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Oasis of knowledge

The hand drawn illustration on the cover of JSTMU encapsulates philosophy of the University and its Journal. It depicts a traveler in the desert stopping by an oasis to take a note to themselves, symbolizing the point after which their journey requires steadfastness and dedication. The note is an excerpt from the Qur'an where God beseeches human beings to reflect. This is the essence of scientific research which prescribes itself in the University logo and is represented through red and blue color in the form of the water and the red sand, and taking further inspiration in the form of the notebook and the quill.

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The *Journal of Shifa Tameer-e-Millat University (JSTMU)* is an open access bi-annually peer reviewed medical journal of the Shifa Tameer-e-Millat University (STMU), Islamabad, Pakistan. The journal encompasses papers from biomedical research, clinical specialties and interdisciplinary medical fields; thereby entertaining the scientific, research and clinical work of a wide variety of health care professionals such as medical practitioners, surgeons, nurses, pharmacists, medical technicians, paramedics, laboratory scientists, physiotherapists, dietitians and bioengineers. The journal is premised on creating influence on the academic as well as corporate thinkers. It is dedicated to presenting advances in medical sciences supporting the recognition and publication of medical scientific research and its effects on human health and well-being. A key question we apply to submission is, "Is this paper going to help readers better understand and conceptualize the research topic while adding something new and innovative to the current pool of knowledge?"

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TABLE OF CONTENTS

Dec 2022 Volume: 05 Issue: 02

EDITORIAL

ORIGINAL ARTICLES

REVIEW ARTICLE

CASE REPORT

JSTMU Journal of Shifa Tameer-e-Millat University

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EDITORIAL

Evidence-based practices in the field of surgery in Pakistan: Where do we stand?

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Keywords: *Evidence-based medicine, Surgery, Medical Specialty*

The term "Evidence-Based Medicine" has been coined decades ago and its definition refined multiple times, but still, there are differences in its interpretation and implementation. The definition is still in evolution and more recently patients' preferences and surgical expertise are also added in addition to the best available evidence at contemporary times.[1] The inclusion of multiple components in the definition appears to have made more confusion rather than facilitating the decision-making. It discriminates between treating all patients equally even in the same region, as available resources and expertise may vary. The term, therefore, seems to be more fashionable and theoretical with limited application and guarded outcome.

Further deliberations on the subject of "evidence-based" revealed two more distinct areas, evidence-based research, and evidence-based practices.[2] This is interesting as currently there is a boom in research-based data, and literature is flooded with so-called evidence, many in conflict with findings reported in other studies. Statistical jargon, confidence intervals, significant values many others are used to bring objectivity and strength to reported data. However, statistically significant does not go always with clinically significant as well.[3] Many practitioners thus continue to follow their treatment protocols as they believe their results are quite satisfactory with the added advantage of patient satisfaction.

The surgical practice is quite different from the medical specialties. The traditional way of researching the efficacy of drugs developed in the laboratory followed by its effect on animals and later on human volunteers and then patients for dose calculation and larger population-based studies to document post-marketing outcomes most of the time does not apply to surgical procedures. Even for testing new equipment, it is not practical to follow such protocols. The recommended pyramid of evidence-based reporting from case report to meta-analysis is also not practical for the surgical field in all areas.[4] The randomized controlled trials which are considered to be the best study design to establish cause and effect may not be practical. In many such trials, it was found that there were no gaps in the knowledge. Many studies were found redundant and a waste of resources and time.

The recent trend of publishing retrospective studies is interesting. Such studies were not given credit in the past and were discouraged because of several limitations. Interestingly they are increasingly reported. Over the years they are further classified just like prospective studies into descriptive and analytical types to give strength to the collected data. This created further conflict in the context of the strength of the evidence generated. They can be done in a short period as data can be retrieved from hospital records.[5, 6] The analysis of data is done with all the statistical tests that used to be applied to prospective studies. Ethical aspects are also not important in such studies as only confidentiality has to be masked. There are significant shortcomings in such studies and data cannot be considered truly reliable. However, it is available in the literature and can be used to inform surgical practices.

In surgical practice, in the context of Pakistan, the area of research is limited. It was observed in a recent surgical conference that was held in Pakistan. The theme was "The Best Surgical Practice – The Paradigm Shift from Orthodox to Evidence-Based". It is important to note the word "orthodox" is used. It needs an operational definition as no

study could be found in recent surgical literature on this subject from Pakistan. It is also important to define "evidence" in the context of Pakistan, considering its healthcare-related surgical services. There is a paucity of data on surgical conditions from Pakistan. At the national level, only one general surgical and allied journal and few specialties-related journals are recognized by Higher Education Commission in the local "Y" category.[7] This speaks volumes in the context of the quality of evidence-based research and reporting. However, the mushroom growth of surgical and allied conferences is witnessed, organized each year by different surgical associations and institutions. In most of the conferences, almost similar studies are presented and many experts from Pakistan in their keynote addresses just review the literature from the advanced countries. These presentations lack local context.

Another area of innovation is the minimally invasive approach. In this context, the use of surgical robots is an ultramodern approach, which is available in a few centers in Pakistan. It is interesting to mention here that one such robot was purchased decades back for a secondary-level hospital in the province of Sindh. It was considered a revolutionary approach in Pakistan at that time. However, instead of gathering and reporting evidence-based data on such equipment in terms of patient benefit, training of surgeons, and cost incurred, a robot has been installed in a small city in the province of Sindh. The tertiary care hospital attached to the medical college in the same city lacks even basic surgical services. The industry-driven pressure and vested interest of few is another area that affects the rational use of resources for surgical practices. Thus needs of the people and surgeons are not fulfilled.

Evidence-based surgical practice sound and rational approach, however in the context of Pakistan many aspects are ignored. Finding evidence from literature based upon studies carried out in advanced countries and its application to our population is not appropriate. It is time to gather local data in a central registry. It may be a baby step but an important approach, even for a common surgical condition like an inguinal hernia. Patients get confused when they receive conflicting information from operating surgeons from mammal invasive to open surgery and nowadays, the robotic approach has also added to this condition. What is the expertise of the operating surgeon, results of the procedure, and perceptions of the patients along with the cost incurred, are all part of evidence-based data collection? A balanced approach is therefore warranted if evidence-based policies are to be developed and evidence-based curricula are prepared for the teaching and training of undergraduate medical students and postgraduate surgical residents. This also helps in faculty development and keeps them abreast with needs at the national level and what is happening in the world arena.

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ORIGINAL ARTICLE

Frequency of moderate to high myopia in primary open-angle glaucoma in tertiary care hospital

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Author`s Contribution

[1] Conceptualization of study, analysis, and interpretation of data

[2-5] Drafting the article or revising it critically for important intellectual content. final approval of the version to be published

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A B S T R A C T

Introduction: Glaucoma is one of the leading causes of irreversible blindness in the adult population worldwide with Primary Open-Angle Glaucoma being its most common type. Moderate to high myopia is one of the various risk factors associated with POAG. The prevalence of myopia is increasing worldwide, early detection and management of glaucoma in such patients can slow down its progression and prevent vision loss.

Objective: The Purpose of this study was to evaluate the frequency of moderate to high myopia in Primary Open Angle Glaucoma (POAG) and to find out the association between myopia and POAG.

Methodology: A total of 100 participants were included in this cross-sectional study through consecutive sampling techniques. Refractive error was measured through an auto refractometer. Glaucomatous Patients have been diagnosed as POAG on clinical findings (elevated IOP and optic nerve changes), visual field loss, and/or retinal nerve fiber layer (RNFL) defects. The anterior chamber angle was evaluated with the Van Herrick technique. Chi-Square for independence was used to find an association between myopia and independent variables like gender, education, and socioeconomic background.

Results: The mean age of all the participants was 52.36 ± 15.350, with males being 63 and females 37. The frequencies of low, moderate, and high myopia were 34%, 12.5%, and 4% respectively. Male gender had a significant association with the high prevalence of low myopia in patients with POAG (p-value <0.05). Illiteracy and low and middle-class socioeconomic background were the other significant risk factors.

Conclusion: Myopia is the major risk factor in POAG and other factors like illiteracy and a poor socioeconomic background attributed to it should be screened and assessed so that earlier detection in the population can prevent vision loss.

Keywords: *Frequency, Myopia, Open-angle glaucoma*

Introduction

Glaucoma (derived from the Greek *glaukós,* a nonspecific term for green or light gray)[1] is one of the leading causes of irreversible blindness in adult populations worldwide and is characterized by multiple pathologic changes. The progressive degeneration of the optic nerve, loss of retinal ganglion cells, thinning of the retinal nerve fiber layer, and progressive excavation of the optic disc are some of the characteristic features of glaucoma pathogenesis.[2-4] Although the mechanisms by which all these changes take place are not yet fully understood but these lead to gradual deterioration of the visual field, which starts from the periphery and then advances until only central vision remains.[5] Primary open-

angle glaucoma is the most frequent type of glaucoma worldwide. Elevated intraocular pressure is a major risk factor for POAG while age, gender, race, refractive error, heredity, and systemic factors may also play a role in its pathogenesis. Myopia has also been associated with POAG, but it still needs convincing evidence.[6]

In open-angle glaucoma, the anterior chamber angle in the eye where the iris meets the cornea is as wide and open as it should be (grade 3 or grade 4 angle with van Herrick technique), but the eye's drainage canals used to drain the aqueous humor become obstructed over time, causing an increase in internal eye pressure and ultimately damage to the optic nerve.[7, 8] In contrast to close angle glaucoma, in which patients have symptoms in the earlier stage, patients with POAG generally report no symptoms in the initial stage and about 33% of patients don't even have any idea about the presence of the disease.[9] One of the behind the late presentation of POAG is that the visual field defects present in POAG are usually compensated by binocular vision as they do not lie in the same part of the fields of the two eyes.

The prevalence of myopia is on a rise globally and is significantly higher in Asian populations as compared to European populations, especially in the younger generations.[10] Even though many studies have suggested a link between Myopia and POAG, there is still not enough evidence to prove it.[11] This association has been linked to a variety of mechanisms. The scleral canal in myopic patients is abnormally large, unusually shaped, and tilted, and the lamina cribrosa and peripapillary sclera are also abnormally thin.[12] This could make a given level of IOP more stressful. But the clinical results aren't unquestionable.[13] In various population-based studies in the United States, it has been estimated that 50 to 75% of people in America don't know that they have glaucoma. By diagnosing and treating glaucoma early, especially in high-risk groups where it is more common and happens more often, vision loss can be prevented and the disease's progress can be slowed down.[14] Even though myopia can be caused by a curved lens or cornea or by other things, axially elongated eyes make up the majority of all myopia cases. Axial elongation can damage the optic disc or macula, which are important parts of the eye that glaucoma tends to damage. Many studies have shown that myopia is a risk factor for developing glaucoma.[15] The prevalence of glaucoma is increasing day by day and POAG being its most common type is becoming a major threat the visual loss in a large number of people. A better understanding and management of all the risk factors associated with glaucoma could prove to be useful in slowing down the progression of the damage caused by the disease.

Besides several other risk factors, myopia is associated with the majority of patients with POAG. Since there is no perfect reference standard for confirming the diagnosis of glaucoma and also the majority of screening tools for its diagnoses such as fundus photography, optical coherence tomography, and perimetry are only available in tertiary eye care hospitals, the early detection of POAG gets very difficult in less developed areas that's why most patients present late in the course of their disease when substantial visual damage has already occurred. Therefore need of the hour to refer myopic patients, old age patients, and those with a family history of the disease for glaucoma screening so that glaucoma, if any can be diagnosed and managed earlier to prevent damage.

Methodology

A cross-sectional study was conducted from July 2021 to December 2021 at the Glaucoma Department of Al-Shifa Trust Eye Hospital, Rawalpindi. A sample of 100 subjects was taken through a consecutive sampling technique. A structured proforma based on previous research and clinical findings was used to gather the data.

Patients presenting in the glaucoma department were screened out for any ocular pathology after being examined through a 90D lens and slit lamp by an Ophthalmologist. Patients with a history of trauma or ocular pathology, any ocular fundus abnormality, without clear ocular media or central fixation were excluded. Intraocular pressure was measured with an applanation tonometer. The Anterior chamber angle was evaluated with the Van Herrick technique. Patients having open-angle glaucoma were shortlisted for the study.

The standard criteria for suspected glaucoma were as follows: (1) IOP ≥22 mmHg; (2) horizontal or vertical cup-to-disc ratio (CDR) ≥0.5; (3) violation of the ISNT rule (neuroretinal rim thickness in the following order by quadrant: inferior > superior > nasal > temporal); (4) presence of optic disc hemorrhage; or (5) presence of retinal nerve fiber layer (RNFL) defect. After that informed

consent was taken from them and subjects who were willing to participate were included in the study for further examination.

Their confidentiality was ensured by the 1975 Helsinki Declaration (as revised in Tokyo in 2004). This research was carried out after the approval of the Institutional Review Board (IRB) reference no Opto-IRB/11-02 of Al-ShifaTrust Eye Hospital, Rawalpindi. Demographic data were collected first which included age, gender, socioeconomic status, area of residence, and educational history. Visual acuity was then taken through the Snellen chart and converted into logMAR values. Autorefractometer was used to find the refractive status of the subjects. Subjective refraction was carried out by the researcher himself and the data obtained was noted in the proforma.

Chi-square for independence was used to find an association between myopia and independent variables. All the subjects were divided into three categories according to the level of spherical equivalent like emmetropic (-0.50 <SE< 0.50), myopic (SE <-0.50), and hyperopic (SE ≥ 0.50). Myopic subjects were further classified into low myopic (SE < -3.00), moderate myopic (SE= -3.00 to -6.00), and high myopic (SE> -6.00).[15]

Results

Demographic Characteristics

In this study, a total of 200 eyes from 100 participants were assessed. Both genders were included out of which males 63 and females were 37. The mean age of all the participants was 52.36 ± 15.350, ranging from 18 to 84 years. 42 of the total number of subjects were literate, whereas 58 were illiterate. 59 of the participants were from rural areas, whereas 41 were from urban areas. Table 1, all of the participants were from the lower and middle classes (42 and 58, respectively).

Table 1: Frequency Distribution of Demographics

Demographics	Frequency
Gender	
Male	63
Female	37
Educational Status	
Literate	42
Illiterate	58
Family Status	
Lower Class	42
Middle Class	58
Area of residence	
Rural	59
Urban	41

Clinical Features

Out of 100 subjects, 89 had blurred vision in both eyes while 51 had eyestrain, 53 had a headache, 49 had redness of eyes, and 52 had difficulty in seeing after evening (Table 2).

Table 2: Frequency Distribution of Clinical Features

Ocular History	Frequency
Blurred vision	89
Eyestrain	51
Headache	53
Redness of eyes	49
Reduced vision in even	52

Visual Acuity

Out of 200 eyes, 31 eyes had mild to severe media opacities and hence VA in log MAR was not possible (HM to NPL). The mean uncorrected visual acuity (UCVA) of the remaining 169 eyes was 0.74 log MAR (SD=0.413). After subjective refraction, 172 eyes had improvement in vision and the Mean Best Corrected Visual Acuity (BCVA) of these eyes was noted which was 0.48 log MAR (SD=0.413) Table 3.

Table 3: Frequency Distribution of Visual Acuity

Visual Acuity	N	Valid	Missing	Mean ± SD
UCVA	200	169	31	0.74 ± 0.413
BCVA	200	172	28	0.48 ± 0.413

Subjective Refraction

28 eyes were not able to be corrected due to moderate to severe opacities as those patients were excluded from the study. Out of the remaining 172 eyes, 54 (27.0%) had

emmetropia, 68 (34.0%) had low myopia, 25 (12.5%) had moderate myopia, 8 (4.0%) had high myopia while 17 (8.5%) had hyperopia (Table 4).

Table 4: Frequency Distribution of Subjective Refraction

Refractive Error	Frequency	Percentage (%)
Emmetropia	54	27.0
Low Myopia	68	34.0
Moderate Myopia	25	12.5
High Myopia	8	4.0
Hyperopia	17	8.5
Missing	28	14.0
Total	200	100

Inferential Statistics

Chi-Square for independence was used to find an association between myopia and independent variables. In gender-wise distribution, the male gender had a significant association with the high prevalence of low myopia in patients with POAG (p-value <0.05). Illiteracy and low and middle-class socioeconomic background were the other major risk factors associated. Eyestrain was the only chief complaint associated with the myopic patients presenting with POAG (p-value <0.05), Table 5.

Table 5: Demographics and Chief Complaints associated with POAG

Demographics	Frequency	X^2(df)	p-value
Gender			
Male	63	6.230(1)	0.046*
Female	37		
Educational Status			
Literate	42	8.179(1)	0.016*
Illiterate	58		
Family Status			
Lower Class	42	7.068(2)	0.027*
Middle Class	58		
Area of residence			
Rural	59	2.482(2)	0.311
Urban	41		

Statistically significant (p-value <0.05)

Discussion

The main objectives of this study were to find the frequency of moderate to high myopia in Primary Open Angle Glaucoma (POAG) and to find the association of different factors which lead to myopia in POAG. According to the national survey on blindness and visual impairment, the estimated prevalence of blindness in Pakistan is 1.05 to 1.09% with Glaucoma contributing as a third major cause of blindness (7.1%).[16]

Results show that the mean age of all the subjects was 52.36 ± 15.350, ranging from 18 to 84 years. Out of the 100 subjects included in the study, 89 had decreased VA ranging from 0.20 logMAR to NPL. The mean uncorrected visual acuity (UCVA) was 0.74 log MAR (SD=0.413). After subjective refraction, Mean Best Corrected Visual Acuity (BCVA) was taken, which was 0.48 log MAR (SD=0.413). A spherical equivalent was noted after adding half of the cylindrical value to the spherical value of the prescription. Out of the total sample, 54 eyes (27%) had emmetropia (-0.50 <SE <0.50), 101 eyes (50.5%) had myopia (SE ≤ -0.50) while 17 eyes (8.5%) had hyperopia (SE ≥ 0.50). Data were missing for 28 eyes (14.0%) due to media opacities as in those subjects one eye was included but the other eye doesn't follow inclusion criteria. Out of the 101 myopic eyes, 68 eyes (67.3%) had low myopia (SE < -3.00), 25 eyes (24.7%) had moderate myopia (SE= -3.00 to -6.00) while 8 eyes (8.0%) had high myopia (SE> -6.00).

