital IRB # 0370-22 dated 04-Jan-2023. Using purposive sampling a sample of N=66 participant students were recruited from National Special Education Centre for Hearing Impaired Children, H-9 Islamabad and Government Special Education Centre Misrial Road, Rawalpindi. Sample size of 57 was calculated using G*Power 3.1.9.4 software with effect size 0.5, α error probability of 0.05, Power 0.95. To cater to any drop outs 70 participants were included in study, however four participants later refused consent and were excluded from the study leaving behind a sample of N=57. Sample included hearing impaired students aged 5 years and above, both genders who had moderate to profound hearing loss for more than three (03) years and were using hearing aids both analogue or digital. Cases with any comorbidities and disabilities like mental retardation were excluded from the study since they couldn't understand the instructions. Basic demographic sheet, Auditory Brain Response (ABR), Auditory Steady State Response (ASSR) or Pure Tone Audiometry (PTA) reports and list of 20 words were used for data collection. Researcher presented the list of words to students first without hearing aids and were asked to repeat the words, and then with hearing aids and responses were noted. Confidentiality of the students was mentioned. Data analysis was performed by Statistical Software for Social Sciences (SPSS version-23.0). Descriptive statistics were used. Percentage and frequencies were calculated for patient variables. Wilcoxon signed rank test was used to determine any associations and $p<0.05$ was considered significant.

RESULTS

Study sample N=66 revealed a mean age of 15.09 ± 5.32 years with majority 45 (68.26) being males (Table 1). Majority 26 (39.4%) had severe HL while least 9 (13.6%) had moderately severe HL. Majority 63 (95.5%) were using digital hearing aids.

Table 1: Participant characteristics (n=66)

Variables	Group	Frequency (%)
Gender	Male	45 (68.2)
	Female	21 (31.8)
Degree of Hearing Loss	Moderate	10 (15.2)
	Moderately severe	9 (13.6)
	Severe	26 (39.4)
	Profound	21 (31.8)
Type of Hearing Aid	Digital	63 (95.5)
	Analogue	3 (4.5)

Since data were not equally distributed Wilcoxon signed rank test was used in table 2, which revealed that for unaided condition Median (IQR) score of 54, and the interquartile rank (IQR) of 35. The IQR represents the range between the 25th and 75th percentiles of the data. The

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mean rank was 32 which suggests the average position of the responses in a ranked order. In aided condition Median (IQR) score was 80, and the IQR range was 20. This indicates that the scores are less spread out compared to the "UNAIDED" category. The mean rank was 0. p=0.000 which suggests that there's a significant difference between the two categories in terms of the measured variable. Hence, there are substantial differences between the "UNAIDED" and "AIDED" categories in terms of the measured variable, with statistical significance. The "UNAIDED" category tends to have lower scores, higher variability, and a higher mean rank compared to the "AIDED" category. The p-value indicates that these differences are unlikely to have occurred by chance.

Table 2: Descriptive Statistics Median (IQR) and Mean rank for different hearing aid status

Hearing status	Median (IQR)	Mean rank	p-value
Unaided	54 (35)	32	0.000
Aided	80 (20)	0	0.000

The biggest difference between aided and unaided scores was present in moderately severe category, children with moderately severe category of hearing loss benefitted the most from hearing aids (Table 3).

Table 3: Difference of degree of hearing loss among aided and unaided patients (n=66)

Test	Degree of hearing loss	Frequency	Mean ± Sd	p-value
Difference between aided and unaided scores	Moderate	10	19.60 ± 10.72	0.203
	Moderately severe	9	35.11 ± 12.56	
	Severe	26	23.19 ± 14.78	
	Profound	21	27.14 ± 22.61	
Percentage of scores repeated unaided	Moderate	10	64.40±24.37	0.526
	Moderately severe	9	49.67 ± 10.69	
	Severe	26	55.42 ± 21.42	
	Profound	21	50.00±36.95	
Percentage of scores repeated aided	Moderate	10	84.00 ± 23.60	0.777
	Moderately severe	9	84.78 ± 6.69	
	Severe	26	78.81 ± 17.85	
	Profound	21	77.14 ± 30.80	

DISCUSSION

Current study sample of N=66 revealed a mean age of 15.09 ± 5.32 years with majority (68.26%) being males with most (39.4%) having severe HL and 95.5% using digital hearing aids. There was a significant (p=0.000) differences between the "unaided" (Median IQR=54, IQR=35) and "aided" (Median IQR=80, IQR=20) categories, and "unaided" category had lower scores, higher variability, and a higher mean rank compared to the "aided" category. Similarly, an Egyptian study conducted by Ezzat *et al.*, in 2022 revealed correlation between language skills and degree of hearing loss in preschool children. It showed that the longer time the hearing aid was being worn by the subject the better his results were. The results of the study reinforce the results of current study which also shows the importance of using hearing aids on a daily basis [20]. This was also supported by a study performed by Cox *et al.*, in 2017 which checked if hearing aids showed improved listening ability according to the patient's point of view. The listening ability was significantly improved which is in accordance with our study which also shows improvement in listening ability while using hearing aids [21]. In 2015 Woods *et al.*, studied older HI population and found that older population revealed small improvement in sentence reception threshold i.e., 2.0 dB following HA fitting, however our study was directed towards students and older groups were excluded [22]. Secondly, current study shows that the difference between aided and unaided scores was more pronounced in the moderately severe category and hence, children with moderately severe category of hearing loss benefitted the most from hearing aids. Similarly, a study conducted by Harris and Terlektsi which assessed listening skills of children, with one group of children using hearing aid and the other cochlear implanted children [23]. The Cochlear implanted children had profound hearing loss and hearing aid group had hearing losses less than profound degree. The results showed that best performance was shown in children with hearing aids. It showed even better performance than cochlear implant group. Which supports our results as our results showed best performance in children with moderately severe hearing loss. Another study conducted by Jarollahi *et al.*, In Persian speaking children tested the listening skills of severe to profound hearing-impaired children and compared it with the listening skills of normal hearing individuals. The group with normal hearing children showed better results than the group with severe to profound hearing-impaired children [24]. This study shows how listening skills are affected by hearing loss which can also adversely affect academic performance, and thus shows the importance of getting hearing aids and wearing them. Similarly, Ohlenforst *et al.*, in their review concluded that HI augment the listening efforts required to perceive speech and there were no evidences in literature which could prove that HA decrease the effort of listening [25]. This also supports our study, in which aided listening has been proved to be much better than unaided listening and is also supported by a study performed by Svirsky *et al.*, which highlighted that HI patients may depend on better quality signal which in their study was provided by unilateral cochlear Implant, following which some patients may start neglecting the input derived from the other ear [26].

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CONCLUSIONS

Study concluded that there was substantial improvement in the listening skills of participants with hearing aids on as compared to without hearing aid with children having moderately severe category of hearing loss benefitting the most from hearing aids.

Authors Contribution

Conceptualization: GS
Methodology: IA, MM
Formal analysis: IA, MM
Writing-review and editing: AM, MAS

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Conflicts of Interest

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Original Article

The Frequency of Gangrenous Infarction of Intestine in Patients Undergoing Intestinal Resection at Tertiary Care Hospital, Rawalpindi

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ABSTRACT

Gangrenous bowel or dead bowel most often occurs as a result of hernia, adhesions, and mesenteric insufficiency. Intestinal gangrene due to acute mesenteric vascular events requiring surgery is one of the most common surgical emergencies at tertiary care hospitals. **Objective:** To determine the frequency of gangrenous infarction in patients undergoing intestinal resection at a tertiary care hospital. **Methods:** This descriptive cross-sectional study was conducted in the Department of Surgery and Pathology, Rawalpindi, Pakistan. A total of 140 resected intestinal specimens were included in this study. Data were entered and analyzed using SPSS v. 23. o. Descriptive statistics were applied and a P-value <0.05 was taken as statistically significant. **Results:** Out of 140 samples, clinical specimens from 30(21.4%) patients were found to be gangrenous. The frequency of gangrene was slightly higher in females 16(53.3%) as compared to males 14(46.7%) with a peak of 19 patients(63.3%) in the age group of 31 to 60 years and mostly affecting the small intestine 21(70%). Among the total of 110(78.6%) non-gangrenous specimens; mild inflammatory changes, perforation, ulceration, tumors, mucosal and mural infarction, infection, reactive hyperplasia, and autolytic changes were noted. **Conclusions:** The frequency of intestinal gangrene is much higher in our population than in most regions of the world, slightly more common in females as compared to males with a peak in the age group of 31 to 60 years and mostly involving the small intestine, indicating negligence towards this important problem.

INTRODUCTION

Bowel infarction, also known as gangrenous bowel, is an irreparable lesion to the gut caused by insufficient blood supply. It is classified as an emergency because it has the potential to cause life-threatening illness and death [1]. The prevalence of gangrenous transformation has been reported to be high in the developing world [2, 3]. It is a fatal disorder, and despite all efforts to improve early detection and treatment, fatality rates in people with this syndrome remain high [4-6]. Many healthcare professionals now share the pessimistic view expressed over 70 years ago regarding this medical condition. Various factors, including the presence of coexisting conditions, advanced age, delayed presentation (beyond 24 hours), hypotension, tachypnea, hypoxia, multiple system failures, extensive resected gangrenous bowel (over three feet in length), 100 cm of remaining viable bowel, the need for a second-look surgery, surgical complications, and more than one mesenteric arterial involvement, have been identified as negative predictors of mortality [7]. Another factor contributing to the high mortality rate is the delay in seeking emergency care after the onset of symptoms, leading to a delayed start of treatment [8, 9]. Common causes of gangrenous infarction include hernias, adhesions, and mesenteric insufficiency [10]. Intestinal

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gangrene due to acute mesenteric vascular events, requiring emergency surgery, is frequently encountered in tertiary care teaching hospitals [7]. Acute mesenteric vascular events may be thrombotic, embolic, vasospastic, or related to venous thrombosis [11]. Conditions such as atrial fibrillation, rheumatic valvular heart disease, prosthetic valves, infective endocarditis, and Q fever endocarditis of the aortic valve are associated with embolic events [12]. Thrombotic events, more common than embolic events, result from generalized atherosclerosis, hyperlipidemia, diabetes mellitus, and hypertension [4]. Patients with these events often present with nonspecific signs that are disproportionate to symptoms, making early diagnosis challenging [13]. Unfortunately, mortality rates remain high, ranging from 50-70% [14]. In cases of advanced age, blood vessels undergo atherosclerosis, a common occurrence in the Western world. This condition can lead to sudden blood flow obstruction by an embolus in the superior mesenteric artery, potentially causing bowel infarction. If the ischemia is total or near-total, transmural infarction develops within 8–16 hours. This period is critical for diagnosing the condition and implementing appropriate measures to prevent bowel infarction. Beyond this timeframe, the only option is the surgical removal of dead bowel, and prognosis depends on the extent of bowel necrosis [15].

The study's objective is to determine the frequency of gangrenous infarction in patients undergoing intestinal resection at a tertiary care hospital.

METHODS

This descriptive, cross-sectional study was conducted in the Department of Surgery and Pathology, Rawalpindi, Pakistan from January 2016 to May 2018. This study was approved by the Ethical Review Board of Rawalpindi Medical University. The study was 1st approved by the departmental review board followed by the approval from the institutional review board. The reference number is SUR-82-46-23 dated 27-12-2015. A total of 140 resected intestinal specimens of patients were selected using the non-probability consecutive sampling technique and their records were reviewed. Sample size calculation was done through WHO sample size calculator by taking 95% confidence interval and 5% margin of error, a total of 140 sample size was calculated. All the patients who underwent surgery for intestinal resection were included in this study. Patients with age between 18-60 years were included in the study. All patients with the plan of laparotomy and intestinal resection for any acute or chronic abdominal pathologies were enrolled in our study. The patients who had surgery without intestinal resection were excluded. Patients with ages less than 18 years and more than 60 years were excluded. Patients who were not willing to participate were also excluded from the study. Histopathological examination of the specimens was conducted by the Department of Histopathology following appropriate staining (hematoxylin and eosin staining). Information regarding laboratory ID number, gender, age, and histopathological findings of patients were recorded on a proforma. Gangrenous infarction of the intestines and other findings were noted as per histopathology reports and also operative findings. Data were entered and analyzed using SPSS v. 23. 0. Descriptive statistics were applied and a P-value <0.05 was taken as statistically significant. For all the categorical variables, frequencies and percentages were calculated whereas for continuous variables, means and standard deviation (SD) were calculated.

RESULTS

A total of 140 samples, 66(47.1%) male and 74(52.9%) female patients were included in this study. The age of the patients ranged between 2 to 90 years with a mean age of 39±16.2 years. Anatomically, 69(49.3%) were small intestine resections, 53(37.9%) were large intestine resections and 18(12.8%) were both/ileocolectomy resections. Clinical specimens from 30(21.4%) patients were found to be gangrenous as shown in Figure 1.

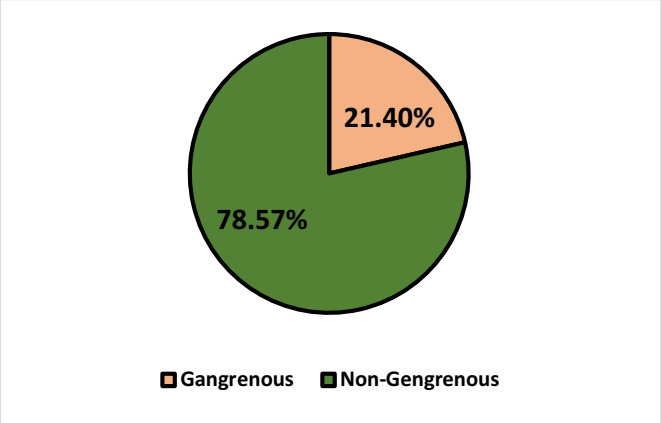

Figure 1: Showing the percentages of the patients with and without gangrenous intestines

The frequency of gangrene was higher in female patients 16(53.3%) as compared to male patients 14(46.7%) as shown in table 1. Among patients with intestinal gangrene, 6(20.0%) patients had ages ranging from 1 to 30 years, 19(63.3%) patients had ages ranging from 31 to 60 years while only 5(16.7%) patients had ages ranging from 61 to 90 years which are shown in table 1. 21(70%) patients had gangrene present in the small intestine while 5(16.7%) patients had gangrene affecting both the large and small intestine and 4(13.3%) patients had gangrene affecting the large intestine as shown in table 1.

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Table 1: Distribution of Gangrene by age groups, gender, and intestinal type/anatomical site in the resected intestinal specimen examined

Total (n=140)		Gangrenous (n=30)	Non-Gangrenous (n=110)
Age groups (In years)	1-30 (n=52)	6 (11.5%)	46 (88.5%)
	31-60 (n=66)	19 (28.8%)	47 (71.2%)
	61-90 (n=22)	5 (22.7%)	17 (77.3%)
Gender	Male (n=66)	14 (21.2%)	52 (78.8%)
	Female (n=74)	16 (21.6%)	58 (78.4%)
Type of intestine	Small intestine (n=69)	21 (30.4%)	48 (69.6%)
	Large intestine (n=53)	4 (7.5%)	49 (92.5%)
	Both/Ileocolectomy (n=18)	5 (27.7%)	13 (72.3%)

Among the total of 110(78.6%) non-gangrenous specimens, frequency of mild inflammatory changes, perforation, ulceration, tumors, mucosal and mural infarction /ischemic changes/ischemic infarction, infection, reactive hyperplasia and autolytic changes were 62(44.3%), 18(12.9%), 10(7.1%), 10(7.1%), 7(5%), 1(0.7%), 1(0.7%) and 1(0.7%) respectively as shown in Table 2.