The factors responsible for the increased number of myopic patients reporting POAG were male gender (p-value=0.046), low socioeconomic background (p=0.027), and low education level (p=0.016). Area of residence had a statistically insignificant relationship with the increased number of myopic cases having POAG (p=0.311). The only chief complaint that has a significant relationship was eyestrain (p=0.021). Headache (p=0.126), redness of eyes (p=0.948), and difficulty seeing at dusk (p=0.165) had no statistically significant relationship with myopia in patients with POAG. The increased risk of glaucoma with increasing age is noticed in almost all population studies. According to Chauhan, patients older than 60 years manifested seven times higher incidence of glaucomatous visual field defects than those under 40 years. Some studies have reported that the prevalence increase becomes significant after the age of 60.[17] Our study also confirms the same finding as

evident from the mean age of all the subjects in this study which was 52.36 ± 15.350.

Gender has no statistically significant impact on the prevalence of POAG as some studies report male while some report female gender to be the major risk factor for POAG.[18] In our study, the male gender (63%) has been reported to be the major risk factor as compared to the female gender (37%). A study in Canada indicates that low socioeconomic status is associated with greater severity of glaucoma, specifically for those ≥65 years old.[19] It could be interpreted as low socioeconomics leading to more blindness that eventually causes more disability and hence starting a vicious cycle of increasing poverty. It came out as no surprise when our data showed that low socioeconomic status (p-value=0.027) was the major risk factor for the prevalence of myopia and ultimately POAG. Importance should be given to glaucoma education and screening, especially in poor areas.

Most studies indicated a low level of education as a contributing factor of blindness and the same is the case with glaucoma as its prevalence is decreased with increasing levels of education and income.[15] Our study has also confirmed the same finding as illiteracy (58%) was the major risk factor associated with myopia and POAG (p=0.016). Whether a person is illiterate or literate, they have no prior knowledge about glaucoma and they only visit hospitals when there is severe visual loss. Studies have shown that people coming from rural areas were more prone to advanced glaucoma due to a lack of proper medical facilities and tools for diagnostics and management of glaucoma patients in rural areas. But in this study, the area of residence was not found to be significant (p=0.311).

Primary open-angle glaucoma remains symptoms less in the earlier stage due to the silent nature of its pathogenesis till the advanced stage is reached when people start to experience visual disturbances. Patients become only aware when they notice vision loss or blind spots, which usually occurs in the late or severe stage of glaucoma and a substantial degree of irreversible optic nerve damage may have already occurred.[19] Our study has found no significant relationship between the various symptoms associated with POAG and myopia except eyestrain which has a statistically significant relationship (p=0.021).

Conclusion

In conclusion, our results show that, as myopia and glaucoma are both among the most prevalent and rapidly increasing eye diseases causing vision impairment and blindness globally, emphasis on knowledge about glaucoma, proper eye consultation, behavior toward the irreversible nature of the disease, and its proper management should be made especially in myopic patients.

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ORIGINAL ARTICLE

Effect of phacoemulsification on intraocular pressure in glaucoma patients

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A B S T R A C T

Introduction: Cataracts and Glaucoma are the leading causes of irreversible blindness worldwide. Lens extraction using the Phacoemulsification technique can be an effective IOP-lowering treatment for all types of glaucoma.

Objective: The purpose of this study was to measure the Intra-Ocular Pressure before and after phacoemulsification and to determine the mean change in Intra-Ocular Pressure.

Methodology: This study included 53 glaucoma patients with Primary Open Angle Glaucoma (POAG) (n=34), Angle Closure Glaucoma (ACG) (n=18), and Pseudoexfoliation (PXF) % (n=4) Glaucoma who visited the Glaucoma Department of Al-Shifa Trust Eye Hospital Rawalpindi. Pre and post-interventional study designs were used. Based on a slit lamp examination, patients were labeled as having cataracts in glaucomatous eyes. Pre-operative Intraocular pressure (IOP) was noted using Goldmann Applanation Tonometer (GAT). Patients were referred for Phacoemulsification and their IOP was noted after 2 weeks of surgery. The non-Probability convenient sampling Technique was used. Paired t-test was used to find the mean change in IOP.

Results: The mean age of respondents was (62.5±10.25) and had a maximum value of 81 years and a minimum value of 40 years among a sample of 53 respondents. The mean IOP before phacoemulsification was (16.25±7.251) the mean IOP after phacoemulsification was (13.28±5.940) and the mean difference was (2.962 ±8.364) in glaucomatous patients having cataracts. This difference was found to be statistically significant (p-value<0.05).

Conclusion: In Glaucomatous patients having cataracts after phacoemulsification there is a significant reduction in IOP and medications after surgery. This IOP reduction was more marked in POAG patients as compared to other types of Glaucoma.

Keywords: *Glaucoma, Intra-ocular pressure, Cataract, Phacoemulsification*

Introduction

Glaucoma is a visual neuropathy of multifactorial etiology in which intraocular pressure (IOP) is the most significant and only modifiable risk factor. Accurate IOP measurement is critical in the diagnosis and treatment of glaucoma.[1] Glaucoma is the primary cause of permanent blindness, according to the World Health Organization, and its incidence is likely to rise dramatically by 2040. Currently, 20 million people have primary angle-closure glaucoma; by 2040, 34 million people will be affected, with 53 million blind. Surgical lens extraction, which is commonly done to treat age-related cataracts, is an alternate treatment for primary angle-closure glaucoma. The lens's

age-related development is a critical factor in the mechanisms that lead to primary angle-closure glaucoma, and lens extraction is commonly performed in individuals who also have a cataract.[2]

IOP is a significant risk factor for the development of glaucoma as well as the progression of pre-existing glaucoma. Reduced intraocular pressure (IOP) is the best and only evidence-based therapy method; pharmacologic and surgical procedures aiming at lowering IOP may successfully delay the progression of structural deterioration and visual field loss in glaucoma patients As a result, IOP monitoring is critical in ophthalmological evaluation. However, despite IOP reduction to therapeutic values, glaucoma may proceed, this suggests that variables other than IOP may play a key role in the etiology of glaucoma. IOP changes among individuals, with normal IOP maintained by the dynamic balance between watery humor production and outflow, as well as episcleral venous pressure. Aqueous humor aids in the maintenance of proper IOP. IOP aids in the maintenance of the normal shape of the eyeball.[3]

POAG affects around 13.5 million persons over the age of 40 worldwide. This accounts for 60 percent of the disease's entire global burden. PACG accounts for 6 million individuals, with an age distribution similar to that of the open-angle variant.[4] Cataract extraction is a safe and successful procedure that has been practiced for several decades in its contemporary form. Many studies have found that cataract extraction may have a clinically important role in the management of concomitant glaucoma. Lens extraction reduces intraocular pressure (IOP), which is the only modifiable risk factor in glaucoma that is beneficial.[5]

Pseudoexfoliation syndrome is usually linked with pseudoexfoliation glaucoma, the most prevalent recognized type of secondary open-angle glaucoma globally. Pseudoexfoliation is an established risk factor for cataract development.[6] PES has been widely demonstrated to cause chronic open-angle glaucoma, as well as angle-closure glaucoma, lens subluxation, blood-aqueous barrier impairment, and complications during cataract extraction, such as capsular rupture, zonular dialysis, and vitreous loss, as awareness of the condition has grown. Medical treatment is usually ineffective, however, numerous surgical treatments have been offered to better cure the syndrome's clinical signs.[7]

More than 20 years ago, phacoemulsification was proposed as a procedure for removing the cataractous lens. With improved safety and efficiency, advances in techniques and equipment have resulted in substantial growth in the popularity of phacoemulsification. Viscoelastic agents were established in combination with modern phacoemulsification procedures, and they are critical to the success of this modern technology. Improved surgical procedures for removing the anterior lens capsule have decreased the incidence of both intraoperative and postoperative capsular complications.[8] Cataracts are thought to be responsible for 41.8 percent of all global blindness. Implementing health care initiatives in a community and raising knowledge of common eye diseases might encourage people to have their eyes examined. This might lead to earlier detection, treatment, and decrease of vision impairment and blindness caused by eye diseases. Glaucoma is the world's second-largest cause of vision loss. It has also been stated that almost half of glaucoma patients were ignorant of their condition at the time of diagnosis and were in an advanced stage of the disease.[9]

Cataracts and glaucoma are the world's primary and second major causes of blindness. As a result, physicians are interested in the interaction of these two disorders. After cataract surgery, both glaucomatous and non-glaucomatous eyes had a drop in IOP. Cataract surgery is a popular and developed procedure with a favorable risk/benefit profile that includes enhanced visual acuity and visual field. The widely held assumption that cataract extraction alone reduces IOP by 2-4 mmHg is gradually giving way to awareness of a larger and more persistent IOP decrease, particularly in patients with higher preoperative IO.[10]

Methodology

This study included a total of 53 patients. Pre and post-interventional study designs were used that involved analysis of data collected from a population before phacoemulsification and 2 weeks postoperatively. All patients with Primary Open Angle Glaucoma (POAG), Angle Closure Glaucoma (ACG), and Pseudoexfoliation (PXF) Glaucoma who visited the Glaucoma Department of Al-Shifa Trust Eye Hospital Rawalpindi had a cataract in

either eye. A study was conducted in the Glaucoma Department of Al-Shifa Trust Eye Hospital Rawalpindi, being visited by patients from different areas of Pakistan.

It was based on the non-probability convenient sampling technique After gaining written informed consent from the representative subset and ethical approval from the respective department, the data was collected from glaucoma patients with POAG, ACG, and PXF glaucoma who had cataracts in either eye (who fulfilled the inclusion criteria) to find out the mean change in IOP before and after phacoemulsification.

A detailed examination was performed by an ophthalmologist. Based on a slit lamp examination, patients were labeled as having cataracts in glaucomatous eyes. Glaucomatous Patients have been diagnosed as POAG on clinical findings (elevated IOP and optic nerve changes), visual field loss, and/or retinal nerve fiber layer (RNFL) defects. Each patient had preoperative gonioscopy showing an open-angle defined as gonioscopy Shaffer grade ≥ 3 in all four quadrants without peripheral anterior synechiae or heavy pigmentation, suggesting secondary or angle-closure glaucoma, on gonioscopy showing peripheral anterior synechiae, characteristic visual Field and optic nerve head changes and IOP greater than 40mmhg patients were assigned as Angle-closure glaucomatous patients. On Examination the presence of PXF material which appears as fluffy, white deposits at the pupillary margin, anterior lens surface, and ciliary zonules were characterized as pseudo-exfoliative glaucomatous patients.

Patients were referred for Phacoemulsification and their IOP was noted after 2 weeks of surgery. IOP was measured with Goldmann Applanation Tonometer. This study was completed in 6 months (From July 2021 to December 2021) after approval by the Pakistan Institute of ophthalmology Institutional Review Board (IRB). This study included Patients above the age of 40 years of both genders treated for Open-Angle Glaucoma, Angle Closure Glaucoma, and Pseudoexfoliation Glaucoma along with cataracts and patients who had undergone Trabeculectomy. Those patients who had a history of other types of Glaucoma, Patients with Ophthalmic diseases (other than cataracts), Ocular emergencies, and Non-cooperative patients were excluded from this study. Data were analyzed using SPSS version 26. Paired sample t-Test was used to find the mean change in IOP.

This study suggested the tissue pressure of intraocular contents before and after phacoemulsification. Post-operatively, a marked reduction in IOP as well as in glaucoma medications was noted. This study will also further provide information to monitor the reduction in IOP at follow-up visits, the mean change in IOP, and the amount of reduction in intraocular pressure.

Results

A total of 53 eyes of 53 patients were included in this study. The mean age of respondents was (62.5±10.25) and had a maximum value of 81 years and a minimum value of 40 years among a sample of 53 respondents. Among 53 respondents 50.9% (n = 27) were male and 49.1% (n = 26) were females. In a sample of 53 eyes, 47.2% (n=25) had positive surgical history and 52.8% (n=28) had negative surgical 58.50 % (n=34) respondents were reported with Primary open-angle glaucoma, 34.00% (n=18) with Angle-closure Glaucoma, and 7.50% (n=4) with Pseudo exfoliative glaucoma. A paired t-test was conducted to compare the readings of IOP before and after phacoemulsification. It can be seen from the results that the mean IOP before phacoemulsification was 16.25 (7.251) and the mean IOP after surgery was 13.28 (5.940). The mean difference was 2.962 ±8.364 and this difference was statistically significant (p-value<0.013, Table 1. The mean IOP before phacoemulsification in primary open-angle glaucoma was 15.69 (6.072) and the mean IOP after surgery was 12.94 (3.369). The mean difference was (2.750±5.657) and this difference was statistically significant (p-value<0.010, Table 2. The mean IOP before phacoemulsification IN Primary angle-closure Glaucoma was 15.47 (4.170) and the mean IOP after surgery was 13.88 (9.020). The mean difference was (1.588± 8.839) and this difference was not statistically significant Table 3. The mean IOP before phaco in Pseudo exfoliative glaucoma was 24.50 (18.50) and after phaco was 10.50 (3.00). The mean difference was (14 ±16.24) and this difference was not statistically significant Table 4.

Table 1: Mean change in IOP readings before and after phacoemulsification in glaucomatous patients

Variables	N	Mean	S.D	P value
IOP before phacoemulsification	53	16.25	7.251	0.013
IOP after phacoemulsification	53	13.28	5.940	

N Number of Patients, S.D Standard Deviation, P <0.05, Paired t-test.

Table 2: Mean change between IOP readings before and after phacoemulsification in Open Angle Glaucoma

Variables	N	Mean	S.D	P value
IOP before phacoemulsification	32	15.69	6.072	0.010
IOP after phacoemulsification	32	12.94	3.369	

N Number of Patients, S.D Standard Deviation, P <0.05, Paired t-test.

Table 3: Mean change between IOP readings before and after phacoemulsification in Angle Closure Glaucoma.

Variables	N	Mean	S.D	P value
IOP before phacoemulsification	17	15.47	4.170	0.470
IOP after phacoemulsification	17	13.88	9.020	

N Number of Patients, *S.D* Standard Deviation, *P <0.05*, Paired t-test.

Table 4: Showing mean change between IOP readings before and after phacoemulsification in Pseudo-exfoliative Glaucoma.

Variables	N	Mean	S.D	P value
IOP before phacoemulsification	4	24.50	18.50	0.183
IOP after phacoemulsification	4	10.50	3.00	

N Number of Patients, *S.D* Standard Deviation, *P <0.05*, Paired t-test.

Discussion

Cataracts and high intraocular pressure (IOP) with or without glaucoma become more common as people get older. Meanwhile, cataract surgery is beneficial for both cataract and glaucoma patients. It has been shown to lower IOP in eyes with and without glaucoma, however to varying degrees and depending on characteristics including anterior-chamber anatomy and angle configuration.[11]

In the current study, 53 eyes of 53 patients were evaluated by the Glaucoma Department of Al Shifa Trust Eye Hospital. 27 were males and 26 were females. Moreover, the current study included only glaucomatous patients with cataracts. The present study demonstrated that there was a mean change in IOP readings before and after phacoemulsification in glaucoma patients with cataracts. When comparing the mean IOP values before and after surgery, there was a reduction in IOP values after phacoemulsification and this IOP reduction was statistically significant in all glaucoma types. When a mean change in IOP was calculated separately for POAG, ACG, and PXG, the IOP reduction was statistically significant for POAG. The reduction in IOP for ACG and PXG was not statistically significant.

These results were complementary to other research e.g. A study conducted by Mark A included 157 eyes in the study. The average preoperative IOP of 16.3±3.6 mm Hg decreased to 14.5±3.4 mm Hg. Phacoemulsification resulted in a small average decrease in IOP in patients with OAG. There was a statistically significant difference in IOP readings after phacoemulsification. This study is in accordance with our results.[12] Another research conducted by AZ Jamil included 50 (41%) males and 72 (59%) females. The mean age was 56.4±8.57 years. The mean pre-operative IOP was 25.70±7.79 mmHg, which was decreased to 17.44±2.8 mmHg (p-value < 0.001) at a follow-up visit. The number of mean antiglaucoma medications decreased from 1.12±1.30 pre-operatively to 0.62±0.92 at a final follow-up visit. Phacoemulsification resulted in a reduction in IOP in normal as well as glaucomatous eyes and it significantly reduced the need for anti-glaucoma medications. This study also supported our results.[13]

Philip *et al* showed that phacoemulsification resulted in a reduction of IOP by 13% and glaucoma medications by 12% in POAG. For PXF, phacoemulsification reduced IOP

by 20% and glaucoma medications by 35%. Patients with acute PACG had a 71% reduction in IOP and rarely required long-term glaucoma medications when phacoemulsification was performed soon after the medical reduction of IOP. Phacoemulsification typically resulted in small, moderate, and marked reductions of IOP and medications for patients with POAG, PXG, and PACG, respectively. These results supported our study but the mean change in IOP in different types of glaucoma is contrary to our study.[14]

J. Jimenez-Roman demonstrated that, after phacoemulsification, there was a statistically significant reduction in IOP values and glaucoma medications in both POAG and PXG patients ($p<0.001$). A significant difference in the mean IOP was revealed between groups ($p=0.005$). The reduction of post-surgical IOP means values in both groups, the POAG group showed a greater reduction in IOP values compared to the PXG group. This study also supported our results.[15]

A study conducted by Armstrong revealed that In individuals with POAG, phacoemulsification as a stand-alone treatment resulted in the reduction of IOP and dependence on topical glaucoma drugs. The results of our study also showed that there is a statistically significant reduction in IOP after phacoemulsification in POAG.[16]

K Hayashi in Japan included 74 eyes with ACG and 68 eyes with OAG having cataract surgery. Preoperatively, 1 month postoperatively, and subsequently every 3 months, the IOP was measured and the number of glaucoma medicines was recorded. The mean IOP and number of medications decreased significantly after surgery in both groups ($p<0.001$). However, the mean decrease in IOP and percentage of IOP reduction in the ACG group were greater than in the OAG group, and fewer medications were required in the ACG group. The IOP reduction is in accordance with results but greater IOP reduction in ACG is contrary to our study.[17]

A study conducted by M Zamani included 129 eyes with open angles and normal or high IOP undergoing phacoemulsification and IOL implantation for senile cataracts. The patients were divided into 3 groups based on preoperative IOP: ≤15 mmHg; from 16 to 20 mmHg and; from 21 to 30 mmHg. IOP was measured by Goldmann applanation tonometry one day before surgery, and 1 and 6 weeks postoperatively. IOP was decreased postoperatively in all study groups 1 and 6 weeks after surgery as follows: 2.8±1.5 and 1.8±1.7 mmHg respectively in G1 ($p<0.001$); 4.2±1.9 and 4.3±2.9 mmHg respectively in G2 ($p<0.001$), and 8.3±4.3 and 9.3±4.1 mmHg respectively in G3 ($P<0.001$). In both normal subjects with open angles and those with ocular hypertension, IOP decreased significantly after phacoemulsification and IOL implantation. Eyes with a higher preoperative IOP had a greater reduction in IOP. These results were complementary to the results of our study.[18]

There was a statistically significant reduction in IOP after phacoemulsification in glaucomatous patients having cataracts. This IOP reduction was more marked in OAG patients. The IOP reduction was statistically significant in POAG patients and the IOP reduction in ACG was not statistically significant. The higher the pre-operative IOP, the greater the post-operative reduction. Moreover, after phacoemulsification, there was also a reduction in glaucoma medications.

Conclusion

In Glaucomatous patients having cataracts after phacoemulsification, there is a significant reduction in IOP and medications after surgery. This IOP reduction was more marked in POAG patients as compared to other types of Glaucoma.

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ORIGINAL ARTICLE

Willingness towards eye donation: A public health necessity in Pakistan

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A B S T R A C T

Introduction: According to the World health organization (WHO), a person is said to be blind when he/she has visual acuity of less than 3/60, and/or a corresponding visual field of less than 10°; for a smaller diameter, in the better eye with the best possible correction. At present, approximately 39 million individuals are bilaterally blind, and another 285 million with severe visual impairment.

Objective: To assess the willingness and knowledge of the people regarding eye donation and to evaluate factors associated with eye donation.

Methodology: This cross-sectional study was carried out in the outdoor patient department (OPD) of two governments and two private tertiary healthcare hospitals in Rawalpindi and Islamabad from Nov 2018 to January 2019. A total of 360 individuals who visited OPD of the tertiary health care hospitals were included. Data were obtained by using an interview-based questionnaire after taking informed consent. Data was entered in SPSS 22. Qualitative variables were presented as frequencies and percentages and Quantitative variables as a mean & standard deviation. Inferential analysis was done by applying the Chi-Square test and binary logistic regression.

Results: Out of 360 respondents, the majority were males 201 (55.8%). Two hundred and six (57.2%) were willing to donate their eyes. Willingness showed a statistically significant association with occupation. 175 (48.6%) had good knowledge regarding eye donation. Male respondents had 3 times more knowledge regarding eye donation as compared to females (OR 3.440, a p-value is <0.01, CI: 2.1- 5.4). Respondents having an age higher than 30 years had 2 times high knowledge as compared to individuals having an age less than 30 years (OR 2.07, a p-value is <0.03, CI:1.1-2.6).

Conclusion: The majority of the people showed willingness but had little knowledge regarding eye donation procedures and eye banks in Pakistan. The donation rate is low in Pakistan due to a lack of resources and awareness.

Keywords: *Willingness, Corneal blindness, Eye donation, Knowledge, Eye bank*

Introduction

According to the World health organization (WHO), a person is said to be blind when he/she has visual acuity of less than 3/60, and/or a corresponding visual field of less than 10°; for a smaller diameter, in the better eye with the best possible correction.[1] At present, approximately 39 million individuals are bilaterally blind, and another 285 million with severe visual impairment.[2] Majority of blind people approximately 90% are living in developing countries.[3] Corneal blindness is the 4th leading cause of blindness. It affects 1.9 million people (5.1%) globally after

cataracts which affect 20 million people (51%) globally.[4] Out of total blindness (18.7 million) in India, 0.19 million are blind due to bilateral corneal disease.[5] In Malaysia, it accounts for 3.42% of all blindness.[6] Pakistan is a developing country, where the national blindness and visual impairment survey reported the prevalence of blindness to be 0.9%; out of which corneal scarring (11.8%) is the leading cause after cataracts (51.5%).[1] The most frequent cause of corneal blindness is trachoma, trauma, Xero-ophthalmia, ophthalmia-neonatrum, keratoconus, ocular trauma, onchocerciasis, and the use of traditional eye medicine.[7] Corneal transplantation is the only treatment option for restoring sight in those with corneal blindness, which can only be accomplished through corneal donation.[8] Corneal donation is low in Pakistan, but the demand is very high, therefore we are dependent on foreign countries like Sri Lanka, the USA, and Europe for donations.[9] Limited data has been found on awareness of eye donation in Pakistan. So this study aimed to assess the willingness and knowledge regarding different aspects of eye donation among the general population and this study will also help to educate people about the eye donation procedure so that more individuals will come up to donate their corneas and assist in reducing the rate of corneal blindness.

Methodology

A cross-sectional study was done on attendants accompanying patients visiting OPD of tertiary health care facilities in twin cities i.e. Rawalpindi and Islamabad. Sample size was calculated by Z2pq/e2, Z=1.96, p (expected percentage) = 65 10, q (100-p) =35, e (margin of error) =5.The total sample size was calculated to be 350. Individuals attending OPD of the hospitals were selected using a consecutive sampling strategy. Individuals of both gender; aged above 18 years were included. An interview-based pre-validated questionnaire was used to collect data. The questionnaire consists of socio-demographic variables, knowledge questions regarding different aspects of eye donation, and willingness to pledge the eyes. Permission was taken from the Ethical review committee (Reference No: ERC-55/AST18) of Al- Shifa trust eye hospital and the medical superintendent (MS) of the selected hospitals. Moreover, verbal informed consent was also taken from every individual before they participated in this study. Face and content validity was checked by circulating it to experts in the field. A few questions were found redundant and unclear to interpret, which were then removed or modified Data was entered and analyzed by using SPSS version 22. The descriptive analysis was done and frequencies and percentages for qualitative variables and mean, and standard deviation for quantitative variables were presented. The willingness was asked by asking the individuals' opinions regarding eye donation with yes, no, and don't know. All the questions related to knowledge were computed and categorized into good (>6) and poor (<6) based on the mean (6) as a cutoff point. Inferential analysis was done by running Chi-square and binary logistic regression. A p-value of less than 0.05 was considered significant.

Results

A total of 360 participants were enrolled in this study. One hundred and fifty-nine (44.2%) were from private hospitals while 170 (47.2%) were from government hospitals (Table 1).

Table 1: Socio-Demographic Characteristics (n=360)

Demographics	Frequency (n=360)	Percentages
Hospital Category		
Government	170	47.2
Private	159	44.2
Gender		
Male	201	55.8
Female	159	44.2
Age (Years)		
18-30	184	51.1
Greater than 30	176	48.9
Education (Years)		
0-12	228	63.3
Greater than 12	132	36.7
Monthly expenditure		
30000 or less	218	60.6
Greater than 30000	142	39.4
Area of Residence		
Urban	257	71.4
Rural	103	28.6
Employment status		
Medical	103	28.6
Non-Medical	124	34.5
Non-Working	133	36.9

The majority of the participants i.e. 206 (57.2%) showed a willingness to donate their eyes and almost 52% of the participants had poor knowledge. The most common source of information regarding eye donation was Mass media through television 124 (34.4%) followed by social media 57 (15.8%) and Abdul Sitar Edhi; who willed to donate his eyes after death; 37 (10.3%). One hundred and eighty-four (51.1%) respondents reported that consultation for donating eyes should be taken from any general hospital, while 51 (14.2%) were thoughtful eye specialists for this purpose. Approximately 60% of individuals did not know about the eye bank in Pakistan. Willingness was statistically significant to working status. Knowledge was found statistically significantly associated with age, gender, employment status, education level, and hospital category (Table 2).

Table: 2 Association of Willingness and Knowledge with demographics (n=360)

	Willingness			P- value	Knowledge		P-Value
	Yes 206 (57.2%)	No 111 (30.8%)	**Don't Know** 43 (11.9%)		Good 175 (48.6%)	Poor 185 (51.4%)	
Age				0.20			0.01*
18-30	111 (60.3)	49 (26.6)	24 (13.0)		101 (54.9)	83 (45.1)	
Greater than 30	95 (54.0)	62 (55.9)	19 (44.2)		74 (42.0)	102 (58.0)	
Employment status				0.02*			0.003*
Medical	64 (63.4)	25 (24.8)	12 (11.9)		67 (31)	36 (32.1)	
Non-Medical	77 (60.2)	32 (25.0)	19 (14.8)		58 (46.5)	66 (53.5)	
Not-working	65 (49.6)	54 (41.2)	12 (9.2)		50 (31)	83	
Education				0.15			0.001*
0-12 Years	126 (55.3)	78 (34.2)	24 (10.5)		70 (40%)	138 (74.6)	
Greater than 12 Years	80 (60.6)	33 (25)	19 (14.4)		105 (60)	47 (25.4)	
Gender				0.12			0.001*
Male	123 (61.2)	53 (26.5)	25 (12.4)		125 (62.2)	76 (37.8)	
Female	83 (52.2)	58 (36.5)	18 (11.3)		50 (31.4)	109 (68.6)	

*Statically significant p-value is < 0.005

A significant regression model was found (p<0.01). This model was explained between 18% (Cox 3 &24 % (Nagelkarke) of the variance between knowledge status and correctly classified 51.4% of cases. Males were 3 times more likely to have good knowledge as compared to females. (OR 3.205, the p-value is <0.01, CI: 1.9- 5.1). Respondents with an age greater than 30 years were 2 times more likely to have good knowledge as compared to respondents with an age less than 30 years. (OR 2.07, the p-value is 0.03, CI: 1.1-2.6) (Table 3).

Table: 3 Binary Logistic Regression modeling for predictors of knowledge regarding eye donation

Knowledge				
	Sig	Exp B	95% CI	
			Lower	Upper
Gender	0.00*	3.440	2.168	5.459
Age	0.03*	2.074	1.051	2.666
Hospital Categories	0.12	0.702	0.447	1.103
Education	0.00*	1.004	0.311	0.816

*Statically significant p-value is < 0.005

Discussion

In the present study, 360 individuals were included. Good and poor knowledge was found among 175 (48.6%) and 185 (51.4%) individuals respectively. The main objective of this study was to assess the willingness of participants to about eye donation. In the present study; despite having poor knowledge, 206 (57.2%) individuals were willing to pledge their eyes after death, which is less than the willingness shown by adults in Singapore (67%).[11] In this study, 316 (87.8%) participants agreed that eye donation should be encouraged which showed the favorable response of participants towards eye donation.

Despite having maximum willingness of individuals; the donation rate is low in Pakistan due to a lack of resources and awareness among the general population. In a current study, people have no idea where to get access or to whom we should consult to get information about eye donation. In India, a government organization was involved in doubling the donation rates as per the target set by the NCPB (National Program for the control of Blindness) in Gujrat and Tamil. Their success was attributed to several NGOs that constantly raise awareness about eye donation among the people of India.[12] But in Pakistan there is no such governmental/non-governmental organization at aims to raise awareness among the population. An eye bank is another factor that affects the donation rate because in the current study maximum i.e. 215 (59.7%) participants were unaware of the presence of an eye bank in Pakistan. Al-Shifa Trust eye hospital took the lead and established the first-ever eye bank in Rawalpindi, Pakistan on August 01, 2018, but in India, there are 120 eye banks formally established in different parts of the country.[13, 14] Another objective of this study was to assess the knowledge regarding eye donation. In the current study, 80.6% of individuals had heard about eye donation which is higher than the studies conducted in North West Ethiopia (57%), and Mangalore (44%).[15, 16] In the present study, 48.6% of the participants had good knowledge regarding eye donation which is less than the knowledge score in studies conducted in Malaysia (69%), Singapore (80.7%), and North-West India (70.5%).[6, 11, 17] It may be inferred that this difference in knowledge may be due to the lower literacy rate in Pakistan (65%) as compared to other countries' adult literacy rates such as that of Singapore (97.5%) and India (74.3%).[18, 19] This could be the reason for misconceptions about eye donation because in the current study 55% of the individuals considered that not only the cornea but the whole globe is extracted during the procedure. Overall this comparison shows that greater effort needs to be exerted to increase the level of awareness about eye donation among the general population. In the current study, the majority of the individuals i.e. 261 (72.5%); considered that healthcare workers are the ones who can promote eye donation; followed by media i.e. 57 (15.9%). So Ophthalmologists, Optometrists, General physicians, Medical students, non-governmental organizations, and religious leaders should be motivated to work together to increase the awareness level and donation rates. Seminars, workshops, and social media may increase awareness and confiscate the misconceptions that make people restrain from donating their eyes.

Conclusion

This study that showed the willingness for eye donation among the general population is high despite having inadequate knowledge regarding eye donation procedures. In Pakistan, the donation rate is low due to a lack of resources and several factors such as a lack of awareness about eye banks, misconceptions about eye donation, and limited campaigns for awareness. Such factors collectively contribute to the low donation rate.

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ORIGINAL ARTICLE

Determinants of the world health organization surgical safety checklist use among clinicians at Kenyatta National Hospital Nairobi, Kenya

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Author`s Contribution

[1] Conceptualization of study, analysis, and interpretation of data

[2-3] Drafting the article or revising it critically for important intellectual content. final approval of the version to be published

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A B S T R A C T

Introduction: The World Health Organization Surgical Safety Checklist (SSC) minimizes harm to patients. Clinicians use the checklist to confirm and ensure that the correct surgical operation is performed on the correct patient at the correct location. There are limited studies done to assess the effectiveness of using SSC in the operating rooms at Kenyatta National Hospital (KNH) since its adoption in 2012.

Objective: The broad objective of the study was to determine SSC use among clinicians at Kenyatta National Hospital in Nairobi, Kenya; and determine clinicians' and institutional-related factors influencing its use at the same hospital.

Methodology: A cross-sectional study was conducted in the operating theatres at KNH. The study recruited 178 consented clinicians who use SSC and excluded those on leave based on the multi-stage sampling technique and Yamane's formulae. Collected data were processed using IBM SPSS version 20.

Results: About 98% of the respondents were aware of SSC with 95% reporting its use during the interview day. Around 52% of the respondents had the clinical experience of over 10 years with 46% having theatre experience of over 10 years. Almost 95% of the respondents reported availability and its use with 99% confirming its mandatory usage in the operating theatres. Training and sensitization of clinicians on the use of the checklist were at 62% and 70%, respectively.

Conclusion There was a recommendable utilization level of SSC at 95% influenced by clinicians' and institutional related factors at Kenyatta National Hospital.

Keywords: *Clinicians, Operating theatres, Surgical safety checklist, Surgical operation.*

Introduction

Patient safety, a global health priority, and the core value of the Joint Commission for International Accreditation is a process described as preventing errors and adverse effects for patients associated with healthcare.[1] This is why the World Health Organization inspired the start of the safe surgery save the lives program in 2007. The initiative aimed at minimizing surgical harm and adverse surgical outcomes such as deaths and disabilities across the world. Subsequently, ten necessary objectives for the safe surgery saves life program was established and compiled into the World Health Organization Surgical Safety Checklist (SSC), introduced in 2008. The checklist serves as a reinforcement tool for accepted surgical safety checks and cultivates better communication and teamwork by the surgical teams. The adoption and usage of the checklist have been associated with reduced postoperative

morbidity and mortality rates in different healthcare institutions.[2, 3]

Kenyatta National Hospital adopted and localized it into its intraoperative notes around 2012 as part of the requirements for ISO certification to document the intraoperative processes and improve surgical outcomes.[3] Before then, surgical teams performed surgeries based on their own expert opinion and experience in the hospital.

The checklist has been an important tool in complementing safety checks among other tools. This tool introduces necessary repetitive surgical safety checks thereby reinforcing good surgical practices. This in turn contributes to good surgical outcomes. Surgeons, anesthesiologists/anesthetists, and nurses use the checklist to confirm and ensure that the correct surgical operation is performed on the correct patient at the correct location, among other checks.[4, 5] Compliance with the usage of the checklist differs across healthcare institutions. The limited usage may be associated with adverse surgical outcomes still being reported in places where it has been adopted. For instance, the recent media report on the wrong patient operated in a Kenyan hospital in 2018 among other adverse surgical outcomes might be linked to poor adherence to the checklist. [6, 7]

Kenyatta National Hospital offers leadership in healthcare services, policy formulation, and implementation not only in Kenya but also in East and Central Africa. Subsequently, documentation and reports regarding the use of WHO SSC in the operating rooms in this premier hospital are essential in promoting positive surgical outcomes to healthcare facilities dependent on its guidance. There are limited publications detailing the utilization of WHO SSC in Kenya, aside from anaesthesiologists reporting varying utilization levels of the checklist at Kenyatta National Hospital among other healthcare institutions in East Africa; though the checklist requires teamwork utilization involving surgeons, nurses, and anaesthesiologists/anesthetists.[8] Furthermore, the tenth objective of the World Health Organization's safe surgery saves live program, requires all healthcare organizations to do routine surveillance of surgical outcomes and share the same with others through publication. Good surgical practices as detailed by such reports are expected to facilitate other healthcare institutions to learn and embrace. [3, 9] Thus, necessitating a study on the use of SSC by clinicians in the operating rooms at Kenyatta National Hospital.