Table 2: : Distribution of other pathologies besides gangrene in the resected intestinal specimen examined

Histopathological changes	Frequency (%)
Gangrene	30 (21.4)
Autolytic changes	1 (0.7)
Ulceration	10 (7.1)
Tumor	10 (7.1)
Reactive hyperplasia	1 (0.7)
Perforation	18 (12.9)
Presence of mucosal and mural infarction	7 (5.0)
Infection	1 (0.7)
Inflammation	62 (44.3)
Total	140 (100)

DISCUSSION

Our findings suggest that the frequency of gangrenous infarction is much higher in our population than in most regions of the world [16, 17], peaking at the age group of 31 to 60 years and most commonly involving the small intestine. Our study rendered the role of gender in the frequency of occurrence of gangrenous infarction as insignificant and subject to further research. Patients with intestinal gangrene due to acute mesenteric vascular event requiring surgery is one of the most common surgical emergencies [7] and despite all attempts towards early diagnosis and treatment mortality in such patients remains high [7]. Surgery for acute abdominal conditions in emergency wards is the most efficient cost-effective public health intervention [18]. With increasing awareness among physicians in the fields of gastroenterology as well as abdominal and vascular surgery, there has been a significant reduction in acute mesenteric ischemia-related mortality from 90 to 50% in the last 30 years [19]. In our study, 30/140 samples (21.4%), showed the presence of gangrenous infarction. We observed a higher number of cases of gangrenous infarction in our study as compared to previously completed local and international studies. In a local study carried out in Lahore, Yusuf et al., reported 9/120 (7.5%) cases of hemorrhagic infarction and gangrene [3]. In a study conducted in India, it was reported that 7/124 (5.6%) samples showed ischemic bowel disease with microscopic features of gangrene and perforations with ulceration, hemorrhage, and necrosis [16]. Another international study based in Turkey, Atamanalp et al., concluded that Sigmoid gangrene is a potentially catastrophic complication of Sigmoid Volvulus and develops in 6.1% to 30.2% of all such cases [17]. It is noted that the frequency of gangrenous infarction is much more common in developing countries, [3] and while our study should correspond more closely to the local study, the reason for the difference in results can be speculated to be due to the variation in duration of studies as well as the sample size. Such markedly increased frequency of gangrenous infarction in our setting can be indicative of late presentation of patients which could be on the grounds of paucity of specific signs, lack of awareness and understanding, as well as poor transportation facilities. Furthermore, in case of total or near total ischemia, it takes 8–16 hours to develop transmural infarction. This is, thus, the golden time during which the diagnosis must be made, and appropriate actions should be taken to prevent bowel infarction [15]. Since the symptoms mimic other similar conditions like appendicitis, this also leads to further difficulty in diagnosis. Hence, a delay in diagnosis or a lack of diagnostic surgical facilities in local health units, as well as a lack of understanding of pathophysiology amongst the doctors and pathologists can also be speculated as the cause for this increased occurrence of cases of gangrenous infarction in our tertiary care hospital. The incidence of gangrenous infarction increases with age [20, 21] and usually affects patients in higher age groups who have multiple comorbid conditions [22]. Following this, our study showed that gangrenous infarction is most common amongst the age group of 31-60 years with 63.3% cases. 20% of cases were seen in the age group of 0-30 years, and 16.67% amongst 61-90 years. These findings correlate with other studies regarding this topic. In an international study, carried out in India, out of the 7 patients with ischemic bowel disease, 5 were in their 4th-5th decade of life while the remaining 2 were in their 6th and 8th decade [16]. Another study, also based in India demonstrated that 5/9 patients with intestinal ischemia were aged more than 41 [20]. This increase in frequency during the age group of 31-60 can be because thromboembolic events are frequently seen in later decades [20] and a sudden obstruction of

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blood flow by an embolus in the superior mesenteric artery is likely to impair blood flow enough to cause bowel infarction [15]. Moreover, based on the World Bank census of 2016, life expectancy in Pakistan is 66.48 years, thus most of the elderly people fall in 31-60 years possibly exaggerating the findings. This, along with the fact that most of our specimens were from patients in this age group can be speculated to be the reason behind the increased frequency of cases in this age interval. In terms of the correlation between gender and cases of gangrenous infarction, our study showed 53% of cases to be female while 47% were males. One can hence deduce that the difference is not drastic, and can be because the majority of cases in our study were females. Our results complement a study carried out in Turkey, (Males: 61.8 vs. Females: 59%) in which it was concluded that there was no correlation between gender and bowel gangrene [16]. In a study conducted in India, Male to female ratio was 4:1 25, while a study based in Uganda also observed that more males (63.6%) had gangrene compared to females (36.4 %). This difference in result can be speculative of the fact that both India and Uganda are developing countries with a lack of gender equality and thus poor concern towards the health of women leading to a possible lack of presentation of female patients. However, it is imminent that further exploration is required in terms of the variable of gender and its relationship with the frequency of occurrence of gangrenous infarction. Moving onto the section of the intestine most affected by gangrene, it seems that the colon seems to be affected less often by ischemia than the small intestine [15]. In our study, 70% of cases with gangrene were found in the small intestine, 13.33% in the large intestine while 16.67% of cases involved both large and small intestines. This can be reasoned to the fact that the majority of specimens in our study were from the small intestine because a higher number of intestinal pathologies such as ischemia and perforation are found in the small bowel, leading to the high number of small intestine resection [20]. Another local study carried out in Lahore, correlates with our results by demonstrating 67% cases from the small intestine while 33% cases from the large intestine [3]. During our study, we came across several pathologies of the intestine with gangrene being the second most common (21.4%) after general inflammatory changes (44.3%). Other pathologies included Perforation (12.9%), Ulceration (7.1%), Tumor (7%), Mucosal and Mural infarction (5%), Autolytic changes (0.7%), Reactive hyperplasia (0.7%), and Infection (0.7%). Based on the results obtained from this study and other similar research, we would recommend that a detailed histopathological study of the intestinal specimens should be done in constant correlation with the clinical and radiological findings for an accurate diagnosis. Furthermore, more research needs to be carried out in regards to determining the various presenting symptoms of different intestinal pathologies, to help limit the development of gangrene. Moreover, both the physician and surgeons must increase their knowledge and awareness about this deadly complication besides keeping it as an important differential diagnosis of abdominal pain in mind to reduce the rate of misdiagnosis and save precious time as well as the lives of patients as suggested in recent studies as well [14].

CONCLUSIONS

The frequency of intestinal gangrene is much higher in our population than in most regions of the world, slightly more common in females as compared to males with a peak in the age group of 31 to 60 years and mostly involving the small intestine, indicating a lack of early diagnosis and appropriate interventions to avoid this complication. More study is required to be conducted in our region and adequate measures are to be taken to eradicate this serious problem.

Authors Contribution

Conceptualization: MR, KW, MM, AN
Methodology: MR, KW, MM, AN, AM
Formal analysis: AM, MSH, AH, AA, AR, SA
Writing-review and editing: MR, KW, MM, AN, AM, MSH, AH, AA, AR, SA

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Conflicts of Interest

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Original Article

Unveiling Pelvic Floor Health: Understanding Awareness, Perspectives and Habits in Pakistani Women of Reproductive Age

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ABSTRACT

The pelvic floor, a crucial anatomical structure supporting pelvic organs, is vital in various physiological functions. Pelvic Floor Dysfunction (PFD) encompasses disorders affecting pelvic floor muscles and is a significant health concern globally. Pelvic floor muscle training (PFMT) has been advocated for managing PFD, especially in women post-childbearing. However, there is a lack of awareness and understanding regarding PFMT in Pakistani women. **Objective:** To assess the Knowledge, Attitude, and Practice (KAP) towards PFMT among women of childbearing age in a rural health centre in Haripur, Pakistan. **Methods:** A cross-sectional study was conducted at a Rural Health Center in Haripur, Pakistan, involving 158 women aged 20 to 50. A structured questionnaire covered KAP's details regarding PFMT. Data analysis employed SPSS 26.0, utilizing mean and standard deviation. **Results:** The study revealed a response rate of 52.6%, with a mean age of 30±7.3 years for participants. Notably, 29.1% of women reported an inability to control their urine. Knowledge assessment showed that 54.9% of participants knew pelvic exercises and their potential benefits. Attitude towards PFMT was positive in 41.8% of women, while only 20.5% practised PFMT regularly. Pregnant women exhibited a higher prevalence of urinary incontinence. **Conclusions:** The study concludes that a substantial proportion of women in Pakistan lack awareness of PFMT benefits, leading to inadequate practice. This underscores the importance of implementing awareness programs and training sessions targeting women of childbearing age to address the challenges posed by PFD effectively.

INTRODUCTION

The pelvic floor, or the pelvic diaphragm, is composed of ligaments, muscles and fascia; their precise integration and coordinated activity is indispensable to support organs and their activity in the pelvic floor. These include reproductive organs, bowels (intestines), and bladders [1]. In addition to providing support to abdominal viscera, there are three primary functions of pelvic floor muscles, which include; (i) continence or constrictor mechanism anal, urethral and vaginal orifices, (ii) Support vaginal contractions and blood flow during sexual intercourse, (iii) Support vaginal delivery during labor [2]. Pelvic floor dysfunction (PFD) refers to the inability to control and coordinate the activity of pelvic floor muscles. PFD includes a wide range of clinical disorders, including chronic pelvic pain, sexual dysfunction, strained defecation, frequent urge to urinate and urinary incontinence [3]. It's a severe health issue that affects women of all ages throughout the world. It has been reported that at least 2% of women suffer four disorders associated with PFD, and approximately 40% face at least one PFD-related disorder, which is very high [4]. PFD has severe consequences for the overall physical and mental well-being of women, slowly compromising their quality of life and resulting in a loss of confidence to socialize and less participation in various leisure activities. The signs and harms of PFD are vital to be understood by women, especially of childbearing age [5]. The pelvic floor functions best when the muscles are healthy enough to release fully after the state of full contraction. Pelvic floor muscle training (PFMT), also called Kegels, has been widely prescribed by medical practitioners to treat sexual dysfunction and urinary incontinence problems in women,

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especially during the postpartum period [6]. PFMT involves practising different contracting and relaxing pelvic floor muscle exercises in various combinations and time durations to strengthen the control and coordination of this group of muscles [7]. During exercise, the pelvic floor muscle lifts upwards and squeezes around the urinary orifice, suppressing detrusor activity. PFMT strengthens pelvic floor muscles and has been observed to improve the fecal and urinary continence and overall sexual health of women [8]. Most studies were conducted in Western countries to analyze women's practices, attitudes and Knowledge (PAK) about PFD. The data on these studies from the Pakistani population is very scarce as most of the time, it goes undiagnosed due to a lack of awareness of this disorder [9].

Therefore, the present study was conducted in the Gynecology and Obstetrics department at Rural Health Center, Haripur, Pakistan, to analyze PAK about PFD among women of reproductive age in Islamabad, Pakistan.

METHODS

This cross-sectional study was performed at the Rural Health Center, Haripur, Pakistan. The study was conducted from 1 November 2023 to 15 December 2023 for a duration of 1.5 months. In total, 158 female inpatients and outpatients of reproductive age were included in the study by convenience sampling [10]. The inclusion criterion included (i) women aged 20 to 50 and (ii) consent of participation in the study. The exclusion criterion included patients who could not complete the questionnaire because of (i) lack of ability to read or write and (ii) psychological issues. Written consent was obtained from all study participants before the questionnaire's completion [11]. Investigators designed the questionnaire based on four categories reported in a previous study and consisting of 17 questions. The four categories comprised personal questions (5 questions), questions on Knowledge (4 questions), attitude (4 questions) and practice (4 questions). The gravity of the problem and general understanding of PFMT were analyzed by asking one fundamental question: (i) Can you control your urine? The Knowledge, attitude, and practice levels were analyzed using the questions in the table below (Table 1).

Table 1: Knowledge, attitude and practice questions that were included in the questionnaire to collect KAP data from participants

Sr. No.	Questions
	Knowledge
A	Do you know pelvic exercise will improve your uterus health?
B	Do you think PFMT can improve your sexual health?
C	Do you think you have to perform PFMT?
D	Do you know pelvic exercise can bring positive change in your life?
	Attitude
E	Do you often hold your urine for a long time?
F	Do you think exercise should be part of your daily routine?
G	Do you believe in taking oral medicine?
H	Do you believe exercise is less effective than oral medicine?
	Practice
I	Did you perform pelvic exercises once in a week?
J	Did you notice your sitting posture?
K	Did you follow any instructions given by the doctor for pelvic health?
L	Did you ever get PFMT?

"Yes" was awarded 1 point for each question, while "No" was given 0. The hardcopy questionnaire was distributed among patients after receiving their formal consent when they visited the gynaecology department of Shifa International Hospital. The patients willing to participate in the study were provided a quiet and comfortable place to complete the questionnaire.

RESULTS

The response rate of this study was 52.6%, as only 158 women out of 300 were willing to participate. The mean age of all willing participants was 30±7.3 years. Responding to one basic question asked by participants, we found that 29.1% of women cannot control their urine. Most women were well-educated, non-pregnant and had 2-4 children. Table 2 shows the characteristics of participants in this study.

Table 2: Characteristics of study participants, including education level, parity, pregnancy status and no children.

Variables		N (%)
Level of education	Vocational	12 (7.59)
	Primary	27 (17.08)
	Secondary	65 (41.13)
	Bachelors	45 (28.48)
	Masters	9 (5.7)
Pregnancy status	Pregnant	43 (27.2)
Job status	Working	45 (28.48)
No of children	No Children	30 (18.98)
	1	25 (15.82)
	2-4	80 (50.63)
	5 Or more	23 (14.55)

Table 3 below shows the number of participants who responded "Yes" to KAP questions.

Table 3: Questions asked from participants and the percentage of their positive response regarding each question

Questions	Positive response
A	85
B	61
C	76
D	125
E	129

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F	43
G	85
H	76
I	10
J	98
K	16
L	6

In the light of this study, the results are reported as a bar graph. As demonstrated in Figure 1, from the knowledge aspect, 53.8% of women thought PFMT could improve their uterus health (A), 38.7% of women knew that PFMT could enhance their sexual health (B), 48.1% of women thought they have to perform pelvic exercises (C) and 79.1% knew that PFMT could bring positive change in their life (D). Overall, the respondents had 54.9% knowledge of pelvic exercises and their promising effects.

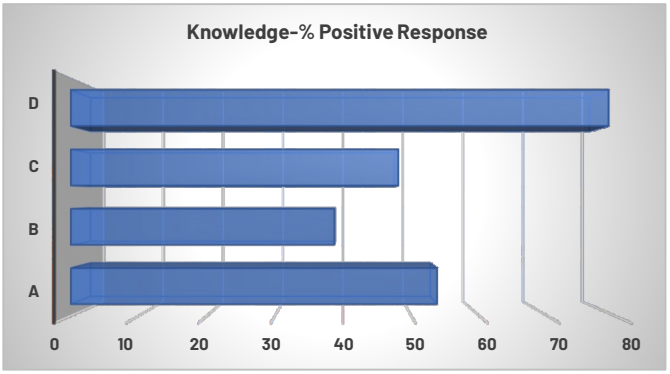

Figure 1: Bar graph for questionnaire data on participants' Knowledge of PFMT

Figure 2 shows the response to questions highlighting the attitude of participants towards PFMT, and it was observed that 81.6% of women hold their urine for a long time (E), 27.2% agreed that it should be part of daily routine exercise(F), 53.7% believed in taking oral medicine for PFD (G), while 48.1 % were of opinion that exercise is less effective than oral medicine (H). Overall, 41.8% of participants had a positive attitude towards practising and believing in the health benefits of PFMT.

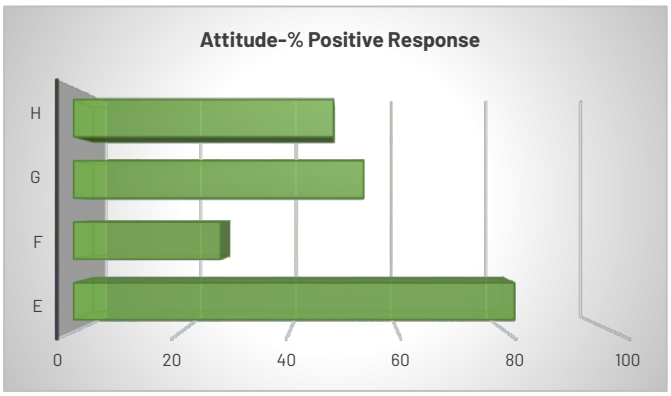

Figure 2: Bar graph for Questionnaire data on the attitude of women towards PFMT

As shown in figure 3, for the practice part of the survey, only 6.3% performed PFMT exercises once a week (I), 62% were aware of their normal sitting posture (J), 10.1% followed instructions provided by a gynaecologist to improve pelvic health (K) and only 3.79% participants ever received PFMT in their life. Overall, 20.5% of the practice level for pelvic exercises was observed in participants.

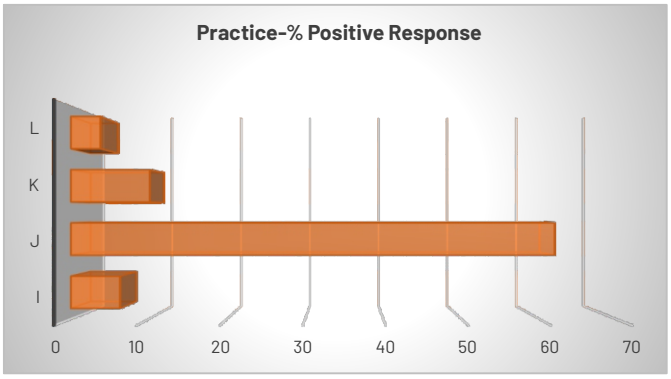

Figure 3: Bar graph for Questionnaire data depicting the practice aspect of PFMT in participants

We analyzed that the majority of women who were suffering from urinary belonged to the age bracket of 36 ± 6 years ($p>0.05$), belonged to the working class and that problems related to urinary incontinence did not significantly increase with parity ($p>0.05$). Urinary incontinence was more common in pregnant women as compared to non-pregnant women ($p>0.05$).