This study endeavored to find out the utilization level of the checklist in the operating theatres as well as factors determining its use at Kenyatta National Hospital. This was to inform any need to develop further education and training programs to improve clinicians' knowledge of surgical safety practices in operating theatres. This would also serve as a baseline study on the use of the checklist by clinicians at Kenyatta National Hospital, with subsequent studies to be done in view of the gaps identified by this study for the overall improvement in patient management in the operating rooms.

Methodology

Study Design and Setting

A descriptive cross-sectional study was conducted at Kenyatta National Hospital in Nairobi, Kenya. This is the largest and oldest public hospital in Kenya, serving as a regional referral hospital. It receives referred patients from all 47 Kenyan counties as well as those from East and Central Africa. The hospital has 24 specialized theatres, and 12 of these are the main ones referred to as main theatres. The specialties include cardiothoracic, plastic and reconstruction, pediatrics, orthopedic, oral maxillofacial, ear nose and throat, nephrology, neurosurgery, obstetrics, gynecology, and general surgery among others. Elective surgeries are done from Monday to Friday while emergency surgeries are done throughout. The study was carried out in the operating rooms of all theatres where the World Health Organization Surgical Safety Checklist is routinely used.

Sample Size Determination

The recruitment of study clinicians was based on multi-stage sampling techniques, with the clocking register utilized as a sampling frame to gather data from 21 operating theatres. The study sample size was calculated using Fisher's formula and since the target population was less than 10,000 the sample size determination was done using Yamane's formula.[10] With a 95% confidence interval and a 5% degree of precision, a minimum sample size of 178 was reached. The study population comprised all consented clinicians working in

the operating rooms that use SSC and excluded those that were on leave. Multi-stage sampling techniques were used to acquire a representative sample from all the clinicians with a large number of nurses as they were more and were also the designated coordinators of theatre activities. Study clinicians were categorized into three groups: nurses, anaesthesiologists/anesthetists, and surgeons. Study nurses were sampled as follows, the main theatre (60/80) and maternity theatre (30/40) based on clocking registers at each station. The study sampled 4 surgeons from each of the 11 specialties (pediatrics, cardiothoracic, neurosurgery, orthopedic, obstetrics and gynecology, oral maxillofacial, plastic and reconstructive, ophthalmology, ear nose and throat, general surgery and urology) until the representative sample was obtained, while 44 anaesthesiologists/anesthetists were sampled using the same technique based on their allocation rota.

Data Collection Tools

A self-administered structured questionnaire was used to collect data from study clinicians to find out their level of experience and any factors affecting the use of the checklist in the operating rooms. The Questionnaire had closed-ended questions whereby clinicians selected responses from the given options closely matching their answers. Additionally, the questionnaire included multiple-choice questions which allowed respondents with two options to express a range of views and dichotomous questions. The attitude of the clinicians towards the use of the checklist in the questionnaire was graded from strongly agree (4), agree (3), disagree (2), and strongly disagree (1). The mean and standard deviation of the above were calculated.

Ethical Consideration

The study protocol was reviewed and approved by Mount Kenya University Institutional Ethics and Research Committee (845), Kenyatta National Hospital-University of Nairobi Ethics and Research Committee (P242/04/2021), and Kenya's National Commission of Science, Technology, and Innovation (463808). Permission to conduct the study was also sought from the County Commissioner, Nairobi City County, The Governor, Nairobi City County (004-07-04-2021), the Regional Director of Education, Nairobi City County (RDE/NRB/RESEARCH/1/65 Vol.1). Data collection permit from the studied institution was received from the Head of Department Research and Programmes, Anaesthesia theatres, Kenyatta National Hospital (11461/2021).

Data Analysis and Presentation

Raw data was cleaned and reviewed for completeness before analyses using IBM SPPS version 20. The descriptive analysis was performed using frequencies and percentages for the demographic variables.

Results

Findings on Utilization level, Clinicians' and Institutional related factors influencing the use of the World Health Organization Surgical Safety Checklist

Approximately 95% of the respondents reported the availability of standard operating procedures on the use of SSC with 99% confirming its mandatory use in the operating theatres (Table 1).

Table 1: **Utilization level, Clinicians' and Institutional** related factors influencing the use of Checklist

Use of checklist on the interview day	Frequency (n=178)	Percent (100)
Yes	169	94.9
No	9	5.1
Length of time worked as a clinician (Years)		
0 to 2	3	1.7
3 to 5	42	23.6
6 to 10	41	23.0
Above 10 years	92	51.7
Length of time worked in the theatres (Years)		
Less than 1year	13	7.3
1to 2	26	14.6
3 to 5	58	32.6
6 years above	81	45.5
Level of Education		
Masters and above	78	43.8
Bachelor's	26	14.6
Diploma	74	41.6
Awareness about checklist		
Yes	175	98.3
No	3	1.7
Use of checklist during surgical operations		
Yes	175	98.3
No	3	1.7

Training on the use of a checklist		
Yes	111	62.4
No	67	37.6
Standard operating procedures on the use of a checklist		
Yes	170	95.5
No	8	4.5
Availability of checklist for use in operating theatres		
Yes	177	99.4
No	1	0.6
Mandatory to use of the checklist in operating theatres		
Yes	169	94.9
No	9	5.1
Sensitization on the use of the checklist in operating theatres		
Yes	125	70.2
No	53	29.8

Results on the attitude of Clinicians towards the use of the World Health Organization Checklist

Study clinicians on average had a positive attitude toward the use of checklists with the majority emphasizing its use in the operating theater, hence ranked highest (Table 2).

Table 2: Attitude of study Clinicians towards the use of the WHO Surgical Safety Checklist

Clinicians' attitude toward the use of a checklist	Strongly agree	Agree	Disagree	Strongly disagree	Mean ± SD	Rank
The WHO Surgical safety checklist should be used in the OR during surgery	167	10	0	1	3.93 ± 0.319	1
All Clinicians in theater should be trained on the use of the WHO surgical safety checklist	161	16	0	1	3.89 ± 0.360	2
A confidential reporting system that documents medical errors is important for safety	130	43	4	1	3.70 ± 0.510	3
I find the use of the WHO surgical safety checklist relevant	126	50	1	1	3.69 ± 0.540	4
I feel confident on my ability to use the WHO surgical safety checklist	122	50	5	1	3.65 ± 0.566	5
I understand the components of the WHO surgical safety checklist	122	51	2	3	3.64 ± 0.597	6
I have adequate time to participate in the use of the WHO surgical safety checklist	105	61	9	3	3.51 ± 0.674	7
I am encouraged by my leaders and co-workers to report any incidents I may observe	97	66	13	2	3.45 ± 0.681	8

Discussion

Utilization level of the World Health Organization Surgical Safety Checklist

This study found that 95% of the respondents were using the World Health Organization Surgical Safety Checklist in operating theatres. This is strongly recommendable and may have been supported by the 62% training and 70% sensitization of study clinicians on the use of SSC (Table 1). This varied from the study conducted in Nigeria,[11] where only 57% of the respondents were using SSC, while a study on point prevalence of surgical safety checklist use in Europe showed that the overall prevalence usage in the European population was at 67.5%, with marked variation between countries from 0 to 99.6%.[12] Existential variations in the implementation of the checklist cited above may be the source of adverse surgical-associated outcomes.[13]

Socio-demographic characteristics of the study Clinicians

About 52% of the respondents in this study had a clinical experience of over 10 years. Additionally, 46% of the respondents had general theatre experience of over 10 years. Moreover, the study observed varying levels of education ranging from master's and above to diplomas and below. Out of that 42 % of the respondents had a diploma and below as an educational qualification and 44% had a master's degree and above (Table 1). Hence, more clinical and theatre experience together with more educational qualifications increase the chances of applying the clinical practices envisaged in the SSC. These findings agreed with a study in Nigeria, in which clinical and professional experience were observed as good predictors of safety practices by the preoperative nurses.[11]

Awareness and use of the World Health Organization Surgical Safety Checklist

The majority 98% of the respondents were aware of and reported the use of SSC during surgery. This implies that the surgical team members understood their roles and responsibilities, thereby boosting and improving their knowledge of the surgical team members.[14] This diverged from the Nigerian study where only 57% of the respondents were aware of SSC and its usage in the

operating theatres by the preoperative nurses was at 91%.[11] On the other hand, more than half 62% of the respondents had been trained on the use of the checklist (Table 1). This implies that a larger number of clinicians were aware of and use the checklist without prior training. This may explain why the utilization level of SSC was not 100%, agreeing with Guatemala investigators who concluded that poor knowledge and lack of training sessions are associated with limited usage of the Checklist.[15]

Institutional factors influencing the use of the World Health Organization Surgical Safety Checklist

About 95.5% of the study respondents confirmed that there was a standard operating procedure for the use of the Checklist (Table 1). This indicates that theatre management had ensured that the processes and services are documented for uniformity. Similar conclusions were drawn by a Japanese investigator who held that there is an absolute need for staff to ensure that important documents are available for use in their operation areas.[16]

The majority of the clinicians 94.9% who participated in the study confirmed that the checklist was mandatory to use in the operating theatres (Table 1). This implies that the hospitals' policies are being adhered to. This is in tandem with the Vanderbilt University Medical Centre and Massachusetts General Hospital investigators in the United States of America who confirmed that staff should operate in line with the required standards, regulations, and their professional body.[17] About 70% of the study participants had been sensitized to the use of the Checklist. Thus, the hospital management ensured their staff was informed of the safety measures in place. Nevertheless, about 30% of the respondents who reported not having been sensitized on its usage in this study may be a result of their failure of themselves to avail of occasional sensitization sessions. And this may explain the failure of 100% usage of SSC in the operating theatres.

Attitude toward the use of the World Health Organization Surgical Safety Checklist

Study clinicians on average had a positive attitude toward the use of SSC in the operating rooms. The majority of respondents emphasized the use of a Checklist in the operating rooms, hence ranked highest among other safety measures. This positive attitude encourages team members to incorporate instinctively their surgical plans to use the checklist and become more familiar with it.[18] The finding also agreed with 95% usage of the SSC. In contrast, the least importance was put on, the encouragement of junior clinicians to report any incidents observed and the lack of adequate time to participate in the use of the Checklist (Table 2). The above attitude may be associated with the failure of 100% usage of SSC in the operating theatres as some of the observed emerging issues are not reported, and hence not addressed. Furthermore, inadequate time to participate in the use of the checklist by the study clinicians may imply that there could have been low staffing levels or high workload, as observed by the Finland investigators that quality hospital services such as surgical operations have been shown to improve with a higher proportion of hospital staff.[19]

Limitation

The study findings might not be generalized to other health facilities due to different institutional factors. Moreover, the Hawthorn effect was expected to occur as the study participants might change their behavior with the knowledge that they are being interviewed and their practices observed.[20]

Conclusion

The studied institution had a recommendable higher utilization level of the World Health Organization Surgical Safety Checklist. This could have been boosted by training, sensitization, and strong institutional factors. Furthermore, there was a generally positive attitude toward the use of the checklist. However, the discouragement of junior clinicians to report any incidents observed during surgery may be a contributing factor to the failure of the hospital to achieve 100% usage of SSC. This study recommends the following based on its conclusion:

1. The theater management to enhance the use of the checklist to 99% from the current 95 % by having it as a clinical indicator of quality and performance contract indicator of leadership.
2. New staff in the theatres be encouraged to use the WHO patient protection checklist to sustain the high

utilization level through continuous participation in training and sensitization.

3. The hospital management should continuously review the use of the WHO SSC which will in turn create awareness leading to improvement of surgical practices.
4. Clinicians should be encouraged to report, and record incidences and near misses since it helps in the continuous improvement of surgical safety practices.
5. Further studies are done by the clinicians or students from learning institutions to find out why the checklist is not utilized 100% because of its importance in averting mistakes that may lead to morbidity and mortality of surgical patients

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ORIGINAL ARTICLE

Lingual nerve injury during extraction of mandibular third molars: Are we extracting correctly?

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A B S T R A C T

Introduction: Neurological injuries including lingual nerve damage are among the most devastating complications of mandibular third molar extraction. Various causes of lingual nerve damage have been proposed in literature including the surgical technique.

Objective: This study aims to assess the adverse outcomes of the removal of mandibular third molars in terms of the frequency of lingual nerve injury (LNI).

Methodology: This prospective case series was carried out at Maroof International Hospital, Islamabad. Surgical extraction was performed after raising both lingual and buccal mucoperiosteal flaps for surgical access. Ostectomy and tooth sectioning was performed while protecting the lingual flap with a passively placed periosteal elevator. Patients were recalled for the assessment of lingual nerve status, one week postoperatively.

Results: Out of the total of 1487 teeth extracted temporary lingual nerve injury was observed in just two cases (0.13%) both of which were extracted because of recurrent pericoronitis. None of the patients had a permanent neurological deficit.

Conclusion: For improving civility in nursing college, insight into incivility among students and faculty members is to be developed and policies to be in place to address unacceptable behaviors in a timely and effective manner. A surgical technique using careful lingual flap elevation and passive retraction results in the prevention of iatrogenic lingual nerve injury.

Keywords: *Mandibular third molar, Lingual nerve, mucoperiosteal flap, ostectomy*

Introduction

Mandibular third molar (wisdom tooth) extraction is one of the most common procedures performed in oral surgery practice. Various complications of surgical extraction of mandibular third molars have been reported but neurological injuries account for the most disabling complications that also have severe medicolegal considerations.

Inferior alveolar and lingual nerves are the most common nerves affected as far as neurological complications of third molar extractions are concerned.[1] Lingual nerve injury (LNI), although relatively less common is most disturbing for the patient as it not only causes loss of sensory sensation but also loss of special sensation i.e., taste on an affected side of the tongue. Unlike lingual nerve various imaging techniques including orthopantomography and cone beam computed tomogram (CBCT) can be used to assess the position of the inferior alveolar nerve and then plan the surgical procedure accordingly. Moreover, the lingual nerve has a considerable variable position in soft tissues on the lingual aspect of the lingual cortical plate and lingual crest in the mandibular third molar region.[2] In an extensive literature review, it has been proposed that the average horizontal distance from the mandibular third molar lingual alveolar wall to the lingual nerve is 3.05 ±

0.48mm while the vertical distance from the lingual nerve to the alveolar ridge in the third molar area is 7.24 ± 0.95mm.[3]

In literature, various risk factors for lingual nerve injury have been identified, whereas iatrogenic injury during surgical extraction of the mandibular third molar is considered the most common cause of lingual nerve injury.[1] Furthermore, various modifications of surgical techniques for wisdom teeth extraction have been published but no significant evidence is available supporting any single surgical technique.[4] this study aimed to determine the incidence of lingual nerve injury using a standard surgical technique (as described below) by an experienced oral and maxillofacial surgeon. Whereas the secondary objective was to describe various factors contributing to the lingual nerve injury while performing extraction of mandibular third molars.

Methodology

This prospective case series was conducted at the Dental outpatient department of Maroof International Hospital Islamabad, Pakistan from Jan 2016 to Dec 2020. A consecutive non-probability sampling technique was used. After taking informed consent all patients who required the extraction of mandibular third molars were included in this study. All patients were operated on by a consultant-level oral and maxillofacial surgeon having more than 20 years of experience. The exclusion criteria were patients with preexisting neurological conditions, a preexisting neurological deficit of lingual nerve due to orthognathic surgery or trauma, and patients with psychological or psychiatric disorders.

The surgical procedure was carried out under local anesthesia (2% lignocaine with epinephrine 1:100000) either alone or supplemented by intravenous sedation with midazolam (3mg). Halstead's Inferior alveolar nerve block technique along with buccal infiltration techniques was used to anesthetize the inferior alveolar, lingual, and buccal nerve.[5] Inferior alveolar nerve block was administered using 27G long needles (45mm) in self-aspirating dental cartridge syringes (Figure 1a).

The initial attempt was made to luxate and extract the tooth by closed technique. In cases of inability to perform extraction by closed means following, steps were employed to perform the surgical extraction.

The standard buccal envelope mucoperiosteal flap was raised by making an incision in the gingival sulcus and the distal extension incision was made in the buccal vestibule, lateral to the external oblique ridge (Figure 1b). Then after the exposure of the external oblique ridge, the distolingual mucoperiosteal flap was raised carefully using Mitchell's trimmer (Figure 1c). This flap is particularly helpful for the extraction of disto-angular third molars and facilitates safe distal cutting of bone and tooth sectioning. This disto-lingual flap should be of appropriate size for adequate access to the area distal to the tooth. To avoid excessive traction on the lingual flap and soft tissue the authors recommend passively placing the blunt end of a molt-type periosteal elevator between the flap and lingual cortex for appropriate retraction and protection of lingual tissues.

Ostectomy or bone removal was done to expose the impacted tooth. Bone removal was done with a surgical handpiece (rotary instruments) and straight fissure carbide bur under copious irrigation of saline. Ostectomy was performed by moving the bur around the tooth from disto-lingual to mesiobuccal direction in brush-like strokes for better control of rotary instruments and to lessen the chances of injury to the lingual tissues (Figure 1d).

Then the tooth was luxated with the help of Coupland's straight elevators. The authors recommend opting for tooth sectioning in case of hindrance in luxation and delivery of the tooth or when the angulation of the tooth or root configuration requires so. Tooth sectioning was performed with rotary instruments under copious irrigation in such a way that only two third of the buccolingual dimension of dental tissue was cut with handpiece and bur to avoid perforation of lingual cortex and injury to lingual soft tissues (Figure 1e). Finally, the tooth was delivered with the help of straight elevators, curved artery clip, or forceps.

The suturing was performed after copious irrigation of the socket and flap. 3/0 polyglactin suture using the reverse cutting or round body needle. The authors recommend extreme caution while suturing and propose small superficial bite from lingual soft tissues to avoid injury to the lingual nerve (Figure 1f). Then the patients were given routine postoperative instructions and were advised tab. Diclofenac potassium 50mg twice a day for three days to manage postoperative pain.

The patients were advised reappointed one week postoperatively for the removal of sutures and examination of the neurological status of the lingual nerve. The lingual nerve sensation was examined by subjective and objective testing (fine touch with a cotton wisp and pinprick testing). All patients having compromised lingual nerve function were called every week to assess the lingual nerve function until full recovery is achieved. Patients showing no recovery of lingual nerve function till 6 months were considered to have a permanent deficit of neural function. Data were analyzed by calculating descriptive statistics i.e., frequency and percentage for categorical variables and mean± SD for the continuous variables. using SPSS 25.

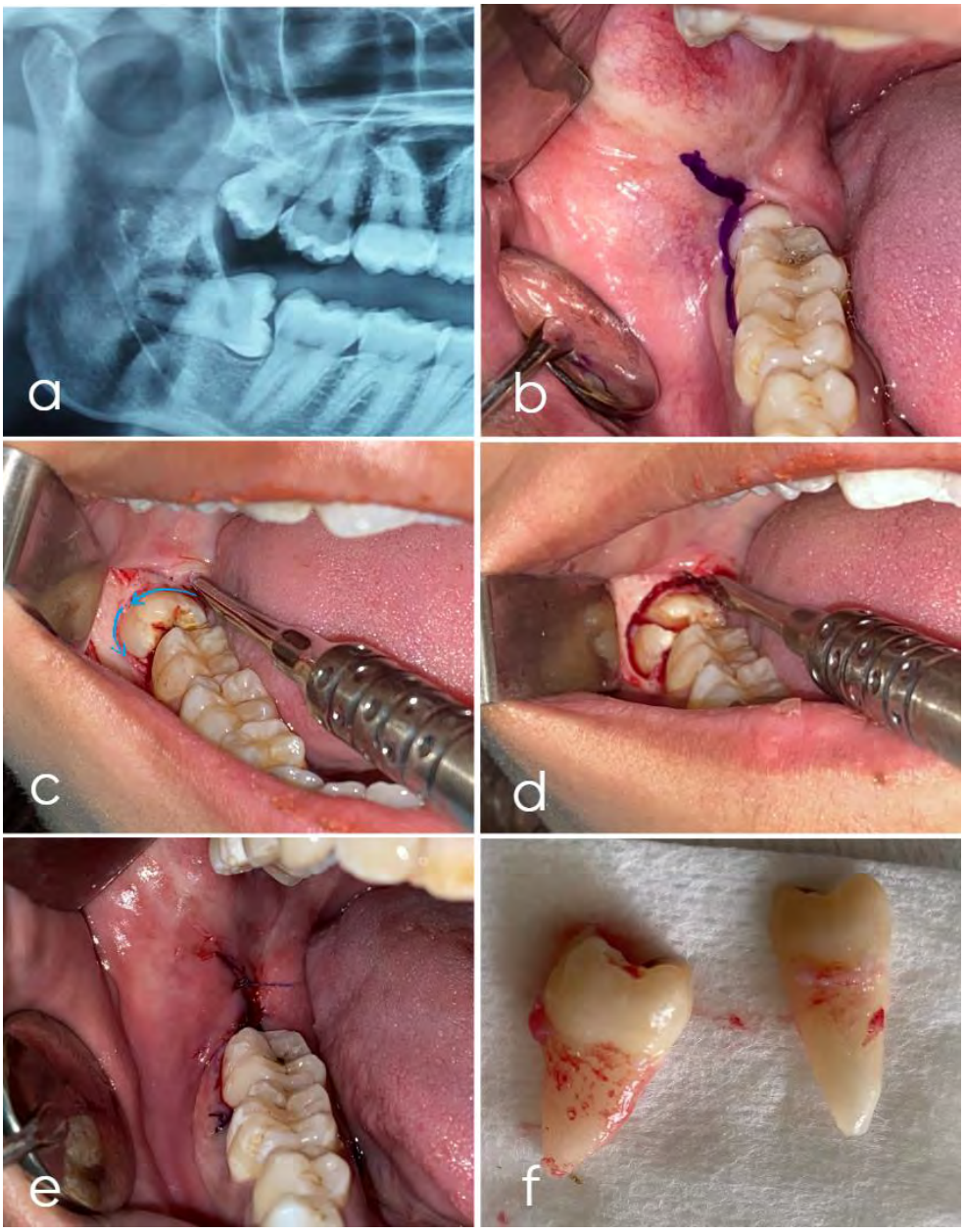

Figure 1: a) Preoperative OPG showing horizontal impaction b) Marking of envelope flap with distal extension c) Buccal and lingual mucoperiosteal flaps raised and retracted (blue arrows showing the direction in which rotary instruments are used for osteotomy d) buccal ostectomy and tooth sectioning performed e) suturing of flaps f) tooth delivered in sections

Results

Twelve hundred patients who met the inclusion criteria were initially included in this study and 15 of them dropped out as they did not report back for the follow-up. A total of 1487 lower third molars were extracted in 1185 patients that were studied, among which 451 (38.1%) were male while 734 (61.9%) were female patients. The mean age was 30.82 ± 8.07 years.

Extractions of 854 (72.1%) patients were performed under local anesthesia while in 331 (27.9%) patients' IV sedation was used along with local anesthesia. Mandibular right third molars were extracted in 468 (39.50%) patients, left third molars were extracted in 415 (35%) cases while in 302 (25.50%) cases extraction was performed on both sides. In 585 (39.34%) patients surgical extraction was required while in other 902 (60.66%) patients mandibular third molars were extracted by closed technique.

Chronic recurrent pain (n=968, 65.11%) was the most common cause of extraction, followed by pericoronitis (n=173, 11.63%), orthodontic treatment (n=172, 11.57%), extensive caries (n=141, 9.48%), prophylactic extractions (n=18, 1.21%), cystic lesions (n=9, 0.61%) and root resorption (n=3, 0.2%) Figure 2.

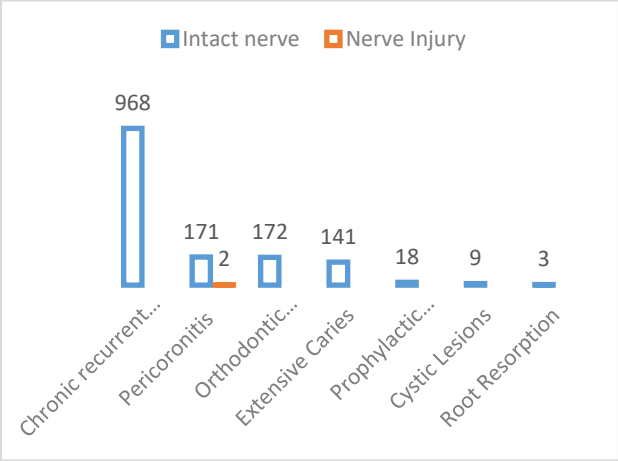

Figure 2: Distribution of the Causes of Extraction of Mandibular Third Molar

Out of the total of 1487 teeth extracted; LNI was observed in just two cases (0.13%) Table 1. The reason for extraction in both these cases was recurrent pericoronitis associated with the impacted wisdom tooth and the surgical extraction procedure was required on both occasions. The neurological deficit in both these patients was of temporary nature as the recovery of lingual nerve function was observed within 6 weeks of surgery.

Table 1: Incidence of Lingual Nerve Injury

Procedure	Intact Nerve (n)	Nerve Injury (n)	Total
Closed Extraction	902(100%)	-	902(60.66%)
Surgical Extraction	583(99.66%)	2(0.34%)	585(39.34%)
Total Extractions	1485(99.87%)	2(0.13%)	1487(100%)

Discussion

The lingual nerve along with the inferior alveolar nerve is at great risk of injury while performing surgery on mandibular third molars because of their close approximation to the surgical area.

Incidence of LNI is quite variable, as in a review of literature it has been described that temporary lingual paresthesia ranges from 0 to 37.5% while permanent lingual nerve injury was reported in 0 to 2% of patients after third molar surgery.[5] In the present study, there was no case of permanent lingual nerve injury while just two patients (0.13%) had temporary paresthesia of the lingual nerve which is a very small proportion considering the large sample of patients studied. Many causes of LNI have been described in the literature.[3] The authors have identified five factors that might have contributed to the iatrogenic injury of the lingual nerve i.e., local anesthesia procedure, incision & flap elevation/retraction, osteotomy procedure, suturing, and surgeon's experience.

Local anesthesia procedures can cause lingual nerve injury due to needle penetration and/or the potential neurotoxic effect of local anesthesia solution. Due to the anatomical variation in the position of the lingual nerve, not much can be done to prevent lingual nerve injury during local anesthesia procedures. Although few authors have advocated the use of the para-apical anesthesia technique having negligible chances of lingual nerve injury still Halsted's technique is mostly used as a local anesthesia technique for the extraction of mandibular wisdom teeth.[6] In a study Pogrel and colleagues have described that in 33% of cases lingual nerve is formed by a single fascicle in

contrast to the inferior alveolar nerve which has 7-39 fasciculi. Therefore, the lingual nerve is more prone to injury during needle penetration as compared to the inferior alveolar nerve.[7] Furthermore, the concentration and type of local anesthesia have also been proposed as the probable cause of nerve damage. Historically it has been suggested that there is a high possibility of nerve injury with 4% articaine as compared to 2% lignocaine.[8] In a retrospective study it was shown that most of the neural injuries due to local anesthesia were among patients in whom 4% of articaine was used.[9] But few recent studies and reviews are unable to propose 4% articaine as more neurotoxic than other local anesthetics due to insufficient evidence to support the hypothesis.[10, 11] Still it is advised to use local anesthesia of lesser concentration, select fine needles, and avoid multiple injections during local anesthesia procedures.[12] Therefore in the current study Halsted's inferior and lingual nerve block technique fine 27G needles and 2% lignocaine (with epinephrine 1:100000) was used to achieve local anesthesia of tissues to minimize the chances of nerve damage during local anesthesia injections.

Various techniques have been proposed for surgical access to the mandibular third molar including the buccal flap technique, the buccal and lingual flap technique, and the lingual split technique.[4, 13] But there is no consensus regarding the benefit of any surgical approach over the other. A recent review of the literature has concluded that lingual flap elevation and retraction along with the standard buccal flap results in a lesser incidence of permanent lingual nerve injury as compared to the only buccal flap approach (0.1% vs 0.49%).[14] On the other hand in a study by Ramadorai and colleagues employed the buccal flap-only technique and found just one case (0.078%) of lingual nerve injury in an audit of 1276 cases of mandibular surgical extractions.[15] In the current study surgical technique employing both buccal and lingual flaps was used for the surgical access of mandibular third molars. The lingual mucoperiosteal flap was reflected cleanly and retracted with the blunt end of the molt periosteal elevator which was passively placed to protect the lingual flap. It has also been proposed in the current study that gentle elevation and passive retraction of the lingual mucoperiosteal flap with a blunt molt elevator result in the protection of the lingual nerve and prevents its injury. In a systematic review, it has been concluded that retraction of the lingual flap with purpose-built retractors results in a lesser incidence of lingual nerve injury.[16] The authors of the current study propose that lingual flap elevation results in better access and visibility at the distal and distolingual area of the impacted tooth, the bone removal or osteotomy can be performed safely under direct vision of the operator which ultimately decreases the incidence of iatrogenic injury to the lingual nerve as depicted by the findings (0.13% incidence of injury) in this study.

Another important factor contributing to LNI during lower third molar extraction is tooth sectioning. A recent review of literature by Pippi R and colleagues has concluded that bone removal is more likely associated with LNI (p-value < 0.01) rather than tooth sectioning procedure (p-value 0.523).[3] In another study it was suggested that by performing tooth sectioning we can decrease the extent of bone removal or even avoid it thus contributing to better postoperative outcomes and lesser complications but the authors of the study could not establish any significant statistical association between tooth sectioning and LNI (P value > 0.05).[17] Furthermore, there is sufficient evidence supporting the fact that tooth sectioning during the removal of third molars having close proximity to the inferior alveolar canal minimizes the risk of injury to the inferior alveolar nerve (20% vs 6%).[18] Coronectomy as a sole procedure has also been proposed for the management of impacted teeth, as it has a lesser incidence (around 0.05%) of LNI, but it is also associated with higher failure rates.[19] In the present study, in case of unfavorable angulation, deeply impacted teeth, inferior alveolar nerve proximity, and failure to luxate the tooth by closed means, the operating surgeon performed minimal osteotomy and tooth sectioning to remove the tooth while avoiding excessive trauma to the surrounding soft tissues.

The surgeon's experience and surgical expertise are other important factors to consider while performing lower third molar surgery. In a study by Jain et.al comparatively very high incidence (13%) of LNI was observed as the surgical procedures were performed by a resident surgeon.[16] The authors proposed that less experience of the operating surgeon might have caused this higher incidence of lingual nerve injury. In another study, a higher incidence (4%) of lingual nerve injury was observed when the procedure was performed by 1st year fellows as

compared to the 3rd year fellows (incidence of 0.5%).[20, 21] In the current study all the surgical procedures were performed by an experienced consultant oral and maxillofacial surgeon to address this confounding factor.

In this study, a large cohort of patients was studied but there was a wide variety of mandibular third molars that were extracted ranging from fully erupted to deeply impacted teeth. And the extent of surgery and the time required to perform the extractions were also quite variable among cases. Therefore, future studies focusing on a more controlled cohort of patients can be conducted to provide more specific evidence of lingual nerve injury in a particular type of third molar extractions using a particular surgical technique.

Conclusion

The surgical technique using both buccal and lingual flap, and passive retraction of the lingual flap while performing osteotomy as described in this study results in the protection of the lingual nerve thus decreasing the incidence of lingual nerve injury. Moreover, tooth sectioning should be performed, whenever required, by cutting half to two-thirds of the buccolingual dimension of the crown using rotary instruments.

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ORIGINAL ARTICLE

Assessment of the effect of Posterior Sub-capsular cataract on the refractive status of the eye at the outpatient department of Hayatabad Medical Complex, Peshawar

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[1] Conceptualization of study, analysis, and interpretation of data

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A B S T R A C T

Introduction: Cataract-induced refractive change is the refraction change caused by a cataract. It can reach multiple diopters (D). It modifies expected refraction errors during cataract surgery by modifying axial length measurement.

Objective: To find the effect of the Posterior subcapsular Cataracts on the refractive status of the eye.

Methodology: A cross-sectional study was progressed in Eye OPD in Hayatabad Medical Complex, Peshawar. 102 patients having Posterior Subcapsular Cataracts were part of this study. The detailed history and eye examination of the patient were recorded. The anterior segment was examined with a slit lamp for evaluation of the posterior subcapsular cataract. The refractive status of an eye having a posterior subcapsular cataract was determined using Retinoscopy and subjective refraction techniques. The axial length of the eye was measured using A-Scan. Keratometric reading was measured using Keratometer. The data was entered and analyzed through the SPSS version 16.

Results: A total of 102 patients were included in this study. Of these, 27 (26.5%) were males and 75 (73.5%) were females. The mean age was 60.5 years with 5.8SD. Results from the study showed refractive error due to Posterior Subcapsular Cataracts were mainly myopic astigmatism (97.1%) and spherical myopia (2.9%) with 0.16SD. Patients with PSCs had myopic astigmatism with a mean value of (1.7diopters, 15.7%) with 0.93SD and spherical myopia with a mean value of (0.1D, 2.9%) with 0.67SD. The mean uncorrected visual acuity was 1logMAR with 1.6SD. The mean corrected visual acuity was 0.3logMAR with 1.2SD.

Conclusion: The most common refractive error found in PSCs was Astigmatism followed by Myopia. These results may help to clarify the Types of refractive errors in patients with PSCs and the prediction of visual outcomes with spectacles.

Keywords: *Posterior sub-capsular cataract, Visual acuity spherical myopia, Astigmatism*

Introduction

The goal of this study was to determine the effect if any, that the three primary morphological types of age-related cataracts have on refractive error. It is fairly obvious that some people who have nuclear cataracts will have a shift toward myopia as a result of the condition.[1-3] This shift is responsible for the so-called "second sight of the aged," in which the myopic shift allows normal reading skills without the need for spectacles, yet distance vision

diminishes. It is not entirely understood how cataracts, both cortical and posterior subcapsular (PSC), affect a patient's refractive error. Planter made the assertion that cortical opacity can cause large hyperopic changes, but nobody else has been able to confirm or refute this finding.[4, 5]

There is some evidence in the form of review articles that suggests that changes in astigmatism can be caused by cortical opacity.[6-8] These reports, on the other hand, were based solely on clinical perception, without any facts to back them up. In the early days of experimental research, researchers looked for proof that age-related cataracts caused astigmatic shifts in refractive error, but they came up empty.[9, 10] Despite this, it is important to revisit this topic since newly developed techniques, such as vector analysis of astigmatism and improved cataract grading systems, should boost the sensitivity to identify these alterations, provided that they are present.