DISCUSSION

Urinary incontinence is a very prevalent problem in women of reproductive age. Pelvic floor muscle disorder reduces both urine and faecal incontinence in women, compromising their overall quality of life [14]. PFMT has proved to be a problem solver, and women undergoing PFMT have reported significant improvement in their sexual health, mental health, dealing with urinary incontinence and other discomforts linked with PFD [15, 16]. In pregnant women, it has been reported that PFMT has a pivotal role both in the antenatal and postnatal period, and it is imperative to educate all women about its promising effects [17]. Unfortunately, most women were unaware of these exercises and the benefits they can bring to their health. Most of these participants were very optimistic about practising their exercises when they were educated on the benefits they could gain from PFMT. Our findings are relevant to observations reported by another study conducted to carry out KAP analysis on pregnant women visiting the Gynecology Department KRL (Kahuta Research Laboratories), Islamabad. Most of these women were unaware of PFMT, and those who had Knowledge about PFMT did not know how to perform these exercises to gain the maximum healthy outcome [9]. Our findings also

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highlight that most of the women considered urinary incontinence normal during pregnancy and after vaginal delivery. In another study conducted across Lahore, only 12% of women were willing to participate in these exercises to recover from PFD, which shows a staggering lack of awareness and training on the health benefits of PFMT among the masses. This study also reported that approximately 80% of women did not know about PFMT, following our findings, which report that only 20% of women knew about PFMT [18]. If we ponder upon the practice part of this study, the results are quite concerning, as only 3.79% of women had ever received PFMT, and only 6.1% practised these exercises once a week. On the other hand, only 10% of women followed instructions provided by gynaecologists about PFMT. The results for Knowledge (54.9%), attitude (41.8%) and practice (20.5%) levels can be compared with a similar study conducted by Jarni et al., at the Obstetrics and Gynaecology Clinic at Sultan Ahmad Shah Medical Centre, Malaysia. The reported participants had comparatively similar levels of Knowledge (52%) as presented by our study, and the attitude score was 58.9%, which is higher than our research findings. In comparison, the practice level was 70% among participants, which shows a considerable difference as our participants had only 20.5% practice level in terms of PFMT [19]. In another study conducted in Malaysia at a primary care clinic, the response rate for this study was 72.1%, relatively much higher than our reported response rate of 52.6%. This shows the overall understanding of the severity of the problem among women of childbearing age in Pakistan. The reported results showed scores of 58% for Knowledge, 46.4% for attitude and 45.2% for practice, which are relatively similar. It can be observed in the studies mentioned above that the gap between Knowledge and practice is not very high, which points towards better practical implications of Knowledge on PFMT, unlike our study where we can see a massive gap between Knowledge (54.9%) and practice (20.5%) of PFMT [20]. This points out the need for reinforcement sessions and a proper campaign on a larger scale to highlight the undermined problem of PFD and educate the masses on treating these dysfunctions with PFMT. Also, we observed during the literature survey that most studies focused on pregnant women only. Our results highlight the fact that many non-pregnant women also face urinary incontinence problems. Therefore, more KAP surveys for inclusion of data on non-pregnant women must be conducted to get precise estimates of PFMT knowledge, attitude and practice in the Pakistani population.

CONCLUSIONS

In light of this study, we conclude that the majority of the women are unaware of the benefits of PFMT, which points towards a lack of educational campaigns on the serious issue of PFD. Among those who had adequate Knowledge of PFMT, they could not follow instructions properly and practice it regularly owing to their busy schedules and exertion following a hectic day. We recommend that awareness programs and training should be introduced to women of reproductive age to enable them to tackle the chronic discomforts of PFD.

Authors Contribution

Conceptualization: AI
Methodology: IB
Formal analysis: AI, IB
Writing-review and editing: AI, IB
All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

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Original Article

Change in Corneal Astigmatism After Phacoemulsification with Rigid Intraocular Lens Implantation

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ABSTRACT

Phacoemulsification with lens implant is the preferred method of cataract extraction nowadays. In resource-deficient settings, rigid polymethyl methacrylate (PMMA) lenses are implanted which require enlargement of corneal incision to 5.5mm. **Objectives:** We conducted this study to evaluate the effect of corneal incisions secured with a single suture on corneal astigmatism after routine cataract surgery. **Methods:** It was a quasi-experimental study conducted at tertiary care hospitals. Sixty patients were studied and preoperative visual acuity and keratometry readings were noted. After standard phacoemulsification, a 5.5mm rigid PMMA lens was implanted in the bag, and the corneal incision was sutured using a single central 10/0 nylon suture. Visual acuity and keratometry readings were noted on 1st postoperative day, 1-week postoperatively, and 6-weeks postoperatively and compared with pre-operative values. **Results:** The mean age was 59.27 ± 10.72 (range: 46 – 78) years. There were 32 (53.3%) males and 28 (46.7%) females in the study. The mean preoperative keratometry reading was 0.89 ± 0.70 D, and the mean first-day postoperative cylinder was 1.94 ± 0.98 D ($p < 0.05$). The mean astigmatism at the 6th week postoperatively was 0.96 ± 0.65 D, and its comparison with the pre-operative astigmatism was statistically not significant ($p > 0.05$). Surgically induced astigmatism was found to be 0.07 diopters. Almost 60% of the patients achieved uncorrected 6/7.5 or better visual acuity, and more than one-third of patients achieved 6/6 best corrected visual acuity six weeks after the cataract surgery using the described technique. **Conclusions:** Phacoemulsification with 5.5mm PMMA IOL with a central single suture is an effective procedure for postoperative astigmatism and visual outcome.

INTRODUCTION

Cataract is the most common cause of reversible blindness worldwide, so cataract extraction is perhaps the most efficient surgical procedure in all of the medicine [1]. In the last 15-20 years, with the use of sophisticated extracapsular cataract extraction (ECCE) and intraocular lens (IOL) implantation, a successful outcome of surgery is predictable [2]. However, the limiting factor in optimum postoperative visual function is often the amount of astigmatism. Surgically induced astigmatism can vary depending on the size and location of the incision, wound closure techniques, and suture material used. Astigmatism produces distortion caused by meridional magnification that may give rise to significant difficulties with binocular function. Every surgeon aims for minimum surgically induced astigmatism for the best visual outcome after cataract surgery [3-6]. Phacoemulsification has become the main surgical procedure of cataract extraction over the past two decades [6, 7]. It is one of the most innovative and popular techniques. It comprises a small incision size, less postoperative anterior chamber reaction, and less surgically induced astigmatism. Foldable lens implantation through a 3.5 mm to 4.0 mm incision significantly reduces postoperative astigmatism, but the main limitation of foldable IOL is their cost in developing countries especially in public hospitals [8].

This study aimed at determining the efficacy of phacoemulsification with implantation of a 5.5mm diameter polymethylmethacrylate (PMMA) intra-ocular

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lens with wound closure using a single central 10/0 nylon corneal suture.

METHODS

It was a quasi-experimental study conducted at the Department of Ophthalmology, Ameeruddin Medical College, Lahore General Hospital, Lahore and Department of Ophthalmology, Allama Iqbal Medical College, Jinnah Hospital Lahore from January 2023 to October 2023, after obtaining approval from the institutional ethical review board (ERB) of the same institution vide letter No. ERB/AIMC/203/102 dated 02/01/2023. Sixty patients were included in the study using consecutive non-probability sampling. We only included patients above 40 years of age presenting with senile cataracts. Patients with complicated cataracts, with a history of ocular surgery like pterygium excision, trabeculectomy, scleral buckling, corneal transplantation, or having other diseases like uveitis, keratoconus, glaucoma were excluded from the study. We got written informed consent from each study participant. Demographic information like name, age, and sex were recorded on a special proforma. Data was divided into pre-operative and postoperative variables. Preoperatively, a complete ophthalmic examination was performed. This included assessment of visual acuity using Snellen's chart, slit-lamp examination, intraocular pressure measurement using Goldman's applanation tonometer, dilated retinal examination, and keratometry readings using Topcon KR-8900 (Topcon Inc., Japan). The patients underwent a standard phacoemulsification procedure using Oertli Catarhex 3 (Oertli, Switzerland) phacoemulsifier. All the surgeries were performed by the same surgeon (SJ). Post-operative visual acuity, slit lamp examination, and keratometry readings were noted on 1st postoperative day, 1st week, and 6th week postoperatively. We analyzed the data using statistical software, SPSS version 23.0. Means were calculated for postoperative visual acuity and keratometry readings. The positive cases for astigmatism and the level of astigmatism were presented as proportions and categories. The gradient of astigmatism was assessed and reported as the level of variable change. A chi-square test was used for the presence of astigmatism and level of astigmatism, and a paired sample t-test was applied for pre- and post-operative visual acuity and keratometry readings. A p-value < 0.05 was taken as statistically significant.

RESULTS

This study was conducted on 60 cases. The mean age of the patients was 59.27 ± 9.72 (range: 46 – 78 years). There were 32 (53.3%) male patients and 28 (46.7%) female patients in the study (Table 1).

Table 1: Age distribution and pre-operative visual acuity of study population (N = 60).

Age (years)	Frequency (%)
40-50	17 (28.3)
51-60	19 (31.7)
61-70	20 (33.3)
71-80	4 (6.7)
Total	**60 (100)**
Mean ± SD	59.27 ± 10.72

The visual acuity of the study population is given in table 2. Almost 47% of the patients had hand motion or finger counting pre-operative visual acuity. At six weeks post-operatively, more than 58% of the patients achieved 6/7.5 or better visual acuity. After refraction, more than one-third of the patients were able to experience normal visual acuity of 6/6 in the operated eye.

Table 2: Comparison of pre-operative with uncorrected and best corrected visual acuity at 6-weeks after phacoemulsification.

Visual Acuity		Frequency (%)
Pre-Operative	6/18	2 (3.3)
	6/24 – 6/60	24 (40.0)
	5/60	4 (6.7)
	HM / CF	28 (46.7)
	PL +/ PR	2 (3.3)
Uncorrected	6/6	5 (8.3)
	6/7.5	35 (58.3)
	6/9	12 (20)
	6/12	6 (10)
	6/18	2 (3.4)
Best Corrected	6/6	40 (66.7)
	6/7.5	12 (20)
	6/9	5 (8.3)
	6/12	3 (5)
	6/18	0 (0)

HM: Hand motion
CF: Counting finger
PL+: Perception of light present
PR: Projection of light

The astigmatism was assessed from keratometry reading as shown in table 3. The mean ± SD preoperative cylinder was 0.89 ± 0.70 diopters cylinder (DC). whereas the mean post-operative astigmatism at 1st post-operative day, 1st post-operative week and 6th post-operative week was found to be 1.94± 0.98, 1.35± 0.84 and 0.96± 0.65 DC respectively. The difference in the preoperative and first and 7th post-operative day astigmatism was statistically

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significant ($p < 0.05$). However, the difference between the pre-operative and 6th-week post-operative keratometry readings was statistically not significant ($p > 0.05$).

Table 3: Comparison of pre-operative and post-operative diopter cylinder astigmatism after phacoemulsification.

	Pre-Operative	1st Post-operative Day (N=60)	1st Week Postoperative (N=60)	6th Week Postoperative (N=60)
Diopter Cylinder	**Frequency (%)**	**Frequency (%)**	**Frequency (%)**	**Frequency (%)**
0.0-0.5	23 (38.3)	10 (16.7)	20 (33.3)	21 (35)
0.6-1.0	17 (28.3)	25 (41.7)	15 (25)	19 (31.7)
1.1-1.50	12 (20)	10 (16.7)	13 (21.7)	11 (18.3)
1.51-2.0	8 (13.4)	12 (20)	10 (16.7)	7 (11.7)
2.1-2.5	-	2 (3.3)	1 (1.6)	2 (3.3)
2.5-3.0	-	1 (1.6)	1 (1.6)	0 (0)
Mean	**0.89 ± 0.70**	**1.94 ± 0.98**	**1.35 ± 0.84**	**0.96 ± 0.65**

DISCUSSION

We report here the outcomes of corneal astigmatism after phacoemulsification with rigid intraocular lens implantation using a 5.5mm incision secured using a single suture. We observed significant change in the corneal astigmatism during the first week, however, the change in the post-operative and pre-operative astigmatism was not statistically significant at the end of 6 weeks after the surgery. This trend towards suture-less and small incision surgery results from continuous technical refinements aimed at reducing post-op astigmatism as well as the time necessary to achieve visual rehabilitation [9]. However, any incision above 3.5mm demands the application of corneal sutures to prevent leakage and the risk of exogenous infections in the early postoperative period. Therefore, securing the corneal wound with a single stitch using a 10/0 nylon suture is advised [1, 10]. Foldable IOL implantation is now an established trend for sutureless phacoemulsification as the smaller incisions significantly reduce post-op astigmatism. However, the main limitation of foldable IOLs is their cost in the developing world. That is why multitudes of extracapsular cataract extractions and phacoemulsification with rigid PMMA material are frequently performed in developing countries [8, 10, 11]. Other factors that need to be considered while using foldable IOLs include the lack of long-term follow-up of various materials and designs used for foldable IOLs compared to PMMA lenses and the risk of endothelial cell damage due to unfolding maneuvers [12]. Most surgeons such as Suhartini S et al., prefer using PMMA IOLs with a diameter of 5.5 mm in phacoemulsification through a limbal or scleral tunnel to minimize post-op astigmatism. However, this can compromise the vision by causing glare and unwanted images, especially under scotopic conditions or in the event of decentration [13]. In our study, phacoemulsification was performed through a 3.2 mm incision made temporally with a phaco-knife: in the right eye, phacoemulsification was done through a supertemporal incision and in the left eye through a super nasal incision. Wound enlargement up to 5.5mm was necessary to implant a 5.5mm optic of PMMA IOL. This PMMA IOL was implanted with the help of McPherson Forceps. The wound was closed with stromal hydration of the cornea and stitched in the center with a single 10/0 nylon suture. No attempt was made to alter the preoperative astigmatism during surgery. Analysis of the astigmatic cylinder was restricted to the keratometry cylinder. We observed higher post-operative astigmatic values in the early postoperative period. Mohan RR et al., and Liu L-R et al., explained this by alterations in the corneal biomechanics in the early postoperative period owing to surgical trauma in diffuse corneal edema, stroma edema, epithelial edema, and corneal wound burns [14, 15]. However, with time, the corneal healing mechanism restored the corneal anatomy, and we did not experience a statistically significant difference in the pre-operative and 6-week postoperative keratometry values. Another thing that should be considered is the operating surgeon's experience as shown by Pagano L et al. A tight stitch is bound to yield astigmatism postoperatively. However, an experienced surgeon can apply the stitch so that the change in corneal astigmatism is minimal, as seen in the results of our study [16]. Iftikhar S et al., conducted a similar study at Al-Shifa Trust Eye Hospital Rawalpindi and PIMS Islamabad [17]. They followed patients of phacoemulsification with implantation of 6 mm PMMA IOLs eight weeks postoperatively, and they found 53.7% had astigmatism of <1D, 30.5% had astigmatism of 1-1.5D and 14.81% had astigmatism >1.5D of which 5 had astigmatism <2D [17]. The level of postoperative astigmatism in our study compared favorably with the result of other studies of sutureless phacoemulsification with rigid PMMA IOLs of 6-7mm diameter [18–22]. We suggest future studies with longer follow-ups and measurement of keratometry readings using more advanced instruments like corneal topographers and taking into account pre- and postoperative change in the axis of astigmatism.

CONCLUSIONS

Removing cataracts through a 3.2mm limbal incision by phacoemulsification with necessary wound enlargement up to 5.5mm for PMMA IOL with one suture application is safe. The environment created within the eye during surgery is controlled and stable with minimal complications. The suture produces a very secure and stable wound with minimal leakage and much less chance

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of infection and inflammation. Phacoemulsification with PMMA IOL with a single suture wound closure produces satisfactory visual outcomes and an acceptable level of postoperative astigmatism, so this procedure can be used in poor populations who cannot purchase a foldable IOL.

Authors Contribution

Conceptualization: SJ
Methodology: SJ, MHA
Formal analysis: MHA
Writing-review and editing: UH, MHA, SJ

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

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Original Article

The Rate of Success of CPR in Patients Suffering from Cardiac Arrest in Patients Admitted in CCU in Cardiology Department Ayub Medical Teaching Institute

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ABSTRACT

Cardiopulmonary resuscitation (CPR) is an essential procedure used to treat patients who are in cardiac arrest, particularly in the Critical Care Unit (CCU). Objective: To assess the success rate of CPR admitted to the CCU, revealing insight on the effectiveness of current resuscitation techniques. Methods: This retrospective study was conducted at Department of Cardiology Ayub Medical Teaching Institute, Abbottabad, between 13th April 2023 to 30th November 2023, 110 patients had cardiac arrest while in the intensive care unit. Data were gathered and examined on patient demographics, pre-existing comorbidities, time to start CPR, duration of CPR, and results. CPR success was defined as a sustained restoration of spontaneous circulation (ROSC) for at least 20 minutes. Results: This study included 110 cardiac patients. Most patients (68.18%) were male. Hypertension was the most common comorbidity at 72.7%. CPR started on average 4.8 minutes late, with a 1.2-minute standard deviation. The average CPR time was 18.2 minutes, with a 5.6-minute SD. After cardiac arrest, 60 (54.5%) patients began CPR within 5 minutes. Another subgroup found 96.0% CPR success in 25 (22.7%) ventricular fibrillation patients. Then occurred ventricular tachycardia (80.0%), pulseless electrical activity (76.0%), and asystole (68.9%). These data suggest that CPR works better in ventricular fibrillation patients. Conclusions: This research sheds light on cardiac arrest CCU patients' demographics, care, and outcomes. The data show that early CPR and ventricular fibrillation detection and treatment improve outcomes for these individuals.

INTRODUCTION

Cardiac arrest is a severe medical emergency that has significant consequences for patient outcomes, especially when it happens in the high-intensity setting of a Critical Care Unit (CCU) [1,2]. Cardiopulmonary resuscitation (CPR) is a crucial procedure used to save lives following cardiac arrest. Its main goal is to restore blood circulation and avoid permanent harm to essential organs [3-5]. Although medical technology and critical care techniques have advanced, the effectiveness of CPR in the CCU context is still a difficult and diverse problem [6,7]. The success rates of CPR vary in various clinical circumstances and patient types, despite ongoing attempts to improve resuscitative strategies [8,9]. It is crucial to understand the variables that affect the effectiveness of CPR in the CCU, where patients often have complicated heart conditions and other medical conditions [10,11]. This study aims to fill this significant gap in information by examining the success rate of cardiopulmonary resuscitation (CPR) in a group of 110 patients who were hospitalized to the coronary care unit (CCU) after experiencing cardiac arrest. The CCU functions as a specialist department that focuses on providing treatment for patients with severe

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cardiovascular problems. In this unit, prompt and efficient interventions play a critical role in achieving positive results. Given the frequency of cardiac arrest cases in the CCU, it is crucial to assess the effectiveness of CPR in this particular environment to improve clinical procedures, enhance patient care, and perhaps increase survival rates [12]. This study aims to provide significant insights into the difficulties and achievements of CPR in the CCU, highlighting the significance of variables such as timely commencement of resuscitation, patient characteristics, and the existence of pre-existing medical conditions. By examining these factors, medical professionals may enhance their comprehension of the intricacies related to CPR in the CCU, therefore guiding evidence-based approaches and perhaps enhancing overall patient results in the presence of this crucial medical occurrence.

METHODS

This retrospective study was conducted at Department of Cardiology Ayub Medical Teaching Institute, Abbottabad, between 13th April 2023 April to 30th November 2023. Approval was taken from the research review board dated: 13th April 2023. The medical records of a cohort of 110 individuals who had cardiac arrest while admitted to the Critical Care Unit (CCU) was examined. Demographic information (age, gender), medical history, and details on the cardiac arrest incident were obtained from electronic health records. Pertinent clinical particulars, including the timing of the cardiac arrest, the length of cardiopulmonary resuscitation (CPR), the drugs delivered during resuscitation, and the procedures conducted, were properly documented. The inclusion criteria consisted of adult patients (aged 18 years or older) who were admitted to the CCU and had a cardiac arrest while hospitalized. Exclusion criteria included patients with insufficient medical data or those with a do-not-resuscitate (DNR) status. The main dependent variable was the efficacy of CPR, which was defined as the attainment of sustained Return of Spontaneous Circulation (ROSC) for a minimum duration of 20 minutes. The secondary factors included patient demographics, comorbidities, time elapsed before CPR commencement, duration of CPR, and particular procedures performed during resuscitation. The research population was characterized using descriptive statistics, which included the presentation of the mean and standard deviation for continuous variables and the frequencies for categorical variables. The success rate of cardiopulmonary resuscitation (CPR) was determined by calculating the proportion of patients who achieved sustained return of spontaneous circulation (ROSC). Subgroup analyses were performed to investigate any connections between patient characteristics and outcomes of resuscitation. The research complied with the ethical criteria specified in the Declaration of Helsinki. All obtained data were anonymized and securely stored to ensure patient anonymity. Due to the study's retrospective nature, informed consent was not required. Sample size was calculated using WHO sample size formula taking anticipated proportion of CPR as 85% with 5% margin of error and 95% confidence level. Convenient sampling technique was employed to enroll the participants.

RESULTS

The research comprised 110 CCU patients who had cardiac arrest. Patients averaged 63.4 years old, with a standard variation of 8.7 years. The majority of patients (68.18%) were male. Hypertension was the most frequent comorbidity, with 72.7% of patients having it. Diabetes (31.8%) and coronary artery disease (40.9%) were also frequent. Table-1 shows key demographic features of CCU patients at risk for cardiac arrest, which might influence future study and treatments to improve outcomes (Table 1).

Table 1: CCU Cardiac Arrest Patients' Demographics (n=110)

Parameter	Frequency (%)/Mean + SD
Age (years)	63.4 ± 8.7
Gender	
Male	75 (68.18%)
Female	35 (31.82%)
Comorbidities	
Hypertension	80 (72.7%)
Diabetes	35 (31.8%)
Coronary Artery Disease	45 (40.9%)

Table 2 shows patient cardiac arrest and CPR information. The average delay to start CPR was 4.8 minutes, with a 1.2-minute standard deviation. The average CPR time was 18.2 minutes, with a 5.6-minute standard deviation. The most prevalent first rhythm following cardiac arrest was asystole, 40.9%. Other first rhythms included ventricular fibrillation (22.7%), tachycardia (13.6%), and pulseless electrical activity (22.7%). The majority of CPR patients got epinephrine (95.5%) and amiodarone (54.5%). 81.8% of patients got defibrillation, while 68.2% received advanced airway intervention. These insights on CCU cardiac arrest therapy may guide future procedures and initiatives to enhance patient outcomes.

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Table 2: Details of Cardiac Arrest Events and CPR (n=110)

Parameter	Frequency (%)/Mean + SD
Time to Initiation of CPR (min)	4.8 ± 1.2
Duration of CPR (minutes)	18.2 ± 5.6
Initial Rhythm	
Ventricular Fibrillation	25 (22.7%)
Ventricular Tachycardia	15 (13.6%)
Asystole	45 (40.9%)
Pulseless Electrical Activity	25 (22.7%)
Medications Administered	
Epinephrine	105 (95.5%)
Amiodarone	60 (54.5%)
Interventions during CPR	
Defibrillation	90 (81.8%)
Advanced Airway	75 (68.2%)

The study's main outcome was CPR success, evaluated by ROSC in table-3. Out of 110 cardiac arrest patients, 95 (86.4%) were resuscitated. Patients under 50 had the greatest success rate of 92.0%, followed by those 50-65 (85.7%) and above 65 (82.5%). The success rate for comorbidities was 87.5% for hypertension and 91.4% for diabetes. These findings imply that age and comorbidities may affect CPR effectiveness in CCU cardiac arrest patients. More study is required to understand these aspects and enhance patient outcomes.

Table 3: The Main Outcome is CPR Success (Return of Spontaneous Circulation) (n=110)

Parameter	Frequency (%)/Mean + SD	Success Rate (%)
Overall, Success of CPR	95	86.4%
	Success by Age Group	
< 50	28	92.0%
50-65	42	85.7%
> 65	40	82.5%
	Success by Comorbidities	
Hypertension	70	87.5%
Diabetes	32	91.4%

Subgroup analysis was used to evaluate CPR success based on time to beginning. CPR was started within 5 minutes after cardiac arrest in 60 (54.5%) of 110 patients. This group has the greatest 91.7% success rate. The success rate declined with time to CPR commencement, with 86.7% for 5-10 minutes, 73.3% for 10-15 minutes, and 60.0% for 15 minutes or beyond. These findings show that early CPR improves outcomes for CCU cardiac arrest patients. Future initiatives and methods should reduce CPR beginning time to enhance success rates (Table 4).

Table 4: Subgroup Analysis - Success of CPR Based on Time to Initiation (n=110)

Variables	Frequency	Success Rate (%)
	Time to Initiation (minutes)	
< 5	60	91.7%
5-10	30	86.7%
10-15	15	73.3%
> 15	5	60.0%

The initial cardiac arrest rhythm was used to evaluate CPR effectiveness in another subgroup study. Of the 110 patients, 25 (22.7%) had ventricular fibrillation as the starting rhythm, with 96.0% success. Then came ventricular tachycardia (80.0%), pulseless electrical activity (76.0%), and asystole (68.9%). These findings imply that CPR is more successful in ventricular fibrillation patients than in others. To enhance CCU cardiac arrest outcomes, ventricular fibrillation must be identified and treated quickly. Based on the first rhythm, further study is required to determine CPR success criteria (Table 5).

Table 5: Subgroup Analysis - Success of CPR based on Initial Rhythm (n=110)

Initial Rhythm	Frequency	Success Rate (%)
Ventricular Fibrillation	25	96.0%
Ventricular Tachycardia	15	80.0%
Asystole	45	68.9%
Pulseless Electrical Activity	25	76.0%

DISCUSSION

The results of this study align with other published research on cardiac arrest in the coronary care unit (CCU). The mean age of participants in this research (63.4 years) aligns with the age range described in previous studies, which have shown the typical age of CCU patients who suffer from cardiac arrest to be between 60 and 65 years [13,14]. Moreover, the significant majority of male patients in our study (68.18%) aligns with prior research indicating a higher prevalence of males among CCU patients [15]. Hypertension emerged as the predominant comorbidity in this analysis, aligning with other research that has established hypertension as a significant risk factor for cardiac arrest in the CCU. However, the incidence of hypertension in our research (72.7%) exceeds the rates reported in earlier studies, where hypertension was observed in 50-60% of CCU patients who had cardiac arrest [13,16]. The success rate of cardiopulmonary resuscitation (CPR) in this research, which is 86.4%, aligns with the success rates reported in prior investigations, which have shown success rates ranging from 80% to 90% [17]. However, the subgroup analysis conducted in this research indicated that patients below the age of 50 exhibited a superior success rate of 92.0%, in contrast to patients

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aged 65 and beyond who had a success rate of 82.5%. Contrary to other research, which has shown that greater age is linked to a lower chance of successful CPR [18]. Additional investigation is required to comprehend the variables that contribute to the disparity in success rates across various age cohorts. The subgroup analysis in this research, which considers the time to commencement of CPR, is consistent with earlier studies that consistently demonstrate a positive correlation between early CPR initiation and a better probability of success. The success rate of 91.7% for patients who had CPR within 5 minutes surpasses the success rates recorded in earlier studies, which have shown success rates ranging from 70-80% for prompt CPR [19]. This underscores the significance of promptly initiating cardiopulmonary resuscitation (CPR) in enhancing outcomes for patients in the coronary care unit (CCU) who are undergoing cardiac arrest. The success rate of cardiopulmonary resuscitation (CPR) in this study aligns with past research, continuously demonstrating that ventricular fibrillation has the greatest rate of success. However, the study's success rate of 96.0% for ventricular fibrillation surpasses the success rates reported in earlier research, which have ranged from 80-90% [20]. This might be attributed to variances in patient demographics and treatment procedures.

CONCLUSIONS

This research sheds light on cardiac arrest CCU patients' demographics, care, and outcomes. The data show that early CPR and ventricular fibrillation detection and treatment improve outcomes for these individuals.

Authors Contribution

Conceptualization: SFG
Methodology: SFG, YAS, RB
Formal analysis: SFG, YAS, SJG
Writing-review and editing: SFG, MIK, ZUK, SJG, RB

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

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Original Article

Comparison of Vicryl Rapide versus Chromic Catgut for Episiotomy Repair

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ABSTRACT

A significant proportion of women benefit from episiotomy, but it's also linked with short and long-term postpartum morbidities like perineal pain due to lacerations and scar formation after repair. The current study was designed to rule out the variations regarding pain and gesia requirement. **Objective:** To evaluate outcome of chromic catgut sutures versus vicryl rapide sutures for episiotomy repair in terms of ache and analgesia requirement. **Methods:** In this randomized control trial from March to September 2021, a total of 206 females (103 in each group) were enrolled and the data was collected after taking informed consent. Episiotomy in all females was done by a senior consultant. Subjects were randomly assigned one of two sutures. In Group-A females were managed by vicryl rapide 2-0 (36mm, 1/2circle round bodied needle and double reverse cutting) females. in group-B were managed by chromic catgut 1.0 (30 mm, 0.5 circle round bodied needle). The comparison of both groups was in terms of pain and analgesic requirement. **Results:** Comparison of pain in chromic catgut versus vicryl rapide sutures after repair of episiotomy showed that 32% (n=33) in Group-A and 49.5% (n=51) in Group-B had pain after 48 hours (p value = 0.01). Analgesia requirement at day 7 was recorded in 20.4% (n=21) in Group-A and 66%(n=68) in Group-B (p = <0.000). **Conclusions:** We concluded that vicryl rapide has a better outcome as compared with chromic catgut in repair of episiotomy in terms of pain and analgesic requirements.

INTRODUCTION

Trauma to perineum is defined as an injury to the genitals occurring during process of childbirth that can happen spontaneously or performed through a surgical incision termed as episiotomy [1]. A surgical incision is performed in episiotomy on to the perineum through the last phase of labor for facilitation of delivery [2, 3]. Episiotomy is always classified according to direction, length and timing and the location of the initial point. There are seven types of episiotomy-based on the classification described however, the midline, mediolateral, and lateral are the three types that are routinely performed by obstetricians [2]. Trauma to perineum can be anterior perineal trauma which can cause injuries to anterior vagina, clitoris and urethra. Anterior perineal trauma is associated with less morbidity as compared to posterior perineal trauma in which there is injury to perineal muscles, anal sphincter, or posterior vaginal wall [4]. Spontaneous tears are classified according to depth of tear. First degree tears happen when only perineal skin is involved. In second-degree tears there is involvement of the skin and perineal muscles and in third degree tears there is complete involvement of anal sphincter which is additional classified as 3a when there is less than 50% tear of the sphincter ani externus, 3b when there is more than 50% tear of the sphincter ani externus and 3c when both external and internal anal sphincter ani is torn. The fourth-degree tears are defined as when there is involvement of anal sphincter complex along with anal epithelium [4, 5]. Globally around 70% of females who will

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have a vaginal delivery will experience from perineal impairment to some level due to episiotomy requiring suturing [6]. The choice of suturing material for these episiotomy repair, along with the technique performed and surgical skills and experience of the obstetrician will determine short- and long-term morbidity of episiotomy. In some studies, the rapidly absorbed synthetic materials have shown a good outcome as compared to mono-filament sutures in terms of wound healing and post episiotomy perineal pain. Vicryl rapide is an interlaced suture prepared from a copolymer of lactic acid and glycolic acid which is labeled as polyglactin 910. The chromic catgut is a type of catgut which is made by treating it with chromic salts which prevents its water absorbing property that in turns reduces the absorption time and hence attenuates the inflammatory response [6-9]. A study reported that 32.5% females in Vicryl Rapide Suture and 57% females in Chromic Catgut Suture had pain at 48 hours with significantly less pain in Vicryl rapide group, p value <0.05. They further reported that 15.5% females required analgesia in Chromic catgut groups and 5% females in Vicryl rapid group needed analgesia at 3-5 days [8]. A local study in 2018 reported that 57.3% females in Vicryl Rapide Suture and 80% females in Chromic Catgut Suture had pain with significantly less pain in Vicryl rapid suture group [7]. One more local study reported that 21.3% females had pain who had episiotomy closure with Vicryl rapide as compared to 52.0% females sutured with Chromic Catgut females after 48 hours (p = <0.05) [6]. Another local study done on primigravida reported that 2% females in Vicryl rapide group and 98% females in Chromic Catgut Stuure group needed analgesia at 7th day.
[9]. Although local and international data exist and support Vicryl rapide but with variable results regarding pain i.e. pain was reported from 21.33%-57.3% and pain in Chromic Catgut was reported from 52%-80% [6, 7]. Also, analgesia requirement reported with wide range of chromic catgut suture group I.e. 15.5%-98% [9].
Through this study we were able to rule out these variations regarding pain and analgesia requirement, so that in future preoperative management could be ensured for early discharge, that would help in reducing hospital stay and female's better satisfaction. The study focused on the evaluation of comparative outcomes of chromic catgut and vicryl rapide sutures for repair of episiotomy in terms of pain and analgesia requirement.

METHODS

We performed a randomized controlled trial at Department of Obstetrics and Gynecology, Lady Wallington Hospital, Lahore from March – September 2021. A total of 206 (103 in each group) females were taken through a consecutive sampling technique (non-probability sampling technique). The subjects were randomly allocated into two equal groups. (Group A and B). In Group-A females were managed by vicryl rapide 2-0 (36mm, 1/2circle double reverse cutting and round bodied needle) females in group-B were managed by chromic catgut 1.0 (30mm, 0.5 circle round bodied needle). The sample size was estimated using percentage of females requiring analgesia in chromic catgut group (15.5%) and in vicryl rapide group (5%) [8]. We used 80% power of test and 5% margin of error. Subjects with age: 18-45 years requiring episiotomies following spontaneous or instrumental deliveries were selected. Women with intra-partum fever (>98.8o), diagnosed cases preeclampsia, anemic females (Hb < 11.5), history of perineal surgery in past were excluded. After approval from the hospital ethical committee the study was started. Data was collected after getting informed consent. Their demographic history (name, age, contact), contact details, and obstetric history was taken. Episiotomy in all females was done by a senior consultant. Episiotomies were performed with the right mediolateral approach and a standard three-step approach was used to repair these episiotomies. A continuous interlocking suture was used initially then perineal muscle suturing was done with an intermittent suture and finally the skin closure was done with a mattress suture. Outcome was evaluated among both the groups in terms of pain and analgesic requirement (as per operational definition). In cases of analgesia requirement, diclofenac sodium was used. Pain was measured at 48 hours and labeled if a female has pain on Visual Analogue Scale (VAS > 3). Analgesia requirement was defined when female need medication to control pain (VAS > 3) at 7th day after episiotomy. Data entry and statistical analysis was performed using SPSS version 24.0 (p value < 0.05 was taken as statistically significant). Frequency and percentage were calculated for qualitative variables like pain and analgesia requirement. Parity was presented as frequency. The mean and standard deviation for numerical variables were calculated such as age, gestational age, and body mass index. Outcome pain and analgesic requirement among two groups was assessed using the Chi-square test.