Methodology

This hospital-based cross-sectional study was done to assess the effect of Posterior Subcapsular Cataracts on the refractive status of the eye at the outpatient department of Hayatabad medical complex Peshawar. The duration of the study was 6 months. The main objectives were to determine the common type of refractive error present in patients with posterior subcapsular cataracts. Cataracts were defined as presenting visual acuity of less than 6/36 in the better eye caused by lens opacity is called cataract or Cataract refers to dense lens opacity that can explain the vision of less than 6/36.[11] Posterior subcapsular opacity was regarded as cataract, as it can be very visually disabling even in its early stages.[12] Refractive Error, also known as refraction error, is a problem with the focusing of light on the retina due to the shape of the eye. The inclusion criteria were all patients having posterior subcapsular cataracts.[13]

Exclusion Criteria were Mentally retarded, Unwilling patients, History of intraocular surgery, ocular trauma, Corneal scar or opacity, and Patients with the following conditions which are likely to affect the refractive status of the eye: keratoconus, trauma, orbital mass, pterygium and eyelid mass such as chalazion. A total of 102 patients are taken using a consecutive sampling technique. Informed consent was taken from each patient and was informed by the aims and objectives and salient features of the protocol. The data was collected and kept confidential and used for research purposes only. No examination was done beyond the ethical limits. Legal approval was taken from the Research, Publication, and Thesis committee of the Pakistan institute of community ophthalmology, HMC, Peshawar. As per the protocol of the hospital, the VA of the patient was recorded at a standard distance with Snellen's visual acuity chart in male and female cubicles of Eye OPD, Hayatabad Medical Complex, Peshawar. Slit lamp biomicroscopic examination for the diagnosis of PSCs was done by an ophthalmologist present on duty in rooms 2 and 3.

Any patient having signs of PSCs was referred for refraction. The refractive status of the patient was determined using objective and subjective refraction techniques. Objectively, refractive status was obtained with the help of an Auto refractometer and Retinoscope. Subjective verification of refractive status was done after retinoscopy and VA was again recorded after complete refractive correction. After complete refraction in refraction rooms, axial length and keratometry were determined in room 37 of Eye OPD. The vector analysis method was used to determine lenticular astigmatism i-e, lenticular astigmatism was obtained by subtracting corneal astigmatism from total astigmatism. Data was entered in SPSS version 16 and analyzed in the form of tables and charts.[14, 15]

Results

A total of 102 patients of PSCs were included in the study. Out of 102, 27 were male (26.5%) and 75 were female (73.5%). The mean age of patients with PSCs was 60.5 years with 5.8 SD. The maximum no. of patients was between 50-60 years with 41.2%. Results from the study showed refractive error due to PSCs were mainly myopic astigmatism (97.1%) and spherical myopia (2.9%) with 0.16 SD. Patients with PSCs had myopic astigmatism with a mean value of (1.7diopters, 15.7%) with 0.93 SD, and spherical myopia with a mean value of (0.1D, 2.9%) with 0.67 SD. The mean uncorrected visual acuity was 1logMAR with 1.6 SD. The mean corrected visual acuity was 0.5logMAR with 1.2 SD.

Discussion

This study showed that female patients are more prone to PSCs than males because the frequency of female patients is 75 (73.5%) and that of female patients is 27 (26.5%). It shows that female patients are more affected than males. The overall frequency of posterior subcapsular cataracts was 41% in the study of the frequency of the PSCs in hereditary retinal degenerations.[14] The Beaver Dam Eye Study showed 6.1% of PSCs and females are more affected than males. The Beaver Dam Eye Study and Population-based study on prevalence and risk factors of age-related cataracts in Peitou, Taiwan also revealed that females are at greater risk of PSCs. [15] The age groups are from 50 to 75 years. The no. of patients in group 50-60 is 43 (41.2%), in the age group of 60-65 years they are 31 (30.4%), and in of 65-75 years, they are 29 (28.4%). The above study also shows that the maximum no. of patients is between the age group of 50-60 years. The Beaver Dam Eye Study showed maximum age affecting PSCs is above 50 years.[11]

According to this study, the types of refractive error found among patients with PSCs are mainly astigmatism followed by myopia. The frequency of patients with PSCs with myopic astigmatism is 99 with 97.1% and the frequency of patients with PSCs with spherical myopia is 3 with 2.9%. British journal of ophthalmology showed a significant astigmatic shift in PSC cataracts (14%) Figure 1.

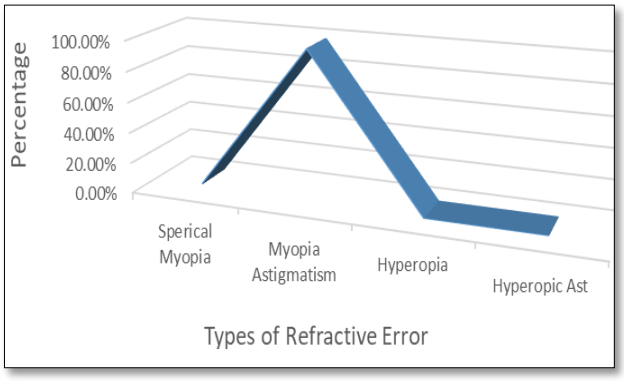

Figure 1: Types of Refractive Error

Myopic Astigmatism range from 0.5D-4D. The no. of patients in the range 0.5-1.00D are 31 with a percentage of 30.4, in the range of 1.00-2.00D they are 43 with 42.2%, in the range 2.00D-3.00D are 17 with 16.7% and from a range of 3.00D-4.00D, they are 6 with 5.9%. The result shows that the maximum no. of patients who have myopic astigmatism is in the range of 1.00-2.00D (Figure 2).

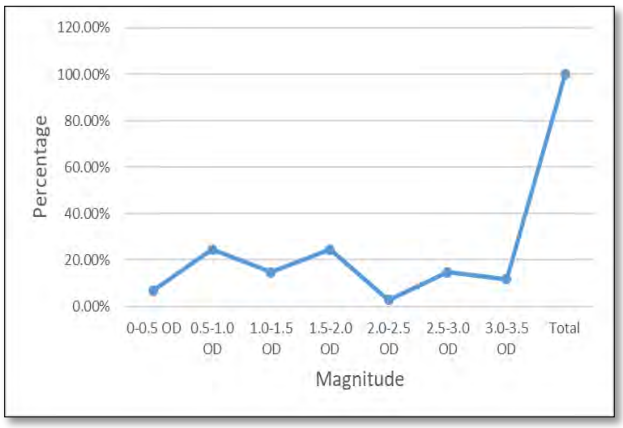

Figure 2: Magnitude of Myopic Astigmatism

Meanwhile, the magnitude of Myopic Astigmatism in male and female patients affected with PSCs is shown in Figure 3 with the range of 0.5D-4.00D. In the range of 0.5D-1.00D, 7 males and 24 females are present.13 males and 30 females are present in the range from 1.00D-2.00D. In the range 2.00D-3.00D, 4 males and 13 females are present and 2 males and 4 females are present in the range from 3.00D-4.00D.

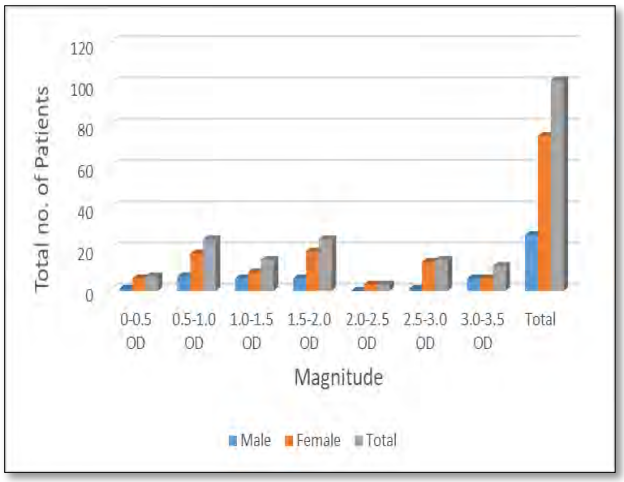

Figure 3: Gender-wise magnitude of Myopic Astigmatism

The range of Spherical Myopia is 1.00DS-4.00DS. The no. of the patient in the range 1.00DS-2.00DS is 1 (male patient) with 33%, in 2.00DS-3.00DS,1 female patient is present with 33% and in 3.00DS-4.00DS, no. of a patient is also 1 (female) with 33%.

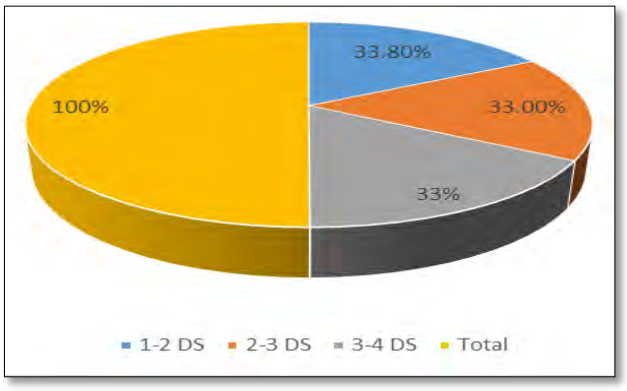

Figure 3: Magnitude of Spherical Myopia

Table 1 has shown the visual acuity which is presented in logMAR with the gender-wise distribution. One male patient has visual acuity of 0.3logMAR with 1%, 8 patients have 0.5logMAR with a percentage of 7.8%, 9 patients have 0.6logMAR with 8.8%, 17 patients have 0.8logMAR with 16.7%, 16 patients have 1logMAR with 15.7%, 20 patients have 1.3logMAR with 19.6% and 31 patients have visual acuity of less than 1.3logMAR with 30.4%. The visual acuity of maximum patients is less than 1.3logMAR.

Table 1: Gender-wise distribution of patients with unaided Visual Acuity

Unaided Visual Acuity		
Sr.	logMAR	No. of patients (gender)
1	0.3logMAR	1 (male)
2	0.5logMAR	8 (2 males and 6 females)
3	0.6logMAR	9 (2 males and 7 females)
4	0.8logMAR	17 (5 males and 12 females)
5	1logMAR	16 (3 males and 13 females)
6	1.3ogMAR	20 (4 males and 16 females)
7	<1.3logMAR	31 (10 males and 21 females)

Out of 102, 8 patients have corrected visual acuity of 0.1logMAR with 7.8%,18 patients have 0.2logMAR with 17.6%, 26 patients have 0.3 logMAR with 25.5%, 41 patients have 0.5logMAR with 40.2%, 2 patients have 0.6logMAR with 2% and 7 patients have corrected visual acuity of 0.8logMAR with 6.9%. Maximum corrected visual acuity is 0.5logMAR (Table 2).

Table 2: Gender-wise distribution of patients with corrected Visual Acuity

Corrected Visual Acuity		
Corrected Visual Acuity		
Sr.	logMAR	No. of patients
1	0.1logMAR	8 (2 males and 6 females)
2	0.2logMAR	18 (5 males and 13 females)
3	0.3logMAR	26 (5 males and 21 females)
4	0.5logMAR	41 (11 males and 30 females)
5	0.6logMAR	2 (2 males)
6	0.8logMAR	7 (2 males and 5 females)

Conclusion

The following study shows the significance of various types of refractive errors which are found among patients with PSCs. The most significant refractive error found in patients with PSCs was Astigmatism followed by Myopia. Females were affected more than males. The visual acuity was improved to some extent with spectacles. These results may help to clarify the Types of refractive errors in patients with PSCs and the prediction of visual outcomes with spectacles.

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ORIGINAL ARTICLE

Effects of perceived intrapersonal problem-solving and social competence on emotional regulation in adolescents

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Author`s Contribution

[1] Conceptualization of study, analysis, and interpretation of data

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A B S T R A C T

Introduction: There is a need to assess the effects of interpersonal problem-solving and social competence on emotional regulation in adolescents. The research was investigating the effect of interpersonal problem-solving and social competence on emotional regulation in adolescents. Moreover, the impact of the study based on demographical variables was also explored.

Objective: This study aimed to assess perceived interpersonal problem-solving and social competence in the emotional regulation of adolescents in Sialkot.

Methodology: A sample of 345 adolescents with the age range of (11 to 20 years) was collected from various educational institutes in Sialkot through a random sampling technique. For collecting data, interpersonal problem solving, social competence, and emotional regulation, the Inventory of Interpersonal problems IIP-32, Social Competence Inventory, and Cognitive Emotional Regulation Questionnaire were used as assessment tools. Statistical analysis of correlational analysis, regression analysis, t-test, and descriptive analysis was applied to the collected data.

Results: Results indicated that interpersonal problem-solving, and social competence significantly correlate with emotional regulation (r = 0.25**, $^{**}p$<0.01, r = 0.31**, $^{**}p$<0.01, r=0.42**, $^{**}p$<0.01 respectively). Further applied analysis indicated that interpersonal problem-solving, and social competence also significantly predict emotional regulation among adolescents (β = 0.31 and β = 0.42, respectively).

Conclusion: Results of current research concluded that emotional regulation positively correlates with interpersonal problem-solving and social competence. Further, interpersonal problem-solving, and social competence also positively correlates with each other.

Keywords: *Intrapersonal, Social competence, Emotional regulation, Adolescents*

Introduction

Currently, adolescents are facing various problems consisting of majorly components i.e., psychological, social, and moral levels. Adolescence is an ambiguous period of one's life. To have matured approach toward a better future one must be an emotionally stable and effective interactional pattern. Trends suggested that emotions are important in formulating an individual's perception. According to the researchers, societal stressors produce a major influence on adolescents' emotions.[1] It is mainly observed that these emotional imbalances are created due to the criticism from society which is produced due to societal interaction. Therefore, it is important to observe interpersonal problem-solving capacity and social competence.

Our study aimed to analyze the consequences of interpersonal problem-solving and social competence on emotional regulation among the adolescents of the Pakistani population. Reviewing various articles and

journals a map study was formulated to explore the effect of interpersonal problem-solving and social competence on the emotional regulation of adolescents. Interpersonal problem-solving skills are an ability to generate a solution to deal with the obstacle concerned with the formulation of solutions that became persistent over time based on the outcome of the results. Adolescents' being socially interactive creatures dealt with the problem they face in their daily life on interpersonal and intrapersonal, resolving issues such as social, emotional, cognitive, and behavioral levels. These interactions formulate the multi-dimensional functionality of an adolescent known as social competence. This social interactional adaptation leads to the formulation of the perspective with which an adolescent formulates their future experiences. According to a study, social competence is goal-directed behavior, which is vitally important for an adolescent to have a secure further or to be completely deviant.[2] Moreover, interpersonal problem-solving and social competence of an adolescent is directly linked to their future perspective and emotionally matured. According to a research study, emotional regulation is an adolescent's process by which they express these emotions such as their positive and negative experiences of their life.[3]

Methodology

A cross-sectional survey was used to carry out the current study. Data was collected from different age groups ranging from 11 to 20 years, with different characteristics, such as socioeconomic status, educational background, family system, ethnic background, etc., for the assessment of their interpersonal problem-solving and, social competence effect on emotional regulation. The sample of 345 adolescents was collected from different schools, colleges, and universities in Sialkot, Pakistan. Convenient sampling was used for collecting data. For this purpose list of different schools, colleges, and universities was attained from Education District Office (EDO) Sialkot. Every fifth institute was selected from the list for data collection.

Demographic Variables:

It comprising of an individual's information such as name, age, sex, education, family structure, family income, earning members, marital status, socioeconomic status, grades, number of siblings, and birth order. This scale is designated to gain information according to the research requirement. Demographic form and other three scales devised in Urdu were used.

Inventory of interpersonal problems (IIP-32):

The IIP-32 is a 32-item measure of under and overdeveloped interpersonal strategies with eight subscales reflecting different interpersonal problems. Twenty questions assess aspects that are hard for the person to do. A five-point response format was utilized starting at; (0) 'not at all', (1) a little bit, (2) 'moderately', (3) 'quite a bit', to (4) 'extremely. For the targeted population, Urdu translation was done following the standard procedure of translation so that tool could be easily comprehensible.[4]

Social competence inventory:

The 25-item social competence inventory measured the behavioral feature of social competence, developed with parents and teachers of children ages 7-10 years. Objects rated on a 5-point scale from 1 = does not apply at all 5 = applies very well. Higher scores indicate higher competence. This questionnaire contains statements describing children's behavior. [5]

Cognitive emotion regulation questionnaire:

Research suggested that it is a multi-exile questionnaire constructed to identify the emotion regulation strategy that someone uses after having experienced a negative trial or site to develop cognitive emotion regulation. It has good factorial validity and high reliability, with Cronbach's as ranging between 0.75 and 0.87. [6]

Pilot Testing:

Pilot testing was conducted on 10% of the sample size which is 45 students. The average time to complete the questionnaire was 25 minutes. Since the tool was in Urdu (the national language) there was no linguistic or other problem identified in the pilot study. The Cronbach's alpha for tools was measured at 0.79, 0.81, and 0.84 which is favorable. [7]

Data collection:

The current research was divided into four major phases. Phase I (Research Design Selection), Phase II (Pilot Study), Phase III (Data Collection), and Phase IV (Analysis). After consulting the literature variable for the research were decided i.e., interpersonal problem-solving,

social competence, and, emotional regulation. To measure the interpersonal problem-solving assessment tool developed by IIP-32, and for assessing social competence tool developed by.[4, 5] Social Competence Inventory was used. Both tools were in English version so, they were translated into Urdu following the standard procedure consisting of the steps i.e., forward translation, panel meeting, back translation, pre-testing and cognitive interviewing, final version and, documentation of the Urdu version. To assess the emotional regulation tool developed by Garnefski (2003) i.e., the Cognitive emotion regulation questionnaire (CERQ) translated version was used. Moreover, ethical rights were also given to the participants. Statistical Package for Social Sciences (SPSS) was used to generate results by applying person correlation analysis, and linear regression analysis.