RESULTS

The Demographic and clinical outcomes of patients are demonstrated in table 1. The mean age in Group A was 31.15 + 4.92 and in Group B was 31.15 + 4.92 years. In Group A 47.57% (n=49) and in Group B 46.61%(n=48) were between 18-30 years of age. Additionally, 52.43%(n=54) in Group A and 53.39%(n=55) in Group B were between 31-45 years of age. Mean gestational age in Group-A was 38.39+1.60 weeks and 38.38+1.55 weeks in Group-B. Parity distribution shows that 1.57+1.03 in Group-A and 1.55+0.99 para in Group -B. Mean body mass index in Group-A and B was 28.99+2.61

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and 28.86±2.66. Residential status showed that 43.69% (n=45) in Group A and 51.46% (n=53) in Group B were urban and 56.31%(n=58) in Group-A and 48.54%(n=50) in Group-B belonged to rural area. Socioeconomic status shows that 44.66% (n=46) in Group A and 51.46 %(n=53) in Group B were lower socioeconomic class and 55.34%(n=57) in Group-A and 48.54%(n=50) in Group-B fall in middle class socioeconomic class. Frequency of type of delivery shows that 39.81%(n=41) in Group-A and 41.75%(n=43) in Group-B were delivered spontaneously whereas 60.19%(n=62) in Group A and 58.25%(n=60) in Group B were delivered with the help of instruments.

Table 1: Demographic and clinical outcome of patients

Variables		Group-A (Vicryl Rapide (n=103)	Group-B (Chromic Catgut) (n=103)
		Frequency (%)	Frequency (%)
Age (years)	18-30	49 (47.57)	48 (46.61)
	31-45	54 (52.43)	55 (53.39)
Gestational Age (weeks)	<37	16 (15.53)	15 (14.56)
	>37	87 (84.47)	88 (85.44)
Parity	0-2	83 (80.58)	86 (83.50)
	>2	20 (19.42)	17 (16.50)
Residential status	Urban	45 (43.69)	53 (51.46)
	Rural	58 (56.31)	50 (48.54)
Socio-economic status	Lower	46 (44.66)	53 (51.46)
	Middle	57 (55.34)	50 (48.54)
Type of delivery	Spontaneous	41 (39.81)	43 (41.75)
	Instrumental	62 (60.19)	60 (58.25)

In table 2 Comparison of outcome of vicryl rapide versus chromic catgut for episiotomy repair shows that 32.04% (n=33) in Group-A and 49.51%(n=51) in Group B had pain at 48 hours (p value = 0.01), analgesia requirement at day 7 was recorded in 20.39%(n=21) in Group A and 66.02%(n=68) in Group B (p value <0.00001).

Table 2: Outcome of vicryl rapide versus chromic catgut

Outcome (n=206)		Group-A (n=103)	Group-B (n=103)	p-value
		Frequency (%)	Frequency (%)	
Pain at 48 hours	Yes	33 (32.04)	51 (49.51)	0.01
	No	70 (67.96)	52 (50.49)	
Analgesia requirement at day 7	Yes	21 (20.39)	68 (66.02)	<0.0001
	No	82 (79.61)	35 (33.98)	

DISCUSSION

A significant proportion of women benefit from episiotomy, but it's also associated short and long-term postpartum morbidities like perineal pain due to lacerations and scar formation after repair The immediate and short-term concerns is loss of blood, edema, pain in perineum, hematoma formation and infection resulting in wound dehiscence leading to a 3rd or 4th degree lacerations. A lot of women complain about dyspareunia as a sequalae of scar formation and infection of wound. The influencing factors of these complications include type of suture used and experience and skill of obstetrician. There is no consensus among obstetricians regarding the type of suture to be used but these newer sutures made of polyglycolic acid materials elicit less inflammatory reaction than a chromic catgut suture [10]. Studies have shown that there is less postpartum pain and faster healing of wounds with use of sutures [11, 12]. The current study was designed to rule out the variations regarding pain and analgesia requirement, so that in future pre-operative management can be ensured for early discharge, that may help in reducing hospital stay and female's better satisfaction. In our study, we compared two suturing technique vicryl rapide versus chromic catgut for pain and analgesia as outcome for episiotomy repair shows that 32.04%(n=33) in Group A (vicryl rapide) and 49.51%(n=51) in Group B (chromic catgut) had pain at 48 hours (p value = 0.01), analgesia requirement at day 7 was recorded in 20.39%(n=21) in Group-A and 66.02%(n=68) in Group-B, p value was <0.00001. Bharathi *et al.*, also used vicryl rapide and chromic catgut for repair episiotomy with these two absorbable suture materials and outcome measured for immediate complications was pain in perineal area and healing of wound [12]. Contrary to our results, this study findings suggest that the outcome among two groups were similar at the start of the trial but vicryl rapide group experienced less discomfort (32.5% vs 57%) and need for analgesia was also less (15.5% vs 0.5) at 3-5 days. In the vicryl rapide group there was a significant reduction for pain in stiches wound dehiscence and induration, (4% vs 13.5%), along with a improved wound healing (p = 0.05). The results were statistically non-significant for perineal pain after 6 weeks. Wound infections were noted in 3.5% of cases with chromic catgut repair but not in the vicryl rapide suturing. They found that episiotomy repair with vicryl rapide is better suturing material for and subjects experience a rapid healing of wound with less perineal pain. Another trial, conducted by Shah *et al.*, found that the polyglactin 910 group experienced higher discomfort (61.1% vs 55.1%) and required more analgesics (88.1% vs 86.9%) as compared to chromic catgut group after 48 hours [13]. Less discomfort was noted on day 5 (19.5% vs 24.6%) and day 20 (5.6 vs 16%) and used fewer analgesics on day 5 (68.5% vs 61%), and day 20 (3.3 vs 18%) in polyglactin 910 group compared to chromic catgut group. There was no discernible change in perineal pain among the two groups three months after delivery was noted. Greenberg *et al.*, in their study found a significant pain reduction in the fast-absorbing polyglactin group as compared to chromic catgut at 24-48 hours in pain (25% vs 34%) (P < .05) [14]. There was no statistically significant reduction in pain was

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noted at 10-14 days, among two groups. In another study by Leurox *et al.*, there was a significant reduction in pain (1% vs 4%) and significant decrease in analgesic use (5% vs 10%) at 6-8 weeks ($p < .05$) [15]. They showed that polyglactin 910 (fast-absorbing) for perineal repair is linked with earlier resumption of sexual intercourse when associated with chromic catgut for second-degree perineal laceration or uncomplicated episiotomy. Almost similar results were found by Monis *et al.*, in his study on effectiveness of vicryl rapide suture versus chromic catgut suture in episiotomy repair, he evaluated pain score and wound healing found at that vicryl rapide has efficacy of 78.67% as compared to chromic catgut of 48.0% ($p< 0.000$) [16]. The need for sutures and postpartum healing difficulties such as loss of blood, oedema, hematoma, infections, wound dehiscence, and perineal pain is associated with episiotomy is a standard obstetric procedure [17, 18]. Odijk *et al.*, found vicryl rapide 3-0 less self-reported dehiscence after tissue-layer closure of the skin in mediolateral episiotomies [19]. Chaudhri *et al.*, extensively studied continuous suture techniques compared with interrupted sutures for perineal closure (all layers or perineal skin only) with both sutures and found vicryl rapide suture a better option [20]. Another study was conducted by Bidri *et al.*, at Patil Medical College Vijayapura, India and showed that at 24-48 hours 18% had severe pain in chromic catgut group while 6% in rapid vicryl group. On subsequent follow up, 54% were uncomfortable in catgut group while no such complaints in vicryl group (p value < 0.0001) [21]. A study conducted by Shahgheibi *et al.*, compared three sutures for episiotomy repair and found out that 15.4% patients who used vicryl rapid reported no pain (p-value < 0.001). Severity of moderate and severe pain and inflammation was also significantly lower in this group [22]. Another study conducted by Gupta *et al.*, concluded that use of vicryl rapide thread to repair perineum to reduce perineal pain (p value 0.035) and improve wound healing (p value 0.000) was better than the use of chromic catgut [23]. Ours study also validate findings of national and international studies that episiotomy closure with vicryl rapide suture are better option as there is significant less pain along with the enhance of wound healing compared to wound closure with chromic gut suture.

CONCLUSIONS

We concluded that vicryl rapide is better as compared with chromic suture for episiotomy repair with respect to pain and analgesic requirements.

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Authors Contribution

Conceptualization: SZS, MA
Methodology: SZS, NA1, NA2
Formal analysis: AS, SM
Writing-review and editing: SZS, MA, NA1, NA2, AA, SM
All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

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Original Article

Common Complications in Infants Born to Diabetic Mothers

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ABSTRACT

Infants of diabetic mothers are at increased risk of complications. There is always a need for more research on this topic to look for complications and make strategies for prevention and management. **Objectives:** To determine the frequency of complications in infants born to diabetic mothers. **Methods:** This descriptive study was done at the Department of Pediatrics, Molvi Ameer Shah Memorial Hospital, Peshawar from 1st January 2022 to 31st December 2022. A total of 150 infants born to diabetic mothers were enrolled after written informed consent and frequencies of complications were noted. Data were analyzed using SPSS 24.0. **Results:** The mean age of the patients was 3.08 ± 1.7 days. The minimum age was 1 day, and the maximum was 7 days. The mean age of the mother was 26.9 ± 4.07 years. The mean gestational age was 36.9 ± 1.4 weeks. The mean duration of diabetes was 7.6 ± 1.14 years. The mean HbA1c level was 7.27 ± 2.41. There were 38% males and 62% female. Adequate diabetic control was present in 24.7% of patients while 75.3% had poor diabetic control. The most common complication was hypoglycemia in 24.7% followed by Macrosomia in 22.7%, prematurity in 20%, hyperbilirubinemia 11.3%, hypocalcemia in 10.7% and polycythemia in 10.7% patients. **Conclusions:** Most common complication was hypoglycemia followed by macrosomia, prematurity, hyperbilirubinemia, hypocalcemia, and polycythemia. However, due to its limited sample size, the results may not be generalizable.

INTRODUCTION

Diabetes is a common metabolic disorder observed during pregnancy, characterized by hyperglycemia resulting from defects of insulin action, insulin secretion, or both [1]. About 1-14% of all pregnancies are complicated by diabetes mellitus, and 90% of them are Gestational Diabetes Mellitus (GDM) [2, 3]. WHO has predicted that between 1995- 2025, there will be a 35% increase in the worldwide prevalence of diabetes and an additional 1-6% of women will develop gestational diabetes [4]. The true prevalence of glucose intolerance during pregnancy in Pakistan is still to be determined but small hospital-based studies have given the figures of 3.2% for GDM and 1.9% for Impaired glucose tolerance [5]. Once pregnant women are labeled as diabetic either known diabetic or having gestational diabetes, high attention should be given to the mother and fetus, as infants born to diabetic mothers (IDMs) are at great risk of developing complications that adversely affect the overall well-being of infants [6]. IDMs are at risk of hypoglycemia, hypocalcemia, hyperbilirubinemia, polycythemia, macrosomia, and prematurity [7, 8]. The increased incidence of fetal complications in IDMs is due to the occurrence of maternal hyperglycemia, hypoglycemia, and ketosis during fetal organogenesis. Fetal hyperglycemia stimulates beta-cell hypertrophy and increases insulin production and fetal oxygen consumption. Insulin has mitogenic and anabolic effects on many tissues (e.g., adipocytes, skeletal and cardiac muscle, hepatic and connective tissue), but not the brain

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[9]. In a study, it was demonstrated that in infants born to diabetic mothers, hypoglycemia was the most commonly observed complication (54%), followed by hypocalcemia which was seen in 43%, polycythemia in 35%, hyperbilirubinemia in 42% and macrosomia in 15% of infants. They further elaborated that 36% of infants born to diabetic mothers were preterm and 21% of total neonates were born through cesarean delivery [10].

This study has been planned to assess the common complications in infants born to diabetic mothers because there is scarcity of knowledge in the local population, which demonstrates the incidence of those complications. The results of the present study will give an idea about the incidence of complications in infants born to diabetic mothers in our local population. The information will help the clinicians to closely monitor diabetic mothers during their pregnancy and will also help to develop the local guidelines on which infants born to diabetic mothers should be evaluated. This would result in an early identification of these complications leading to prompt management. As there is no such study conducted in a secondary care hospital among the local populations, all the information to be gathered systemically shall be new for us. This study aimed to assess common complications among infants born to diabetic mothers.

METHODS

This descriptive study was carried out at Department of Obstetrics and Gynecology, Molvi Ameer Shah Hospital, Peshawar during the period, 1st January 2022 till 31st December 2022, after obtaining approval from the research review board of the institute vide Ref. No. 30/HEC/B&PSC/2021 dated 20th December 2021. The study included newborns received in a nursery, of either gender in the age range of 1 to 7 days, born to mothers with a documented history of diabetes mellitus for at least two years. Infants with gross congenital abnormalities like cleft palate, neonatal sepsis, twin pregnancies, and infants born to mothers with multiple comorbidities like thyroid disorder and hypertension were excluded. Diabetes status was determined through the measurement of the HbA1c level of the mothers before delivery. Glycemic control was defined as adequate and poor. If HbA1c < 7%, it was labeled as adequate glycemic control, and if HbA1c ≥ 7%, it was labeled as poor glycemic control. Complications were determined during the first week of birth in all the infants born to diabetic mothers. Complications were assessed in terms of; 1) Hypoglycemia: Through laboratory analysis of neonatal blood sample. Hypoglycemia was labeled if the glucose level in neonatal serum was <27 mg/dL (<1.5mmol/L) at the time of diagnosis. 2) Hypocalcemia: Through laboratory analysis of neonatal blood sample Hypocalcemia was labeled if total serum calcium concentration was < 8 mg/dL (< 2 mmol/L). 3) Polycythemia: Polycythemia is an abnormally high level of red blood cells. Polycythemia was labeled if hematocrit was>65% and hemoglobin > 22 g/dl. 4) Hyperbilirubinemia: Through laboratory analysis of neonatal blood samples, hyperbilirubinemia was defined as the elevation of the bilirubin level in the newborn's blood. It was labeled if a total serum bilirubin level was > 5 mg/ dL (86 µ mol per L). 5) Macrosomia: Fetal macrosomia was defined as a birth weight >4500 g measured through pediatric weigh machine. 6) Prematurity: A premature infant is a baby born before 37 weeks of gestation (as received on referral notes or procured from history determined by obstetricians in history). A total of 150 patients were registered. The sample size was determined using WHO sample size calculator taking an anticipated proportion of hypoglycemia as 54.0% with 8% absolute precision at 95% confidence level. Participants were enrolled using a non-probability consecutive sampling technique. All the demographic details (age of neonate, gender of the neonate, age of mother, gestational age, duration of diabetes in mothers, and their glycemic control status) were collected. For neonatal complications including polycythemia, hyperbilirubinemia, hypocalcemia, and hypoglycemia blood sample was taken from the superficial vein of the newborn and sent to the hospital laboratory. For prematurity, history was taken from the mother about the last menstrual period which was subtracted from the date of birth of the baby to yield gestational age at the time of birth of the baby. Macrosomia was confirmed on clinical examination of the newborn by measuring the weight of the newborn using a weighing scale. The presence of complications was recorded as per operational definitions. Data were entered and analyzed on computer software Statistical Package for Social Sciences version 25.0. Quantitative variables were presented as mean ± SD. Frequencies and percentages were calculated for all qualitative variables. Categorical variables were compared using the chi-square test. Continuous variables were compared using the student t test and Mann Whitney U as appropriate. P-value ≤0.05 was considered as significant.

RESULTS

The study comprised 150 patients, 38% were male and 62% were female. The majority of patients (75.33%) had a deranged blood glucose profile, with just 24.67% having acceptable control. This emphasizes the need for adequate diabetic control in the community. (Table 1).

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Table 1: Gender wise distribution of infants.

Characteristics	Frequency (%)
Gender	
Male	57 (38)
Female	93 (62)
Adequate Diabetes control	
Present	37 (24.67)
Poor	113 (75.33)

The statistical characteristics of the 150 patients involved in the study are shown in Table 2. The average age of the neonates was 3.08 ± 1.74 days, ranging from a minimum of 1 day to a maximum of 7 days. The average age of the mothers was 26.9 years. The average gestational age was 36.67 ± 1.41 weeks, ranging from a minimum of 1 week to a maximum of 7 weeks. The average duration of diabetes was 7.67 ± 1.14 years, ranging from a minimum of 1 year to a maximum of 14 years. The average HbA1c level was 7.27 ± 2.41, ranging from a low of 5.90 to a maximum of 9.80. The descriptive statistics provide a comprehensive summary of the attributes of the patients included in the study.

Table 2: Descriptive statistics (N=150).

Variables	Mean ± S.D
Age of Neonate (days)	3.08 ± 1.74
Age of Mother (years)	26.9
Gestational Age (weeks)	36.67 ± 1.41
Duration of Diabetes (year)	7.67 ± 1.14
HbA1c (%)	7.27 ± 2.41

Table 3 displays the most common complications found in the study's 150 patients. The prevalence of hypoglycemia, a frequent consequence, was seen in 24.7% of the patients. Subsequently, macrosomia occurred in 22.7% of the patients. Additionally, a prevalent complication seen in 20.0% of the patients was prematurity. Additional problems noted were hypocalcemia (10.7%), polycythemia (10.7%), and hyperbilirubinemia (11.3%). These results emphasize the need for monitoring and controlling these problems in people with diabetes to enhance their overall health outcomes.

Table 3: Most common infant complications.

Complication	Frequency (%)
Hypoglycemia	37 (24.7)
Hypocalcemia	16 (10.7)
Polycythemia	16 (10.7)
Hyperbilirubinemia	17 (11.3)
Macrosomia	34 (22.7)
Prematurity	30 (20)
Total	**150 (100)**

The data in Table 4 shows the age groups of mothers and the incidence of different problems in their newborns. Among the 100 mothers aged 20-30, 20% of their newborns had hypoglycemia, whereas 7% suffered hypocalcemia. Among newborns aged 31-40, 34% suffered hypoglycemia and 18% developed hypocalcemia. However, the disparity in the prevalence of these problems between the two age groups did not reach statistical significance (p = 0.061 and p = 0.094, respectively). Likewise, there was no notable disparity in the prevalence of preterm, macrosomia, hyperbilirubinemia, and polycythemia across the two age cohorts. These data indicate that maternal age may not have a substantial impact on the incidence of problems in newborns born to mothers with diabetes.

Table 4: Age group data of mothers.

Variables	Age of Mother 20-30 (N = 100)	Age of Mother 31-40 (N = 50)	P -value
	Frequency (%)	Frequency (%)	
Hypoglycemia			
Yes	20 (20)	17 (34)	0.061
No	80 (80)	33 (66)	
Hypocalcemia			
Yes	7 (7)	9 (18)	0.094
No	93 (93)	41 (82)	
Prematurity			
Yes	23 (23)	7 (14)	0.194
No	77 (77)	43 (86)	
Macrosomia			
Yes	26 (26)	8 (16)	0.168
No	74 (74)	42 (84)	
Hyperbilirubinemia			
Yes	14 (14)	3 (6)	0.145
No	86 (86)	47 (94)	
Polycythemia			
Yes	10 (10)	6 (12)	0.708
No	90 (90)	44 (88)	

Table 5 shows neonate gender and problems. Out of 57 male newborns, 28.1% had hypoglycemia and 19.3% hypocalcemia. In contrast, 22.6% of 93 female newborns had hypoglycemia and 5.4% hypocalcemia. Male and female infants had significantly different hypocalcemia rates (p = 0.007). Macrosomia occurred in 12.3% of male infants and 29.0% of female neonates (p = 0.017). Other problems did not vary between male and female infants. These data imply that gender may affect diabetes mother-born problems

Table 5: Infant complications based on gender.

Variables	Male Baby (N = 57)	Female Baby (N = 93)	P -value
	Frequency (%)	Frequency (%)	
Hypoglycemia			
Yes	16 (28.1)	21 (22.6)	0.449
No	41 (71.9)	72 (77.04)	
Hypocalcemia			
Yes	11 (19.3)	5 (5.4)	0.007
No	46 (80.7)	88 (94.6)	

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Prematurity			
Yes	13 (22.8)	17 (18.3)	0.501
No	44 (77.2)	76 (81.7)	
Macrosomia			
Yes	7 (12.3)	27 (29)	0.017
No	50 (87.7)	66 (71)	
Hyperbilirubinemia			
Yes	5 (8.8)	12 (12.9)	0.438
No	52 (91.2)	81 (87.1)	
Polycythemia			
Yes	5 (8.8)	11 (11.8)	0.556
No	52 (91.2)	82 (88.2)	

Table 6 shows mothers' diabetes duration and neonatal problems. In 92 mothers with diabetes under 5 years, 29.3% of their neonates had hypoglycemia and 9.8% had preterm. The 58 mothers with diabetes over 5 years had 17.2% neonates with hypoglycemia and 36.2% with preterm. The difference in preterm rates between groups was substantial ($p < 0.001$). Hyperbilirubinemia ($p = 0.003$) was also significantly different between the two groups, with 17.4% of neonates born to mothers with diabetes less than 5 years and 1.7% born to mothers with diabetes more than 5 years. These data imply that mothers' diabetes duration may affect neonatal problems.

Table 6: Duration of diabetes.

Variables	Duration of Diabetes less than 5 years (N = 92)	Duration of Diabetes more than 5 years (N = 58)	P -value
	Frequency (%)	Frequency (%)	
Hypoglycemia			
Yes	27 (29.3)	10 (17.2)	0.094
No	65 (70.7)	48 (82.8)	
Hypocalcemia			
Yes	8 (8.7)	8 (13.8)	0.325
No	84 (91.3)	50 (86.2)	
Prematurity			
Yes	9 (9.8)	21 (36.2)	<0.001
No	83 (90.2)	37 (63.8)	
Macrosomia			
Yes	20 (21.7)	14 (24.1)	0.733
No	72 (78.3)	44 (75.9)	
Hyperbilirubinemia			
Yes	16 (17.4)	1 (1.7)	0.003
No	76 (82.6)	57 (98.3)	
Polycythemia			
Yes	12 (13)	4 (6.9)	0.235
No	80 (87)	54 (93.1)	

Table 7 displays the data on the adequate level of glycemic control in mothers and the incidence of different problems in their newborns. Among the 37 mothers who maintained appropriate glycemic control, 18.9% of their newborns encountered low blood sugar levels, while 29.7% were born prematurely. By contrast, among the 113 mothers who had inadequate control over their blood sugar levels, 26.5% of their newborns suffered from low blood sugar (hypoglycemia), while 16.8% were born prematurely. However, there was no statistically significant disparity in the prevalence of these problems between the two groups. These data indicate that maintaining proper management of blood sugar levels in mothers may not have a substantial effect on the incidence of problems in their newborns.

Table 7: Adequate glycemic control.

Variables	Present (N = 37)	Poor (N = 113)	P -value
	Frequency (%)	Frequency (%)	
Hypoglycemia			
Yes	7 (18.9)	30 (26.5)	0.350
No	30 (81.1)	83 (73.5)	
Hypocalcemia			
Yes	4 (10.8)	12 (10.6)	0.974
No	33 (89.2)	101 (89.4)	
Prematurity			
Yes	11 (29.7)	19 (16.8)	0.088
No	26 (70.3)	94 (83.2)	
Macrosomia			
Yes	6 (16.2)	28 (24.8)	0.280
No	31 (83.8)	85 (75.2)	
Hyperbilirubinemia			
Yes	5 (13.5)	12 (10.6)	0.063
No	32 (86.5)	101 (89.4)	
Polycythemia			
Yes	4 (10.8)	12 (10.6)	0.974
No	33 (89.2)	101 (89.4)	

DISCUSSION

The results of this study align with other research performed by Alam M *et al.*, that has shown a significant occurrence of problems in newborns delivered to mothers with diabetes [11]. Within this research, 75.33% of the mothers exhibited inadequate glycemic control, a proportion that aligns closely with the results of a separate study done in India by Sunjaya AP *et al.*, where 73.3% of the mothers also had inadequate glycemic control [12]. This underscores the need for improved care and regulation of diabetes in expectant mothers to mitigate the possibility of problems in their newborns. The study identified hypoglycemia as the prevailing problem, with a prevalence of 24.7% among the newborn. This aligns with the results of research done in Saudi Arabia by Al-Khalifah R *et al.*, which reported that 25% of newborns delivered to mothers with diabetes had hypoglycemia [13]. Similarly, research carried out by Turkyilmaz E *et al.*, in Turkey found that 22.7% of newborns delivered to mothers with diabetes had hypoglycemia [14]. These results emphasize the need for

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monitoring and controlling blood glucose levels in newborns delivered to mothers with diabetes to avoid hypoglycemia. In this research, macrosomia was the second most prevalent problem, impacting 22.7% of newborns. This aligns with the results of research carried out in Iran by Aalipour S et al., which reported that 23.3% of newborns delivered to women with diabetes exhibited macrosomia [15]. Similarly, research carried out in the United States by a group led by Salihu HM *et al.*, found that 20% of newborns delivered to women with diabetes had macrosomia [16]. These results emphasize the need for promptly identifying and treating macrosomia in newborns delivered to diabetic mothers in order to avoid negative consequences. Additionally, this research showed a high incidence of prematurity, affecting 20.0% of the newborns. This aligns with the results of research carried out in Pakistan by Saheb HS *et al.*, which revealed that 20.5% of newborns delivered to women with diabetes were born prematurely [17]. In a research done in Brazil, De Moura DR *et al.*, showed that 19.2% of newborns delivered to women with diabetes were premature [18]. These results emphasize the need for vigilant surveillance of pregnant women with diabetes to avert preterm birth and its associated consequences. The frequency of hypocalcemia differed significantly between male and female infants in this research, with 19.3% of male neonates and only 5.4% of female neonates reporting this problem. This aligns with the results of research carried out in India by Sonia SF *et al.*, which revealed that male newborns born to mothers with diabetes had a higher risk of developing hypocalcemia in comparison to female newborns [19]. This phenomenon may be attributed to the elevated amounts of testosterone in male newborns, which can result in heightened insulin resistance and compromised glucose metabolism. The length of time that mothers have had diabetes was shown to be a major predictor in the frequency of preterm and hyperbilirubinemia in their newborns. Offspring born to moms with a prolonged period of diabetes had an elevated susceptibility to prematurity and hyperbilirubinemia. This aligns with the results of research conducted by Gasim T *et al.*, in Saudi Arabia, which revealed that a greater length of time that mothers had diabetes was linked to a higher likelihood of premature birth and hyperbilirubinemia in their newborns [20]. This emphasizes the need for promptly identifying and controlling diabetes in expectant mothers to minimize the possibility of problems in their newborns.

CONCLUSIONS

This research emphasizes the significant frequency of complications in newborns delivered to mothers with diabetes and underscores the need for improved care and regulation of diabetes in expectant women. The results of this study align with other research and provide significant perspectives on the variables that might impact the incidence of problems in newborns delivered to mothers with diabetes. Additional investigation is required to ascertain efficacious approaches for the prevention and treatment of these problems to enhance the health outcomes of newborns delivered by mothers with diabetes.

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Authors Contribution

Conceptualization: SBS
Methodology: SBS, SB,
Formal analysis: NF
Writing-review and editing: SBS, SB, W

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

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Original Article

Exploring the Efficacy of Kinesio Taping as an Adjunct Treatment for Knee Osteoarthritis, Grade 1 & 2: A Quasi-Experimental Study

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ABSTRACT

Osteoarthritis (OA) is a prevalent chronic joint condition resulting in pain, stiffness, and reduced joint function. Kinesio taping (KT) has emerged as an adjunct treatment for OA. **Objective:** To examine the role of KT as an adjunctive intervention in the physiotherapy management of knee OA. **Methods:** A quasi-experimental investigation was conducted at Bethania Hospital, Pakistan, comparing the effectiveness of standard physiotherapy alone (Group 1) and standard physiotherapy plus KT (Group 2) in patients with knee OA grade I and II. By convenience sampling selected 50 participants aged above 40 with knee OA. Both groups received standard physiotherapy treatments, and KT was applied to Group 2 using a specific technique. Outcome measures included pain reduction Visual Analogue Scale (VAS), functional improvement using Western Ontario and McMaster Index (WOMAC), and presence of swelling and tenderness. **Results:** Demographic findings showed left-sided predominance of knee involvement, higher female prevalence, and a common age group of 40-45 years. Both groups demonstrated improvement in pain and functional outcomes post-intervention. The experimental group (Group 2) exhibited significantly lower WOMAC scores ($p < .001$) and VAS pain scores ($p = .011$) compared to the control group indicating superior improvement. The incidence of swelling and tenderness around knee demonstrated no improvement in posttest analysis. **Conclusions:** Promising results are reported in KT group in management of knee OA in grade I and grade II as compared to only physiotherapy treatment. The study highlights the age specific considerations, tape application method and impact of kinesio tape intervention as an additional option in physiotherapy.

INTRODUCTION

One of the most common musculoskeletal ailment OA results in gradual decay of hyaline cartilage and symptoms of pain, stiffness and reduced range of motion are reported [1]. The weight-bearing joints especially knee are affected frequently and the sufferer are in millions globally especially in the elderly [2]. Once developed there is no absolute cure of the condition but various strategies are employed to reduce symptoms and refine the standard of life [3]. KT as a treatment option in knee OA has gained popularity over the past few years [4]. This new technique was incepted by Dr. Kenzo, a Japanese chiropractor in 1970 that involved the use of elastic and adhesive tape in a specific manner to address the biomechanical dysfunctions in various soft tissues and joints. In 1970 [5]. Its clinical benefits in terms of pain and dysfunctions have been studied with promising results by a number of clinicians [6, 7]. On the flip side of this certain studies report it just as a subjective and temporary relief of pain perception with no definite superiority compared to placebo and with no longer benefits [8, 9]. The non-invasive method of applying KT with no side effects has been investigated and this approach as an additional intervention supports the treatment outcome in addition to exercise, physical therapy and medication [10, 7]. The user friendly features in its application, its elasticity and porous texture with variable skin colors can make it a sound

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clinical tool in managing OA of knee [11].

The supportive role of KT in the management of knee OA is addressed in the study with its possible advantages, its biomechanical role and the evidence reinforcing its use in minimizing the sensations of pain, reducing disability and enhancing the quality of life. The tape application technique, its duration of use, possible side effects and its realistic implications can provide health care professionals an insight to address the treatment options to address this degenerative pathology. While KT is not a standalone solution for managing knee OA, its integration into a comprehensive treatment plan holds promise in optimizing patient outcomes.

METHODS

The research study was a quasi-experimental investigation that aimed to compare the effectiveness of two different treatment approaches in patients diagnosed with knee OA grade I and II according to the criteria set by the Kelgren Lawrence [12]. Both groups, group 1, non-taping & group 2, taping received same physiotherapy treatments whereas group 2 received an extra application of tape after each treatment session, concluding in 6 sessions on alternate days. The study was conducted at the physiotherapy OPD of Bethania Hospital Sialkot, a clinical affiliate of UMT Sialkot, Pakistan from May 2021 to May 2022. Before proceeding with the study, the ethical review committee of UMT Sialkot thoroughly examined the trial to ensure patient safety and approved its implementation on 23rd April 2021 vide letter with reference number "kuhs/pt/01-421". Convenience sampling, a non-probability technique, was used to select the participants. The inclusion criteria for the study were individuals aged above 40 years, diagnosed with knee OA (grade I and II), and attending the hospital's physiotherapy OPD. Both genders were eligible for participation. Participants could have knee OA in one or both knees. The study excluded individuals with trauma, certain systemic conditions affecting joints and bones, having fragile skin, diagnosed with cancer, those who had received intra-articular injections within the last 3 months, individuals using analgesic medication, pregnant ladies, orthotics users, those with prior experience with the KT method, or individuals unwilling to participate were also excluded from the study. Sample size was calculated online, by reviewing previous literature and estimated inflow of cases in the hospital OPDs [13]. Fifty participants were selected and divided into two groups of 25 each. Both groups, received the same standard physiotherapy treatments, which included isometric knee exercises, interrupted therapeutic ultrasound therapy, transcutaneous electrical nerve stimulation (TENS), general range of motion exercises, and squatting [14-18]. A combination of Y-shaped and I-shaped strips was utilized in group 2. The initial Y-shaped band was positioned over the mid of rectus femoris with its end around patella towards tibial tuberosity. The subsequent Y-shaped band commenced just below the tibial tuberosity, with its tails encircling the patella, and the ends extending over the vastus medialis and vastus lateralis muscles with 0% tension at distal attachments and 10-15% in middle part. Two I-shaped bands were applied over the patella tendon transversely and the medial/lateral collateral ligaments transversely with partial superimposition of both with full tension [6]. The outcome measures were evaluated before and after the treatment to determine the effectiveness of this taping approach as an adjunctive therapy for knee osteoarthritis. Data collection occurred both before and after the trial, and all outcome measures were recorded, tabulated, and compared using SPSS version 24.0 software to analyze the results. The primary outcome measure was the reduction in pain, which was assessed using the VAS [19]. Participants who scored 4 or 5 after the conclusion of the treatment sessions were categorized as "improvers". Another outcome measure focused on the WOMAC index, indicating scores of disability from 0 to 96 [20]. The presence of swelling and tenderness, common symptoms in arthritis, were noted and analyzed before and after the trial to assess any changes associated with the treatment approaches. Decreased swelling and tenderness were evaluated through physical examination and by performing patellar ballottment test [21].

RESULTS

Knee involvement was found to be more prominent on the left side. Interestingly, the study population exhibited a higher proportion of females compared to males, suggesting a potential gender-based difference in knee-related issues. The most prevalent age group affected was between 40 to 45 years, followed closely by the age groups of 50 to 55. The below data in Table 1 shows various important descriptive variables.