Results

The current study aimed at the effect of interpersonal problem-solving and social competence on the emotional regulation of adolescents. The data were investigated and showed the following results.

Table 1: Mean, standard deviation, and correlation matrix for all variables (345)

Variables	IPS	SC	ER	M	SD
Ips	---	.25**	.31**	58.15	15.99
SC	---	---	.42**	85.77	13.29
CER	---	---	---	110.24	18.84

Note: IPS= Inventory of interpersonal problems, SC= social competence inventory, CERQ= cognitive emotional regulation questionnaire. **p<0.01. *p<0.05

Table 1 indicates that Interpersonal Problems solving (IPs), Social Competence (SC), and Cognitive Emotional Regulation (CER) significantly correlate with each other at a significance level of 0.01. This table shows that interpersonal problem-solving (IPS) significantly correlated with social competence (0.25**) and Cognitive emotional regulation (0.31**) respectively. Whereas Social competence (SC) also significantly correlates with (CER) Cognitive emotional regulation at (0.42**).

Table 2 describes inter-correlations among scales and subscales. Results suggested that IPS and its all subscales have a significant positive correlation with the Cognitive Emotion Regulation Questionnaire (CERQ). The table also indicates that IPS significantly correlates with the CER's sub-components.

Table 3 indicates that total SC significantly correlates with the CER's sub-components. Total social competence shows a non-significant result with the other-blame (0.01), catastrophizing (0.09), other-blame (0.03), catastrophizing(0.09), other-blame (-0.01), catastrophizing (0.09), other-blame (-0.02).

Table 4 shows that sub-components of IPs i.e., controlling, self-centered, distant, socially inhibited, nonassertive, overly accommodating, self-sacrificing, Intrusive., significantly correlate with sub-component of emotional regulation i.e., self-blame, acceptance, rumination, positive refocusing, refocus on planning, positive reappraisal, putting into perspective, catastrophizing, other-blame. It also showed non-significant results with the self-blame.

Table 5 shows that sub-components of Social competence (SC) i.e., Prosocial Orientation, Social Initiative, significantly correlate with cognitive emotional regulation (CER) the sub-components, such as Prosocial orientation significantly correlate with Self-blame, Acceptance, rumination, and positive refocusing, refocus on planning, positive reappraisal and putting into perspective. Results also showed that social initiative significantly correlates with Self-blame, rumination, putting into perspective, catastrophizing, and other blame. Whereas, Prosocial orientation indicated non-significant results with Acceptance, Catastrophizing, and, other blame. The social initiative shows significant results with the Accepta Positive refocusing, Refocus on planning, and positive reappraisal.

Table 6 indicates that the sub-component of social competence i.e., pro-social orientations and social initiative significantly correlate with the sub-component of interpersonal problem solving i.e., domineering with the Prosocial orientation (-0.23**) and, social initiative (0.17**). Results also showed that Self-centered correlates with the Prosocial orientation (0.22**), and cold/distant positively correlate with the Prosocial orientation (0.17**). It shows nonassertive significantly correlates with Prosocial orientation (0.19**), table indicated that overly accommodating correlate with social initiative (0.14**), at

the end it is show that self-sacrificing correlate with Prosocial orientation (0.29**), social initiative (0.14*).

Table 7 indicates that 9% of the variance in emotional regulation can be attributed to a model comprising Interpersonal Problem Solving as a predictor (R^2 = 0.09, p<0.001). Overall, the model was significant {F $(1,343)$ = 37.01, p<0.001}, and IPS was the significant positive predictor of cognitive-emotional regulation (β =0.31, t =6.08, p<0.001). Whereas interpersonal problems were excluded as a predictor.

The model presents an interaction of Domineering/Controlling, Vindictive/Self-Centered and Cold/Distant, socially inhibited, Nonassertive, Overly Accommodating, self-sacrificing, and Intrusive/ Needy as a predictor of Emotional Regulation (Table 8). The overall model was found to be significant with ΔR^2= 0.14, ΔF = 7.72, and p< 0.05. Domineering/Controlling is non-significant in predicting the Emotional Regulation with β =-0.03, t=-0.92, and p<0.05. Vindictive/Self-Centered was found to be non-significantly predicting Emotional Regulation with β = 0.00, t =-0.60, Cold/ distant was found to be non-significantly predicting Emotional Regulation with β = 0.13, t =1.73, socially inhibited was found to be significantly predicting Emotional Regulation with β =-0.01, t =0.19. Nonassertive was found to be non-significantly predicting Emotional Regulation with β = 0.04, t =0.59. Overly Accommodating was found to be non-significantly predicting Emotional Regulation with β = 0.11, t =1.89, p<0.01, self-sacrificing was found to be significantly predicting Emotional Regulation with β = 0.19, t = 3.46, p<0.01. Whereas, Intrusive/ Needy was found to be significantly predicting Emotional Regulation with β = 0.18, t = 0.3.12, and p<0.01. The product of these variables contributes to a .16% variance in the dependent variable (R^2 = 0.16).

Table 9 indicates that 0.17% of the variance in emotional regulation can be attributed to a model comprising Interpersonal Problem Solving as a predictor (R^2 = 0.17, p<0.001). Overall the model was significant {F $(1,343)$ = 73.62, p<0.001}, and IPS was the significant positive predictor of cognitive emotional regulation (β = 0.42, t = 8.58, p<0.001).

Table 10 showed that model 1 presented an interaction of Prosocial Orientation as the predictor of Cognitive Emotional Regulation was found to be non-significant with ΔR^2= 0.14, ΔF = 58.06, β = 0.38, t = 7.62). The product of these variables contributes to a 0.15% variance in the dependent variable (R^2 = 0.15). Model 2 presented an interaction of Pro-social Orientation and Social Initiative as a predictor of Emotional Regulation. The overall model was found to be significant with ΔR^2= 0.17, ΔF =37.24, and p<0.001. Pro-social Orientation was non-significant in predicting Emotional Regulation with β =0.36, t =7.39, and p<0.05. Whereas Social Initiative was found to be significantly predicting Emotional Regulation with β=0.19, t = 3.77, p< 0.001. The product of these variables contributes to .18% variance in the dependent variable (R^2 = 0.18).

Table 2: Correlation Mat**rix for total IPS with ER's sub** components Variables Used in the Study (N = 345)

V	*T.IP*	*SB*	*A*	*R*	*PR*	*RP*	*PRE*	*PP*	*C*	*OB*	*M*	*SD*
T.IP	---	.16**	.17**	.19**	.18**	.19**	.17**	.15**	.27**	.16**	11.33	3.41
SB	---	---	.45**	.48**	.14**	.22**	.14**	.44**	.39**	.17**	11.64	3.30
A	---	---	---	.49**	.31**	.33**	.31**	.34**	.38**	.17**	12.17	3.50
R	---	---	---	---	.27**	.27**	.27**	.41**	.39**	.21**	14.39	3.59
PR	---	---	---	---	---	.63**	1.0**	.38**	.09	.03	14.46	3.43
RP	---	---	---	---	---	---	.63**	.41**	.09	.01	14.39	3.59
PRE	---	---	---	---	---	---	---	.38**	.09	.03	12.32	3.51
PP	---	---	---	---	---	---	---	---	.33	.24	10.63	3.43
C	---	---	---	---	---	---	---	---	---	.40	10.44	3.52
OB	---	---	---	---	---	---	---	---	---	---	---	---

Note: T.IP= Total interpersonal problem, SB= Self-blame, A= Acceptance, R= rumination, PR= positive refocusing, RP= refocus on planning, PRE= positive reappraisal, PP= putting into perspective, C= catastrophizing, OB= other blame, **p<0.01.

Table 3: **Correlation Matrix for SCI to sub component of CERQ's all the Variables Used in the Study (N = 345)**

Note:

V	T.SC	SB	A	R	PR	RP	PRE	PP	C	OB	M	SD
T.SC	---	.17**	.26**	.21**	.44**	.40**	.44**	.29**	.15**	.01**	11.33	3.41
SB	---	---	.45**	.48**	.14**	.22**	.14**	.44**	.39**	.17**	11.64	3.30
A	---	---	---	.49**	.31**	.33**	.31**	.34**	.38**	.17**	12.17	3.50
R	---	---	---	---	.27**	.27**	.27**	.41**	.39**	.21**	14.39	3.59
PR	---	---	---	---	---	.63**	1.0**	.38**	.09	.03	14.46	3.43
RP	---	---	---	---	---	---	.63**	.41**	.09	.01	14.39	3.59
PRE	---	---	---	---	---	---	---	.38**	.09	.02	12.32	3.51
PP	---	---	---	---	---	---	---	---	.33**	.24**	10.63	3.43
C	---	---	---	---	---	---	---	---	---	.40**	10.44	3.52
OB	---	---	---	---	---	---	---	---	---	---	---	---

T.SC= Total social competence, SB = Self-blame, A= Acceptance, R= rumination, PR= positive refocusing, RP= refocus on planning, PRE= positive reappraisal, PP= putting into perspective, C= catastrophizing, OB= other blame, **p<0.01.

Table 4: Correlation Matrix for sub component of Interpersonal problems and subcomponent of emotional regulation Variables Used in the Study (N = 345)

V	C	SC	C/D	SI	N	OC	SS	I/N	SB	A	R	PR	RP	PR	PP	C	OB	M	SD
C	---	.07	.07	.16**	.05	.17**	.06	.24**	.06	-.02	.03	.17**	-.10	-.17**	.01	.12**	.23**	3.71	3.08
V/SC	---	---	.01**	.37**	.51**	.23**	.26**	.17**	.05	.05	.06	.18**	.17**	.17**	.05	.11*	.03	8.77	4.60
C/D	---	---	---	.40**	.50**	.25**	.24**	.16**	.09	.09	.06	.17**	.18**	.17**	.09	.15**	.06	8.61	4.19
SI	---	---	---	---	.47**	.02	.18**	.27**	.00	.09	.09	.05	.09	.05	.04	.14**	.08	7.17	3.41
N	---	---	---	---	---	-.05	.16**	.19**	.03	.03	.08	.12*	.13*	.12*	.08	.16**	.07	8.19	3.54
OC	---	---	---	---	---	---	.20**	.16**	.15**	.05	.21**	-.02	-.07	-.21	.09	.11*	.13*	5.72	3.25
SS	---	---	---	---	---	---	---	.38**	.17**	.24**	.19**	.25**	.23**	.25**	.14**	.21**	.08	9.19	3.49
I/N	---	---	---	---	---	---	---	---	.21**	.21**	.22**	.13*	.16**	.13*	.18**	.22**	.11*	6.79	2.86
SB	---	---	---	---	---	---	---	---	---	.45**	.48**	.14**	.22**	.14**	.44**	.39**	.17**	11.33	3.41
A	---	---	---	---	---	---	---	---	---	---	.49**	.30**	.33**	.30**	.34**	.38**	.17**	11.64	3.30
R	---	---	---	---	---	---	---	---	---	---	---	.27**	.27**	.27**	.41**	.39**	.21**	12.17	3.50

PR	---	---	---	---	---	---	---	---	---	---	---	---	.63**	1.00**	.38**	.09	-.03	14.39	3.59
RP	---	---	---	---	---	---	---	---	---	---	---	---	---	.63**	.41**	.09	-.01	14.46	3.43
PR	---	---	---	---	---	---	---	---	---	---	---	---	---	---	.38**	.09	-.03	14.39	3.59
PP	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	.33**	.24**	12.32	3.51
C	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	.40**	10.63	3.43
OB	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	10.44	3.52

Note: Sub component of interpersonal problems, C= controlling, SC=self-centered, D=distant, SI=socially inhibited, N=nonassertive, OA=overly accommodating, SS= self-sacrificing, I=Intrusive. Sub component of emotional regulation i.e., SB=self-blame, A=acceptance, R= rumination, PR=positive refocusing, RP=refocus on planning, PR=positive reappraisal, PP=putting into perspective, C=catastrophizing, OB=other-blame. ***p< 0 .01, *p< 0.05.*

Table 5: Correlation Matrix for sub component of Social competence and subcomponent of Cognitive emotional regulation Variables Used in the Study (N = 345)

V	PO	SI	SB	A	R	PR	RP	PRE	PP	C	OB	M	SD
PO	---	.09	.13*	.26**	.19**	.47**	.42**	.47**	.23**	.08	.06	62.52	11.61
SI	---	---	.18**	.06	.12*	.00	.05	.00	.23**	.22**	.23**	20.21	4.03
SB	---	---	---	.45**	.48**	.14**	.22**	.14**	.44**	.39**	.17**	11.33	3.41
A	---	---	---	---	.49**	.31**	.33**	.31**	.34**	.38**	.17**	11.64	3.30
R	---	---	---	---	---	.27**	.27**	.27**	.41**	.39**	.21**	12.17	3.50
PR	---	---	---	---	---	---	.63**	1.00**	.38**	.09	.03	14.39	3.59
RP	---	---	---	---	---	---	---	.63**	.41**	.09	.01	14.46	3.43
PRE	---	---	---	---	---	---	---	---	.38**	.09	.03	14.39	3.59
PP	---	---	---	---	---	---	---	---	---	.03**	.24**	12.32	3.51
C	---	---	---	---	---	---	---	---	---	---	.40**	10.63	3.43
OB	---	---	---	---	---	---	---	---	---	---	---	10.44	3.52

Note: V= Variables, PO=Prosocial Orientation, SI=Social Initiative, SB = Self-blame, A= Acceptance, R= rumination, PR= positive refocusing, RP= refocus on planning, PRE= positive reappraisal, PP= putting into perspective, C= catastrophizing, OB= other blame, **p< 0.01. *p< 0.05.

Table 6: Correlation Matrix for sub component of Interpersonal problems and Social competence Variables Used in the Study (N = 345)

V	D/C	V/SC	C/D	SIN	N	OA	SS	I/N	PO	SI	M	SD
D/C	---	.07	.07	.16**	.05	.17**	.06	.24**	-.23**	.17**	3.71	3.08
V/SC	---	---	.71**	.37**	.51**	-.23**	.26**	.17**	.22**	.04	8.77	4.60
C/D	---	---	---	.40**	.52**	-.25**	.24**	.16**	.17**	.10	8.61	4.19
SIN	---	---	---	---	.47**	.02	.18**	.27**	.09	.04	7.17	3.41
N	---	---	---	---	---	.05	.16**	.19**	.19**	.10	8.19	3.54
OA	---	---	---	---	---	---	.20**	.16**	-.01	.14**	5.72	3.25
SS	---	---	---	---	---	---	---	.38**	.29**	.14*	9.19	3.49
I/N	---	---	---	---	---	---	---	---	.11*	.09	6.79	2.86
PO	---	---	---	---	---	---	---	---	---	.09	62.50	11.61
SI	---	---	---	---	---	---	---	---	---	---	20.21	4.03

Note: D/C= Domineering/Controlling, V/SC= Vindictive/Self-Centered, C/D= Cold/Distant, SIN= Socially Inhibited, N= Nonassertive, OA= Overly Accommodating, SS= Self-Sacrificing, I/N= Intrusive/Needy, PO= Prosocial Orientation, SI= Social Initiative, **p< 0.01. *p< 0.05.*

Table 7: Linear Regression Analysis for Interpersonal Problems Solving as Predictor of Emotional Regulation (N = 345)

Variable	R^2	ΔR^2	B	SE	**B**	t	F (Model)
Constant	0.09	0.09	88.86	3.65		24.38***	37.01***
IPS			0.37	0.06	.31	6.08***	

Note: IPS= Interpersonal problem solving, ***p< 0.001.

Table 8: Linear Regression Analysis for Interpersonal Problems (N = 345)

Predictor Variable	R^2	ΔR^2	B	SE	**β**	t	F (Model)
(Constant)	.16	.14	83.90	3.81		22.03**	7.72***
D/C			-.29	.32	.05	-.92**	
V/SC			-.02	.31	-.00	-.06**	
C/D			.59	.34	.13	1.78**	
SI			-.07	.33	-.01	-.19**	
N			.20	.34	.04	.59**	
OA			.61	.33	.11	1.89**	
SS			1.07	.31	.19	3.46**	
I/N			1.17	.38	.18	3.12**	

Note: D/C= Domineering/Controlling, V/SC= Vindictive/Self-Centered, C/D= Cold/Distant, SI= Socially Inhibited, N= Nonassertive, OA= Overly Accommodating, SS= Self-Sacrificing, I/N= Intrusive/Needy ***p<0.01*.

Table 9: Linear Regression Analysis for Social Competence as Predictor of Emotional Regulation (N = 345)

Variables	R^2	ΔR^2	B	SE	**β**	t	F (Model)
Constant	.17	.17	59.11	6.03		9.80***	73.62***
CERQ			.59	.07	.42	8.58***	

Note: CERQ= Cognitive emotional regulation questionnaire, ***p<0.001

Table 10: Linear Regression Analysis for Social Competence (N = 345)

Model	Predictor Variable	B	SE	**β**	R^2	ΔR^2	F (Model)
1	(Constant)	71.65	5.15		.15	.14	58.06***
	PO	.62	.081	.38			
2	(Constant)	55.84	6.57		.18	.17	37.24***
3	PO	.59	.08	.36			
4	SI	.87	.230	.19			

Note: PO= Prosocial Orientation, SI= Social Initiative, ****p<0.001*.