Table 1: Demographic data. Non taping group (NTG), Taping group (TG)

Variables	Group 1 (NTG)(n= 25)	Group 2 (TG)(n= 25)
Sex(male/female)	9/16	12/14
Age(Mean ± SD)	44.90±7.26	45.40±7.46
BMI(Mean ± SD)	28.89±3.25	29.39±4.80
Affected Side(Right/Left)	9/14	7/16
Tenderness(positive/negative)	15/10	18/7
Swelling(positive/negative)	9/14	11/16

A decreased trend is noted in both groups in terms of pain and functional disability score. WOMAC score reaches to maximum of 96 but in group 1 and group 2, it came out to be

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with mean of 35.24 and 34.88 and standard deviation of 4.83 and 3.19 respectively, measured at baseline. The posttest analysis shows decreased values in both groups but group 2 establishes more decrease in WOMAC score (M = 19.12.88, SD = 6.1) compared to the group 1 (M = 29.6, SD = 5.13)(Table 2).

Table 2: Group Statistics WOMAC Score

Groups		N	Mean ± SD
Pretest WOMAC Score(0-96)	Group 1(NTG)	25	35.24 ± 4.83
	Group 2 (TG)	25	34.88 ± 3.19
Posttest WOMAC Score(0-96)	Group 1(NTG)	25	29.6 ± 6.01
	Group 2 (TG)	25	19.12 ± 5.13

The independent sample t-test at 95% confidence interval(CI) and 48 degree of freedom(df), was used to check the significant difference in mean of WOMAC score between group 1 and group 2 which confirmed that this difference was statistically significant ($p < .001$), underscoring the efficacy of the treatment in enhancing knee function and alleviating pain. Before conducting t-test, Levene's test, pre-requisite of t-test, confirmed that homogeneity assumption is met and the variances in two samples are not significantly different ($p > 0.5$) from each other(Table 3).

Table 3: t-test statistics for Equality of Means of Womac Score between groups

Levene's Test for Equality of Variance			Independent sample t-test						
Parameters	F	p-value	t	df	p-value	Mean Diff.	St. Err. diff.	95% CI low.	95% CI upp.
Equal variance assumed	1	0.3	6.6	48	0.00	10	1.58	7.3	13.85
Equal variances not assumed	-	-	6.6	47	0.00	10	1.58	7.3	13.86

The values of VAS score indicated the similar drop in its score in both groups post treatment but in group 2 these score decreased markedly. These findings further support our hypothesis of positive outcome in group 2 (M = 1.48, SD = 0.71) compared to the group 1 (M = 2.12, SD = 0.97)(Table 4).

Table 4: : Group Statistics Pain(VAS)

Parameters	Groups	N	Mean ± SD
Pretest Visual Analogue Scale(0-10)	Group 1(NTG)	25	3.84 ± 0.688
	Group 2 (TG)	25	5.4 ± 0.5
Posttest Visual Analogue Scale(0-10)	Group 1(NTG)	25	2.12 ± 0.971
	Group 2 (TG)	25	1.48 ± 0.714

To check the significant difference in pain scores, independent sample t-test was used after confirming the assumption of homogeneity is met and variance in two samples is not significantly different (p value>0.05) The t-test, with 95% CI and 48 df, supported the statistical significance of this reduction ($p = .011$), emphasizing the effectiveness of the intervention in reducing pain levels in group 2 as compared to group 1(Table 5).

Table 5: : t-test for Equality of Means of Pain (VAS) between groups

Levene's Test for Equality of Variance			Independent sample t-test						
	F	p-value	t	df	p-value	Mean Diff.	St. Err. diff.	95% CI low.	95% CI upp.
Equal variance assumed	4.8	0.33	2.65	48	0.011	0.64	0.241	0.155	1.125
Equal variance not assumed	-	-	2.65	44.08	0.011	0.64	0.241	0.154	1.126

The consistent presence of swelling in both groups in posttest measurements supports the fact that the inflammation due to knee OA remained unchanged. The objective finding of local tenderness at knee joint line at baseline showed variable results and this tenderness was also present in both groups in post intervention analysis. The results of the study are indicative of significant improvement in perception of pain and physical disability particularly in age group of 40 to 45 years in both groups. But group 2 proves to be more superior over group 1 in the treatment outcomes studied.

DISCUSSION

The present investigation highlighted the effectuality of kinesio taping technique in improving perception of pain and disability outcomes in individuals with grade 1 and grade 2 knee OA. Although both groups demonstrated significant improvement in both primary treatment outcomes but tape use showed superiority over no tape along with standard physiotherapy treatments which both groups received. A systematic review demonstrated and acknowledged positive outcomes in terms of gain of muscular strength, psychological well-being and supportive effects on knee stability although these effects are not categorically reviewed upon in our study. Furthermore, a more cautious approach may be adopted before selecting such patients taking into account severity and duration of disease [7]. A randomized controlled trial established that the kinesio taping method resulted only in the subjective resolution of symptoms with no effects on overall mobility and function when compared to sham taping group. It is also crucial to note the large sample size and variable inclusion criteria in that study [8]. The findings from another inquiry demonstrated insignificant results in KT group and KT group with myofascial release to address joint range of motion in elder age group with knee OA. It is worth mentioning that we included participants across different age groups and with relatively mild disease of knee OA. The age related slowed healing processes may have been attributed to the study outcomes [22]. The demographic findings of the study indicate a higher

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prevalence of knee involvement on the left side, a greater proportion of females affected, and the most common age group being between 40 to 45 years. This information is consistent with previous literature that suggests an increased susceptibility to knee issues in females and older individuals which might be attributed to hormonal and anatomical factors, warranting further investigation in future studies [23]. The post-intervention analysis demonstrated a statistically significant decrease in pain and WOMAC scores in both the control and experimental groups. Notably, the experimental group exhibited a more significant improvement, as evidenced by their lower WOMAC score and VAS pain scores compared to the control group. These findings align with previous research that highlights the potential benefits of interventions in managing knee pain and function The treatment's success in improving functional outcomes can be attributed to its targeted approach, specifically tailored to address knee-related issues. Similar results have been reported in the study conducted by Anna but they used the sample of knee OA involving all severity levels whereas in our study we used grade I and II knee OA only [24]. The consistent presence of swelling in both groups throughout the trial indicates that the intervention did not significantly influence the swelling aspect rather a study by Jarecki *et al.*, has shown improvement in knee effusion post operatively in knee OA patients [25]. However, it is worth noting that this result might be influenced by other factors not directly targeted by the intervention. Future studies could explore additional strategies to address swelling in knee-related interventions. Regarding tenderness, the pretest values varied significantly among the groups. Despite this initial difference, the posttest analysis revealed no significant variation in tenderness presence between the control and experimental groups. This suggests that the intervention did not have a substantial impact on the tenderness aspect, which might be due to other underlying factors influencing tenderness levels in the participants, this finding has not been studied in detail in past.

The limitations of the study encompass a sample size that is relatively modest, patient reported pain and disability questionnaire and potential confounding variables such as prior level of activity and occupation that were not accounted for. Conducting research with a more extensive and varied sample, considering that well as the consideration of additional variables, could further strengthen the findings and provide a more comprehensive understanding of knee involvement and its management.

CONCLUSIONS

This study sheds light on the efficacy of the intervention in improving knee pain and functional outcomes in relatively mild cases of knee OA. These findings hold substantial promise for managing knee-related degenerative issues, particularly in the age group of 40 to 65 years and grade I and grade II of Knee OA. Further research and exploration of gender-based and age differences and the influence of other factors on knee involvement will contribute to advancing knee health interventions and enhancing the quality of life.

Authors Contribution

Conceptualization: DA
Methodology: FA
Formal analysis: RS
Writing-review and editing: DA, HZ, FA, SKK, AK

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

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Original Article

Chemical Composition of Calculi Removed From Urinary Tract

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ABSTRACT

Urinary stone (calculi) disease is the most prevalent occurrence in the outpatient urology department by far. It is becoming more and more common worldwide. Since most of the calculi might recur, understanding chemical composition is crucial. **Objective:** To analyze the different compositions of calculi removed from urinary tract. **Methods:** A descriptive study was performed in the Department of Urology, Avicenna Medical College and Hospital, Lahore, from July 2016 to October 2022. 300 Patients operated for urinary stone disease were selected as the sample population. All calculi removed from these patients were subjected to stone analysis and then results were prepared. **Results:** The most common stone type based on chemical composition was calcium oxalate (52%), followed by uric acid stones (25%), mixed stones (17%) and magnesium ammonium phosphate MAP (5%). Other less common types were accountable for only 1%. **Conclusions:** Calcium oxalate, uric acid and mixed composition stones are most common varieties in the draining area of our hospital setup.

INTRODUCTION

The most common presentation in urology outpatient department is urinary stone (calculi) disease. its prevalence is increasing worldwide [1]. The incidence of urinary stones has been reported to be 5.8% in China and 12% in India [2, 3]. Unfortunately, no authentic data is available in Pakistan. Understanding the chemical composition (stone analysis) of these calculi is very important for prevention of recurrence [4]. Patients who develop calculi in early age are at increased risk of recurrence [5]. If we know the chemical composition of stones removed from urinary tract, we can advise the patient about dietary precautions, life style modifications, medication or further investigations to prevent future recurrence of stone [6]. Stone analysis can also tell us that which type of stone is most common and which one is least common in our society. Chemical composition of urinary calculi depends upon metabolic disorders, environmental, geographic, socio-economic factors, presence of urinary tract infection [7]. Knowledge of chemical composition is very important as most of these calculi can recur [8, 9] Once the patient has been operated and stone has been removed, measures to prevent the recurrence depend

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solely on the chemical composition of the stone [10, 11].

METHODS

A descriptive study was conducted in the Urology department of Avicenna medical college and hospital Lahore. A total of 300 patients were included in study by simple random sampling and sample size was measured using formula of adjusted sample size

(S)/[1+(S–1)/Population]

where, S = sample size for infinite population, Z = Z score, P = population proportion (Assumed as 50% or 0.5) and M = Margin of error.

Patients who had first presentation with renal and upper ureteric calculi and who underwent surgery were included in the study. Patients who removed their calculi by medication or lithotripsy were excluded from the study. Calculi or pieces of calculi were collected during surgery. patients usually underwent pyelolithtomy, PCNL, ureterolithotomy or URS. Patients clinical data like age, sex, site of stone was collected. Study was carried out from July 2016 to October 2022. Stones were sent to laboratory for stone analysis. Stone analysis was carried out using infrared spectroscopy, chemical composition or x-ray diffraction. Data were analyzed using SPSS Statistics V22.0, mean, frequency and percentages were calculated using descriptive stats.

RESULTS

A total of 300 patients were operated and same number of calculi were sent for analysis. out of 300 patients,75 were females and 225 were males. Male to female ratio was 3:1. Mean age was 35 years with 50% patients falling between 25 years to 45 years(table 1).

Table 1: Demographic Characteristics of Participants(N=300)

Variables	Frequency (%)
Gender	
Male	225 (75)
Female	75 (25)
Age	
0-15	27 (9)
15-25	43 (14.3)
25-35	79 (26.3)
35-45	71 (23.6)
45-55	30 (10)
55-65	28 (9.3)
65 and above	22 (7.3)

Out of these the 300 patients who had calculi removed, 69 were removed from ureter and 271 were removed from kidneys(table 2).

Table 2: Sites of Calculi Removal

Site of Removal	Frequency (%)
Kidney	23 (177)
Ureter	69 (23)

The most common stone type on chemical composition was calcium oxalate(52%),followed by uric acid stones (25%), mixed stones (17%),magnesium ammonium phosphate MAP (5%) Other less common types were accountable for only 1%. As far as the distribution of chemical composition according to gender was considered, there was no major difference in both sexes. Equal percentages of chemical composition of calculi were observed in both sexes with very negligible difference (table 3).

Table 3: Distribution of Calculi based on their Chemical Composition

Chemical Composition	Frequency (%)
Calcium oxalate	156 (52)
Uric acid	75 (25)
Mixed	51 (17)
Magnesium Ammonium Phosphate (MAP)	15 (5)
Others	3 (1)

DISCUSSION

Stone analysis is an important post operative investigation that should be carried out in all patients under going any stone removal surgery [12-14]. An important aspect of management of urolithiasis is prevention of recurrence [15]. There are different methods being used for stone analysis, out of these infra red spectroscopy, chemical analysis and x-ray diffraction are most commonly used [16]. Among these three methods chemical analysis is cheap, quick results and can be performed in any laboratory [17]. In our study, the most common stone type based on chemical composition was calcium oxalate(52%),followed by uric acid stones (25%),mixed stones (17%), magnesium ammonium phosphate MAP (5%) Other less common types were accountable for only 1%. In a similar study of 258 calculi removed from upper urinary tract by Zafar *et al.*, from south punjab showed that calcium oxalate are the most common stone type followed by mixed variety [18]. According to a study conducted by Shahjehan and Rahman, forty stones were examined in order to identify the etiological variables. There was a significant prevalence of urates in the stones, and the majority of the stones were of mixed types. When comparing 29 stone formers to 21 normal people, the associated etiological factors seem to be abnormalities in urine pH, crystalluria of calcium oxalate—dihydrate and hypercalciuria in certain cases, and elevated serum and urine mucoproteins in adults [8, 19]. In another study conducted at Dera Ghazi Khan by Sial *et al.*, found that mixed stones are the most common variety.

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calcium oxalate being the 2nd and uric acid calculi being the 3rd [20]. Rizvi and colleagues conducted a study in Karachi concluded that most common stone variety was calcium oxalate and second most common variety was mixed calculi containing calcium oxalate, uric acid, calcium phosphate [21]. As far as the international data was studied, we found that calcium oxalate was around 77% in china,58% in united states of America,39% in United Kingdom and 75% in Sudan [22]. One of the important limitation of our study is that it is single center study and the data might not show the real prevalence of stone composition, later on we might take on board and collect data from other centers in the city to portray a true picture of the chemical composition of urinary calculi in the area. Another limitation was that we only considered calculi which were surgically removed from urinary tract, we have not included in the study the calculi those who naturally passed through urethra.

CONCLUSIONS

Concluding the whole study, the most common variant of calculi according to chemical composition in draining population of our hospital was calcium oxalate followed by uric acid.

Authors Contribution

Conceptualization: AAC
Methodology: ABN
Formal analysis: NA, SS
Writing-review and editing: HRA, MZA, MA, ABN

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

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Original Article

Investigating the Prevalence of Ectasia in Angiographic Patients with Acute Coronary Syndrome

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ABSTRACT

Coronary artery ectasia is dilatation of a segment of the coronary arteries leading to intense cardiac conditions. Among the patients undergoing angiography, it has a rare prevalence of 0.3 – 5.3%. It has been strongly associated with atherosclerosis as an evident cause of the dilation of coronary lumen. **Objective:** To determine the frequency of ectasia in patients of acute coronary syndrome undergoing coronary angiography. **Methods:** It is a cross sectional study conducted over six months. 160 patients from the Department of Cardiology, Mayo Hospital, Lahore were enrolled that fulfilled the study criteria of 30-70 years of age, presenting acute coronary syndrome, and undergoing angiography. The Angiography was done by an expert surgeon, simultaneously observed by one of the researchers. Ectasia was diagnosed in all the 160 based on its operational definition. Socio-demographic information including name, age, sex, diabetes (BSR>200mg/dl), hypertension (BP≥140/90mmHg), smoking, and type of acute coronary syndrome was collected with informed consent. Statistical analysis was performed using SPSS version 21. The chi-square test was practiced comparing ectasia in stratified groups of socio-demographic characters and type of acute coronary syndrome. **Results:** Ectasia was diagnosed in 54 (33.8%) patients. No significant association was seen between the age of patients and ectasia. However, frequency of ectasia was higher in patients in the age group 30-50 years. Frequency of ectasia was higher among male patients, but it was not statistically significant when compared with frequency of ectasia among female patients. No significant association was seen between ectasia and diabetes (p-value > 0.999), hypertension (p-value = 0.439) and smoking status (p-value = 0.140) of patients. **Conclusions:** Ectasia is a well-established condition of coronary artery but is an unconventional diagnostic finding of coronary angiography in patients affected with acute coronary syndromes.

INTRODUCTION

Coronary artery ectasia is a relatively familiar condition characterized by abnormal dilatation of the coronary vessels. Scientifically it is labeled with the presence of dilatation exceedingly more than 3 times the length of normal coronary artery and a diameter of the dilatation greater than 1.5 times that of a normal nearby segment [1]. Clinical manifestations include stable angina, acute coronary syndromes, heart failure and sudden death [2]. The scientific mechanism of its progression is unknown, but a different hypothesis suggests that there might be a coalescence of genetic susceptibility, atherosclerosis, and abnormal metabolism of vessel wall [3, 4]. The major trigger for coronary artery syndrome is plaque rupture caused by the dissolution of the fibrous cap [5]. The severity of ectasia decreases from type 1 to type IV [6, 7]. Increased concentration of a circulating marker of myocardial necrosis such as cardiac troponin I or T act as an effective diagnostic marker [8]. Coronary ectasia plays a role in periodic acute coronary syndrome (ACS) [1]. Coronary artery ectasia occurs in 0.3 to 5.3% of patients undergoing coronary angiography [8]. It has been reported in Pakistan, it was observed that frequency of ectasia was detected in 0.8% patients of acute coronary syndrome [9]. In a Turkish study, the frequency of coronary ectasia was

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reported in 1.59% cases of coronary artery disease [10]. While another study, done in Pakistan, it was observed that frequency of ectasia was detected in 5.3% patients of acute coronary syndrome.8 But one study, done in China, coronary ectasia was found in 67% patients o coronary angiogram [11]. The controversy exists in studies done in Pakistan and other regions which create a dispute whether ectasia is a rare or a significant factor leading to acute coronary syndrome.

The purpose of this study was to state the prevalence of ectasia in patients of acute coronary syndrome undergoing coronary angiography to get improved evidence for local population. In future we may be able to implement the screening and appropriate management of ectasia along with acute coronary syndrome to prevent complications.

METHODS

This cross-sectional study was conducted in the Department of Cardiology, Mayo Hospital, Lahore over a six-month period starting from 11-3-2022 to 12-9-2022. A sample of 160 patients was selected with 95% confidence level and 3.5% margin of error, using non-probability consecutive sampling technique. The percentage of ectasia was 5.3% of the sampled patients with acute coronary syndrome. Inclusion criteria was patients aged 30-70 years of either gender presenting acute coronary syndrome (as per operational definition) and undergoing coronary angiography. Whereas patients with previous history of any coronary revascularization were excluded. With informed consent demographic information, including name, age, sex, diabetes (BSR>200mg/dl), hypertension (BP≥140/90mmHg), smoking, and type of acute coronary syndrome, was also taken. Then patients underwent coronary angiography by an expert cardiologist having at least 4 years' experience in angiography with assistance of researcher. If in any coronary artery the presence of dilatation exceeded 3 times the length of normal artery and a diameter of the dilatation exceeding 1.5 times the diameter of a normal adjacent artery, the condition was detected as ectasia as per operational definition. Patients were managed as per hospital protocol. The collected data was analyzed statistically using SPSS version 21. Quantitative variable of was presented in form of Mean ± Standard deviation. Qualitative variables like gender, diabetes, hypertension, smoking, type of acute coronary syndrome and ectasia were presented in form of frequency and percentage. Data was stratified for age, gender, diabetes, hypertension, smoking, and type of acute coronary syndrome. To make comparisons of ectasia in stratified groups, post-stratification and chi-square test was applied.

RESULTS

Table 1 shows the socio-demographic characters of 160 patients. The mean age was 52.66 years with a standard deviation of 8.62. Moreover, among the 160 patients 120 (75%) were males and 40 (25%) were females. In case of the occurrence of lifestyle anomalies in subjects, 97 (60.6%) were diabetic, 97 (60.6%) were hypertensive and 70 (43.8%) were smokers. This validates the general perception of diabetes, hypertension, and smoking being among the risk factors of coronary diseases.

Table 1: Demographic characters of subjects with acute coronary syndrome

Socio-demographic Characters	Statistics
Age (Mean ± SD)	52.66 ± 8.62
Gender N (%)	
Male	120 (75)
Female	40 (25)
Lifestyle Anomalies N (%)	
Diabetes	97 (60.6)
Hypertension	97 (60.6)
Smoking	70 (43.8)

Table 2 demonstrates the penetrance of ectasia among the total subjects along with other types of acute coronary syndromes. Among the subjects 44 (28.1%) were diagnosed with UA, 59 (38.1%) with ST-Segment Elevation Myocardial Infarction (STEMI) and 54 (33.8%) with Non-ST-Elevation Myocardial Infarction (NSTEMI). This shows that ectasia possesses a comparatively significant proportion of occurrence in acute coronary syndrome patients.

Table 2: Frequency proportions of ectasia and type of acute coronary syndrome in sample population

Condition	N (%)
Ectasia	54 (33.8)
Types of acute coronary syndrome	
Unstable angina (UA)	44 (27.5)
STEMI	59 (36.9)
NSTEMI	54 (33.8)

Table 3 highlights the proportion of ectasia positive subjects (33.8%) in relation to the socio-demographic frequencies of age, gender, diabetes, hypertension, smoking habit, and type of acute coronary syndrome. No significant association was seen between the age of patients and ectasia (p-value = 0.174). However, frequency of ectasia was higher in patients in age group 30-50 years (51.9%). Frequency of ectasia was higher among male patients (77.8%) but it was not statistically significant when compared with frequency of ectasia among female patients (22.2%). Among the type of acute coronary syndromes, the frequency of ectasia was higher among patients who were presented with NSTEMI (38.9%) as compared to those with STEMI (29.6%) and lowest

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frequency was seen in patients with UA (1.5%); however, no significant association was seen between type of syndrome and frequency of ectasia. Lastly, no significant association was seen between the proportion of ectasia positive subjects with diabetes (p-value > 0.999), hypertension (p-value=0.439) and smoking habits (p-value=0.140).

Table 3: Frequencies of ectasia in relation to age, gender, type of acute coronary syndromes, and lifestyle anomalies (N=54).

Variables	Ectasia Detected N (%)	p-value
Age (years)		
30-50	28 (51.9)	0.174
51-70	26 (48.1)	
Gender		
Male	42 (77.8)	0.562
Female	12 (22.2)	
Type of acute coronary syndromes		
UA	17 (1.5)	0.285
STEMI	16 (29.6)	
NSTEMI	21 (38.9)	
Lifestyle Anomalies		
Diabetes	32 (60.4)	>0.999
Hypertension	35 (64.8)	0.439
Smoking	28 (51.9)	0.140

DISCUSSION

Morgagni was the first to explain the existence of coronary artery ectasia in 1761 [12]. Since then, globally it has been acknowledged as a frequently occurring disease of coronary arteries. The pathological entity is regarded as the swelling of the coronary artery as compared to normal nearby artery [13]. Coronary ectasia is present in 3-8% of patients undergoing coronary angiography. It may involve the localized area or may be of diffuse variety. In 50% of patients the underlying cause is atherosclerosis while in 30% cases it may be congenitally acquired. In 10-20% it is associated with connective tissue disorders [14, 15]. In this study we determined the frequency of ectasia in patients of acute coronary syndrome undergoing coronary angiography. As per operational definition ectasia was diagnosed in 54 (33.8%) patients. Muhammad *et al.*, reported in Pakistan that ectasia was observed that frequency of ectasia was detected in 0.8% patients of acute coronary syndrome [16]. In a Turkish study, Aksu *et al.*, declared that the frequency of coronary ectasia was reported in 1.59% cases of coronary artery disease [10]. While in another study done in Pakistan by Arshad *et al.*, it was observed that frequency of ectasia was detected in 5.3% patients of acute coronary syndrome [17]. Frequency of coronary ectasia in this study is higher as compared to above mentioned studies. Another recently published study from Pakistan done by Hartnell *et al.*, reported the frequency of ectasia as 62.83% which was quite higher as compared to this study [15]. In China, Wang *et al.*, stated that coronary ectasia was found in 67% patients of coronary angiogram [11]. In a recently published study from India, Lazzarin *et al.*, stated the penetrance of coronary ectasia among North Indian patients who underwent coronary angiography as 4.1% [14]. In the present study, 64.8% of patients with ectasia faced hypertension, 60.4% of the patients were diabetic and 51.9% were smokers. These risk factors for coronary artery disease have been shown to be linked with ectasia in the corresponding study conducted by Ahmed *et al.*, and Iqbal et al. [18, 19]. Histopathological studies could have depicted to an improved degree the frequency of ectasia obtained from each causative factor. Possibly, the redundancy of etiologic factors results in the occurrence and progression of ectasia. Age (30-50 years=51.9% vs. 51-70 years=48.1%, p-value=0.174), gender (male=77.8% vs. Female=22.22%, p-value=0.562), diabetes (60.4%), hypertension (64.8%, p-value=0.439) and smoking status did not show statistically significant association for ectasia. Contrary to these findings a recently published study reported by Hartnell *et al.*, described significant association for these factors with ectasia [15]. As per his finding's male patients, diabetic, hypertensive and smokers had higher frequency of ectasia. Studies have proven that the clinical horizon of ectasia is inconsistent, including stable angina pectoris, unstable angina, and myocardial infarction. It may occur in a few ectasia patients in the absence of coronary artery disease. Ectasia has correlations to different connective tissue disorders as well. Authors state that ectasia is not specifically linked to angiographic diagnosis alone. Ecstatic people are medically at risk of catching acute coronary syndromes despite the absence of any plaque syndrome. As mentioned by Sultana *et al.*, the dilatation of vessels changes the fluid dynamics resulting in abnormal spasms and partition of blood vessels [20].

CONCLUSIONS

As per the findings of this study, ectasia was diagnosed in 33.8% of the sampled subjects undergoing angiography. Ectasia is a well-established condition of coronary artery but is an unconventional diagnostic finding of coronary angiography in patients affected with acute coronary syndromes.

Authors Contribution

Conceptualization: AF
Methodology: AF, AA
Formal analysis: AT
Writing-review and editing: AS, WA, ASH

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Systematic Review

Health Benefits and Consequences Associated with Uric Acid Among Exercise Performers

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ABSTRACT

Uric acid (UA) is a waste product formed when chemicals called purines break down. UA perform various functions such as a stimulant of the immune system, urate is an effective antioxidant, maintains blood pressure in a salt-poor environment and works against certain health diseases of the nervous system due to its antioxidant properties. Being an important biochemical agent, people do not give much importance due to insufficient knowledge about UA. This review study was initiated to assess the benefits and consequences associated with UA among exercise performers. One hundred (100) articles were placid into two (02) categories, i.e. (a) articles about health benefits of exercise and complication or penalties of UA (b) articles about the linkage or association of UA and Exercise. Moreover, the study was limited to the primary two magnitudes of UA, i.e. health benefits and consequences or risks of UA and Association of UA and Exercise. A literature search was done based on predefined keywords of the study. Finally, two (02) foremost search sources were used for assembling pertinent literature, and thus thirty-three (34) research articles were entertained per the study's recommended criteria. The categorization of studies grounded on quality and quantity was based on the established standards of the current review study. The existing literature disclosed that different managerial strategies such as eating low-purine foods, eluding certain medications, conserving a moderate weight, evading alcohol and sugary drinks, drinking coffee, increasing vitamin C intake, eating cherries and execution of low or moderate-intensity exercise have a significant effect on UA concentration.

INTRODUCTION

UA is a typical waste product molded when chemicals called purines break down [1]. Purines are natural substances create in the body and various foods like alcohol, shellfish, and liver. It is similarly shaped when DNA breaks down [2]. Metabolism of purine includes the breakdown of Adenosine triphosphate (ATP) to adenosine diphosphates (ADP), Adenosine monophosphate (AMP), Inosine monophosphates (IMP), and inosine [3]. When purines are broken apart into UA in the blood, the body gets free of it when a person urinates or has a bowel activity [4]. The normal ranges for UA in the bloodstream are as follows; Adult female: 2.7-7.3 mg/dL or 0.16-0.43 mmol/L, Adult male: 4.0-8.5 mg/dL or 0.24-0.51 mmol/L Elderly: A slight increase in values may occur, Child: 2.5-5.5 mg/dL or 0.12-0.32 mmol/L and Newborn: 2.0-6.2 mg/dL [5]. The body makes too much UA if the kidneys are not working properly [6]. The UA level also increased due to overeating purine-rich foods or taking medicines like aspirin, diuretics, and niacin [7]. Then UA crystals can precipitate and accumulate within the joints. This results the painful inflammation. This state is called gout. It may also lead to kidney stones [7, 8]. UA is a heterocyclic (A heterocyclic compound or ring structure is a cyclic compound) that has atoms of at least two different elements as members of its ring(s) [9] compound of carbon, nitrogen, oxygen, and hydrogen with the formula C5H4N4O3 [10,11]. The structural formula of UA is shown in figure 1.

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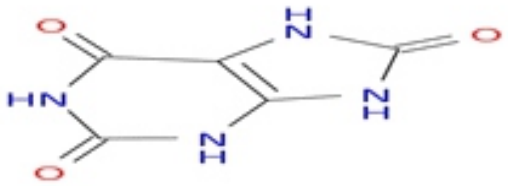

Figure 1: Structural Formula of UA

UA play a vital part as a stimulant of the immune system. It also has antioxidant potential that helps uphold blood pressure in a salt-poor situation and helps in eluding diseases of the central nervous system due to its antioxidant capacity [11, 14]. Exercise has a significant impact on living organisms with gout. Research indicates that exercise not only decreases UA but also improves the lifespan of 4 to 6 years among those who have elevated levels of UA. Being overweight may cause a dramatic increase in UA and thus regular exercise may decrease the level of UA. Overweight people are always at risk of different health risks such as high blood pressure, chronic disease and chronic pain in muscles and bones [6,7].

After a critical analysis of the above previous studies, now it is clear to say that UA is the most important biochemical parameter of the study and plays a key role in the maintenance and promotion of different physiological activities of the body. What role is played by UA with context to exercise and body, this particular research study was initiated to analyze the previous studies for the assessment of health benefits and consequences associated with uric acid among exercise performers.

METHODS

Keeping in view the importance of UA with special reference to health benefits and consequences, particularly among exercise performers as indicated by the overhead studies, one hundred (100) articles were placid into two (02) categories, i.e. (a) articles about health benefits of exercise and complication or penalties of UA (b) articles about the linkage or association of UA and Exercise. Moreover, the study was limited to the primary two magnitudes of UA, i.e. health benefits and consequences or risks of UA and Association of UA and Exercise. A literature search was done based on predefined keywords of the study. Finally, two (02) foremost search sources were used for assembling pertinent literature, and thus thirty-three (34) research articles were entertained per the study's recommended criteria. The categorization of studies grounded on quality and quantity was based on the established standards of the current review study.

RESULTS

Various factors cause low or low levels of UA are; Fanconi syndrome (Fanconi syndrome is the state of the kidney to reabsorb nutrients such as minerals which the need for its normal functions and similarly the main symptoms of this state of the body are peeing a lot, drinking more than usual, bone pain and muscle weakness, metabolic disorders associated with heredity diseases, HIV infections, malnutrition and different types of medications [12]. The main factors responsible for elevated UA levels are; drinking too much alcohol and soda, water retention relievers or consuming too much of foods that hold fructose, a type of sugar, genetics, immune-suppressing medications, kidney disorders, leukemia, high blood pressure, niacin, metabolic disorders also named polycythemia vera, psoriasis, obesity, vitamin B-3, a purine-rich diet, high in foods such as game meat, liver, sardines, anchovies and Tumor lysis syndrome — a fast release of cells into the bloodstream resulted by certain cancers or by chemotherapy for those cancers [7,13,14]. Aerobic exercise (AE) is considered advantageous for well-being [15]. Likewise, long-term means high-intensity exercise may cause an imbalance among reactive oxygen species (ROS) and antioxidants [16]. Research shows that AE produced a substantial upsurge in salivary UA concentration. In addition, UA is an end relic of purine metabolism and has been projected to function as the most dynamic antioxidant particle in saliva [17].UA has free-radical-scavenging characteristics, and systemic direction is known to upsurge serum antioxidant capacity. Though, it is not recognized whether this defends against oxidative stress [18]. Association of elevated serum uric acid (SUA) concentration (hyperuricemia) with gout has been recognized likewise elevated SUA has been also considered associated with many coronary heart diseases such as hypertension, stress, and hypercholesterolemia. Despite this conclusion, many studies signpost an advantageous association among physical activity, risk factor alteration, and vulnerability to coronary heart disease. Physical activities have a very positive impact on health by strengthening the immune system and reducing health issues. It also influences the level of SUA as well. Exercise with low to moderate intensity exercise drops SUA levels. Mechanisms for these variations are deliberated as well as inferences concerning coronary disease [19]. Overweight people are mostly at risk of increased UA. Weight control is significantly co-related with the reduction of UA. In addition, In-between to strenuous exercise helps to decrease waist circumference and SUA. In the hyperuricemia (high level of UA) population, overweight, middle-aged men were the most pretentious, and also the most probable to do more exercises and get their body weight back to normal [20]. Increased UA levels are rapidly increasing in the general masses [21]. Epidemiological studies have shown that hyperuricemia is

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linked with numerous metabolic syndromes [22]. Alike occurrence has been originated in China [23]. Few research article highlighted that being overweight might be linked with varied metabolic complications [24]. UA due to its antioxidant activity, was thought to safeguard neuronal cells, therefore enabling brain development, and also show a significant role in maintaining blood pressure [25]. However, the antioxidant activity of UA is not as influential as either hydrophilic vitamin C or hydrophobic vitamin E conferring to its chemical structure. The effects caused by the antioxidant activity can be easily relieved by intake of the two vitamins [26] and other foods comprising sinking chemicals [27,28]. Many health consequences are associated with increased level of UA, such as weakness and pain in bones, joints, tendons, ligaments, kidney disease, heart disease, high blood pressure, fatty liver diseases, and fatty liver diseases [29,30,31]. For the management of uric acid, it is important to; eat low-purine foods, avoid certain medications, maintain a moderate weight, evade alcohol and sugary drinks, drink coffee, increase vitamin C intake, eat cherries and perform low or moderate-intensity exercise [32,33].

CONCLUSIONS

Based on the above critical analysis of previous research findings, it is concluded that different managerial strategies such as eating purine-rich foods, avoiding certain medications, maintaining a moderate weight, evading alcohol and sugary drinks, drinking coffee, increasing vitamin C intake, eating cherries and perform low or moderate-intensity exercise has a significant influence on UA concentration. Likewise, the volume and intensity of exercise also matter greatly because exercises such as low-intensity and moderate-intensity exercise have a positive impact on UA concentration as compared to high-intensity exercise.

Authors Contribution

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Formal analysis: MIM, ZIB, AK
Writing-review and editing: MIM, ZIB, AK

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