Discussion

Interpersonal problem-solving is the capacity to resolve the problems in the life of an adolescent, which can be part of their personal, family, and social settings. According to research, interpersonal relationships play the most important role while solving these problems, as their results can either be positive i.e., the solution generated to resolve is effective to have better relationships or they can be negative i.e., worsening of the situation which in turn affect an adolescent's mental status as well as their social interaction.[8, 9] these interpersonal problem-solving skills are complemented by an adolescent's capacity to apply their learned personal knowledge and skills already developed to effectively deal with life situations.[10] Social competence is viewed as goal-specified social skills, sociometric status, relationships, and functional outcomes.[11] These skills induce socially responsible behavior among adolescents', which leads them to self-regulate their emotions.[12]

Mainly focused on the effect of interpersonal problem-solving and social competence on the emotional regulation of adolescents. It is important to understand the main variable of this research i.e., interpersonal problem-solving skills, social competence, and emotional regulation. Based on the finding it is elicited that there is a significant correlation between interpersonal problem-solving and social competence with emotional regulation.[13] Results also suggested via regression analysis that interpersonal problem-solving and social competence predict emotional regulation in adolescents. Table 1 indicates that interpersonal problem-solving positively correlates with the emotional regulation of adolescents at 0.31 (p= 0.01). The study suggested that a balanced emotion enhances the ability of individuals to deal with everyday problems more effectively. [14] Therefore, it is vitally important that an adolescent develop a better ability to deal with daily life problems effectively using their interpersonal problem-solving skills and social competence capacity to become betters emotionally regulated. Table 4 shows that the sub-component of interpersonal problems (IPs) i.e., domineering, self-centered, cold/distant, socially inhibited, nonassertive, overly accommodating, self-sacrificing, intrusive., significantly correlate with the sub-component of emotional regulation i.e., self-blame, rumination, positive refocusing, refocus on planning, positive reappraisal, putting into perspective, catastrophizing, other-blame. A research work elicited that interpersonal sensitivity i.e., perspective to see others, personal evaluation, and view towards personal interaction directly affect the individual's emotional regulation along with the fluid intelligence of an adolescent.[15] Results indicated in Table 1 shows that interpersonal problem solving significantly positively correlate with emotional regulation of adolescent at 0.42 (p= 0.01).

Research on emotional understanding as a mediator of correlation between interpersonal competencies, aloneness, perceived social support, and a class of social networks. Table 1 indicates that IPS, significantly correlates with the CER's sub-component i.e., Self-blame, acceptance, rumination, positively refocusing, refocus on planning, putting into perspective, catastrophizing, and other-blame at with significance level of 0.01. Literature suggests that children's behavior strongly influences their social taking.[16] Results obtained indicate that Table 5 shows that, Prosocial Orientation positive relationship with self-blame, acceptance, ruminations, positive refocusing, refocus on planning, positive reappraisal, and Putting into Perspective at a level of p<0.05. Whereas there is no relationship between Prosocial Orientation and Catastrophizing and other blame. Similarly, a report discussed social competence as the ability and compatibility of an adolescent to achieve different goals and the generation of adaptive responses.[17] Which is the requirement of the social society, similarity could be observed in the results obtained as it is vitally important as prosocial behaviors and social initiation leads towards goal-directed behaviors, which benefits others and increases the chances of an adolescent's social appraisal and acceptance.[18] Therefore, this positive health acceptance and societal relationships further create emotional stability which further creates well regulates human emotions in such situations for the future. Hence, adolescents have a better ability to deal with daily life problems i.e., interpersonal problem-solving also has better social competence indicating that there is a positive correlation between the two variables. Results obtained indicate that controlling, self-centered, distinct, nonassertive, self-sacrificing, and needs significantly correlate with pro-social behavior. Research presented that pro-social orientation helps adolescents have a

positive association with positive peer interaction, a good family social environment, and a positive personality. [18] According to the researcher, individuals who take responsibility for their own life are mentally strong and interns lead towards better adaptability, confidence, and self-awareness.[19] The results showed that Table 2 indicates that interpersonal problem-solving is a significant predictor of cognitive-emotional regulation. The study indicated that high-quality relationships with peers significantly predict this stability in emotional regulation and a high capacity to resolve interpersonal problems solving with friends. Adolescents having a better ability to deal with daily life problems i.e., interpersonal problem solving, and social competence have predicted emotional regulation.[20]

Limitation

The sample collected from Sialkot city was limited, so for the further general implementation of the research, the sample size should be increased and data should be gathered from various cities of Pakistan so that results could be implemented generally for all the adolescents of the Pakistani culture. Reviewing the results of the current research workshops should be organized with adolescents and their parents so that, they have commanded on how to deal with emotionally vulnerable situations, and enhance their interpersonal interaction to become psychologically healthy and effective participants in the development and progress of Pakistan.

Conclusion

It was concluded from the current research that emotional regulation positively correlates with interpersonal problem-solving and social competence. Results further also indicated that interpersonal problem-solving, and social competence also positively correlate with each other.

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REVIEW ARTICLE

Variation in COVID-19 mortality rate across populations, polymorphism in genes, and gender-associated genetic patterns

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[1] Conceptualization of study, analysis, and interpretation of data

[2-4] Drafting the article or revising it critically for important intellectual content. final approval of the version to be published

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A B S T R A C T

A severe onset of COVID-19 leads to death due to respiratory failure and ARDS is the common finding of lung histopathology in different people with different comorbidities. It can invade the nervous system leading to the manifestation of neurological symptoms and brain damage including encephalitis and stroke. Genetic polymorphism, comorbidities, and gender differences is playing a pivotal role in conferring resistance and susceptibility to COVID-19. Despite almost the same ACE2 expression profile in males and females, males have shown a high mortality rate due to higher expression of TMPRSS2 (pivotal for S protein binding) as these genes are androgen responsive. While women have shown higher expression of ADAM17, ADAM10 genes are associated with the shedding of ACE2 receptors and are estrogen-responsive, leading to low levels of membrane-bound ACE2 which is indispensable for SARS-Cov2 entry into the cell. People with blood Groups A, and AB are comparatively more susceptible to COVID-19 than people with blood group O, the reason for the O group is attributed to the presence of Anti A antibodies.

Keywords: *COVID-19, TMPRSS2, ACE2, Gene polymorphism, Blood group susceptibility, Gender*

Epidemiology

Since the onset of the COVID-19 pandemic, it has been observed that its infection and severity is varying across different geographical regions. Epidemiological studies confirm that populations carry different variants of ACE2, ABO, and TMPRSS2 genes at respective loci, making people susceptible or resistant to infection depending on their gene variant. In addition to variation in these genes, differences in immunity, sex, age, and comorbidities, and comorbidities are contributing factors in COVID-19-associated fatalities across various ethnic backgrounds.[1]

Up till now, Italy has seen the highest rate of Covid-19 disease and fatalities globally in a specific time duration. The overall death toll shows the USA being the top in fatalities followed by Brazil, the UK, and Italy In Europe and America. South Asia has reported less number of infections and mortality rates as compared to Europe and North America. Data on the number of confirmed cases and deaths, percent fatality rate, and deaths per 100,000

people in European and American populations as of June 25, 2020, when the pandemic was at its peak (Table 1).[2]

Table 1: Data on COVID-19 infection and death Statistics across various European and American countries

Country	Confirmed cases	Deaths	Deaths/ 100,000 people	Fatality %
Italy	239,410	34,644	57.33	14.5
USA	2,381,361	121,979	37.28	5.1
Germany	192,871	8,928	10.77	4.6
UK	308,337	43,165	64.92	14.0
Canada	104,087	8,544	23.06	8.2
Belgium	60,898	9,722	85.12	16.0
Spain	247,086	28,327	60.63	11.5
France	197,885	29,7334	44.39	15.0

In Asian countries, the lower instance of the disease may be attributed to lower testing capacity, genetic variations comorbidities, and previous infection with malarial disease (Table 2).[3] Testing done on people per 1000 till June 23, 2020, were 5.10 for Pakistan, 3.73 for Bangladesh, and 5.17 for India, compared to 82.92 and 186.49 in Italy and Iceland. Testing done per confirmed cases also show lower stats in South Asian Countries with 5.65 tests in Pakistan, 12.53 in India, and 4.54 In Bangladesh. Data on several confirmed cases and deaths, percent fatality rate, and deaths per 100,000 people in the Asian population as of June 25, 2020, is given in table 04 below (Our World In Data, 2020) (Figure 1).

Table 2: Data on COVID-19 infection and death Statistics across Asian countries

	Confirmed cases	Deaths	Deaths /100,000 people	Fatality %
Pakistan	192,970	3,903	1.84	0.8
Bangladesh	122,680	1,528	0.98	1.3
Nepal	10,099	24	0.09	0.2
Afghanistan	29,481	618	1.66	2.1
Sri Lanka	2,001	11	0.05	0.5
Thailand	3,158	58	0.08	1.8
Singapore	42,623	26	0.46	0.1
India	473,105	14,894	1.10	3.1

ACE2 Variation and Ethnicity

The 41.04 kb large ACE2 gene is located on chromosome Xp22.22. It has two variants with 18 or 19 exons each, with the larger variant having an additional exon at the 5' end. [4]

ACE2 Interaction inhibitor SNPs

18 variants of ACE2 18 SNPs including rs1348114695 [E35K], rs146676783 [E37K], rs1192192618 [Y50F], rs760159085 [N51D], rs1569243690 [N51S], rs1325542104 [M62V], rs755691167 [K68E], rs1256007252 [F72V], rs766996587 [M82I], rs759579097 [G326E], rs143936283 [E329G], rs370610075 [G352V], rs961360700 [D355N], rs751572714 [Q388L], rs762890235 [P389H], rs1016409802 [H505R], rs1352194082 [R514G/*], and rs1263424292 [Y515C] act as interaction-inhibitors, means that they bind less competently to SARS-CoV-2. Two of these variants M821 and Q388L have been found more commonly in Africans and Americans respectively. The impact of the Asian-specific variants on viral contagivity was still uncertain. [3]

TMPRSS Variation and Ethnicity

According to the generated information from Ensembl, TMPRSS2 is present on chromosome 21q22.3 and has 15 exons. The prevalence of TMPRSS2 variant kinds, including missense mutations, intronic variations, and frameshift mutations, were also identified by Ensembl. A total of 11,184 SNPs was found in TMPRSS2 according to the results of dbSNP, including 10,578 intronic, 187 synonymous, 392 missense, 21 frameshifts, 3 inframe insertions, 2 inframe deletions, and 1 initiator codon variants. Data from the analysis of 493 SNPs in 1000 genome browsers showed that only 92 SNPs had significantly changed frequency rates in Asian and non-Asian countries. In other words, just 21 out of 92 SNPs affected how the protein functioned. Nine SNPs (rs423596, rs8134203, rs464431, rs2298662, rs2094881, rs75603675, rs456142, rs462574, and rs456298) out of the 21 examined indicated a significant variation in incidence between the Asian population and other groups. Additionally, it was discovered that the frequency of 2 SNPs (rs402197 and rs456016) varied among other populations but was similar in American and Asian

groups. A considerable difference in frequency between Europeans and others was found for 8 SNPs (rs422761, rs8134203, rs2094881, rs75603675, rs456142, rs462574, rs456298, and rs12473206). One SNP (rs461194) reportedly showed a significantly different frequency in the African population compared to others. Five SNPs (rs402197, rs456016, rs461194, rs464431, and rs2298662) that were compared between populations in Europe and Africa exhibited nearly comparable frequencies. The table below shows important TMPRSS2 SNPs across various populations and their associated mutation in global (Glo), African (AFRN), Asian (ASN), European (EURO), South Asian(SASA), and American (AMRN) populations (Table 4).

Diverse population frequencies of TMPRSS2 SNPs have been found in the 1000 genome study.

Employing PolyPhen-2, the impact of SNPs on TMPRSS2 was assessed, and it was discovered that both missense SNPs had the greatest impact on the TMPRSS2 function. The occurrence of SNPrs1239760 is found to be highest in America, followed by South Asian, European, African, and Asian, whereas the occurrence of SNPrs75603675 was found to be highest in Asia, followed by South Asian, American, African, and then European (PolyPhen-2) Table 5.

Gender differences in ACE2, TMPRSS2, and ADAM17 expression in relation to COVID-19 vulnerability

It has been reported that males are lightly at a higher risk of getting infected with COVID-19 than females and make up the majority of the severely ill and fatality cases, especially those having chronic diseases like Type 2 Diabetes, and hypertension or are above 60 years of age.5 The two molecules are crucial for one another in terms of SARS-CoV2 entrance because SARS-CoV-2 enters human alveolar cells via the SARS-CoV receptor ACE2 and TMPRSS2 for activating spike protein. ACE1 and ACE2 antagonistic enzymes work in coordination in the renin–angiotensin system (RAS) to balance the proliferative/ local vasoconstrictor and antiproliferative vasodilator activity. [6, 7].

All organs revealed significant positive relationships with CD8+ T cell abundance levels exclusively in males (0.20 r 0.68) in a study examining tissue expression levels of ACE2. Female CD8+ T-cell enrichment levels were adversely linked with thyroid and lung ACE2 expression levels (r = -0.36). Similar to this, both males and females showed substantial positive correlations between the interferon reaction pattern and the levels of ACE2 expression in skin blood vessels (0.14 r 0.75). [8] Male's ACE2 expression levels displayed substantial positive relationships with the interferon reaction pattern in the lungs, kidneys, thyroid, adrenal gland, bladder, and colon (0.32 r 0.82). ACE2 expression levels, on the other hand, were inversely linked (-0.26 r -0.20) with the interferon response profile in the lungs, thyroid, and colon of females. The ACE2 tissue expression data extracted from GTEx.org shows that males and females exhibit the same expression of ACE2in lungs and arteries, while in kidneys and left heart ventricles the expression is high in females than males (Figure 2).

The androgen hormone is thought to have an impact on the mRNA levels of TMPRSS2, according to research. By attaching to the androgen response element (ARE) found in the TMPRSS2 promoter, androgen hormones control the amount of time that TMPRSS2 is expressed. [9] Therefore the expression of TMPRSS2 is slightly higher in males than in females (Figure 3). Metallopeptidase ADAM17 and ADAM10 that cleave the intracellular domain of ACE2 and are involved in ACE2 shedding are responsive to estrogen hormone, therefore estrogen lowers the susceptibility of infection in females as SARS-CoV2 can enter the cell only through membrane-bound ACE2 receptor. [10, 11] The expression profile of ADAM17 in both males and females reveal that females have higher expression of ADAM17 in the lungs than males and thus have higher expression of membrane-bound ACE2 receptor which makes them more susceptible to COVID-19 (Figure 4).

Table 3: Number of SNPs for the X-linked Ace2 locus with significant variations in occurrence across different ethnicities

Specific for a common population of the comparisons				
Comparisons	Total	Specific SNPs in either of the comparisons	Specific SNPs in all of the comparisons (Frequency)	Population size (Avg-/Median)
Asians vs Europeans, Americans or Africans	55	43	4 (0.00013-0.00030)	40,150/45,859
Europeans vs Asians, Americans or Africans	86	12	1 (0.000143)	122,845/147,472
Africans vs Asians, Americans, or Europeans	47	46	8 (0.00013- 0.00336)	20,482/21,424
Americans vs Asians, Europeans, or Africans	52	29	2 (0.00016-0.00018)	-

Table.4: Important TMPRSS2 SNPs across various populations

SNP	Function class	Allele	GLO	AFRN	ASN	EURO	SASA	AMRN
rs386416	Intron	G>C	G = 0.444	G = 0.431	G = 0.698	G = 0.300	G = 0.354	G = 0.439
rs402197	Intron	T>C	T = 0.126	T = 0.018	T = 0.349	T = 0.021	T = 0.072	T = 0.236
rs112467088	Intron	A>T	A = 0.814	A = 0.743	A = 0.981	A = 0.7187	A = 0.867	A = 0.771
rs422761	Intron	G>A	G = 0.775	G = 0.707	G = 0.682	G = 0.981	G = 0.759	G = 0.764
rs423596	Intron	C>T	C = 0.904	C = 0.994	C = 0.750	C = 0.961	C = 0.833	C = 0.977
rs456016	Intron	T>C	T = 0.125	T = 0.019	T = 0.349	T = 0.018	T = 0.075	T = 0.231
rs461194	Intron	C >G	C = 0.131	C = 0.004	C = 0.347	C = 0.030	C = 0.113	C = 0.228
rs8134203	Intron	C >T	C = 0.464	C = 0.506	C = 0.741	C = 0.256	C = 0.326	C = 0.477
rs464431	Intron	A >G	A = 0.126	A = 0.019	A = 0.349	A = 0.019	A = 0.075	A = 0.232
rs2298662	Intron	G>C	G = 0.123	G = 0.006	G = 0.346	G = 0.020	G = 0.082	G = 0.231
rs7364088	Intron	G>A	G = 0.695	G = 0.675	G = 0.604	G = 0.736	G = 0.736	G = 0.751
rs875393	Intron	G>A	G = 0.944	G = 0.998	G = 0.822	G = 0.942	G = 0.970	G = 0.986
rs2094881	Intron	T>C	T = 0.470	T = 0.524	T = 0.744	T = 0.252	T = 0.324	T = 0.491
rs75603675	Exon G>D	C >A	C = 0.756	C = 0.705	C = 0.983	C = 0.595	C = 0.777	C = 0.728
rs12329760	Exon V>M	C >T	C = 0.738	C = 0.738	C = 0.637	C = 0.764	C = 0.774	C = 0.846
rs456142	3'UTR	T >A	T = 0.370	T = 0.372	T = 0.634	T = 0.1690	T = 0.317	T = 0.352
rs462574	3'UTR	A >G	A = 0.257	A = 0.177	A = 0.590	A = 0.0338	A = 0.254	A = 0.252
rs456298	3'UTR	T >A	T = 0.372	T = 0.372	T = 0.636	T = 0.1690	T = 0.321	T = 0.353
rs12627374	3'UTR	C >T	C = 0.940	C = 0.995	C = 0.850	C = 0.998	C = 0.863	C = 0.996
rs12473206	3'UTR	C >G	C = 0.861	C = 0.959	C = 0.955	C = 0.740	C = 0.800	C = 0.800
rs75036690	3'UTR	G>A	G = 0.989	G = 1.000	G = 0.955	G = 1.000	G = 0.993	G = 1.000

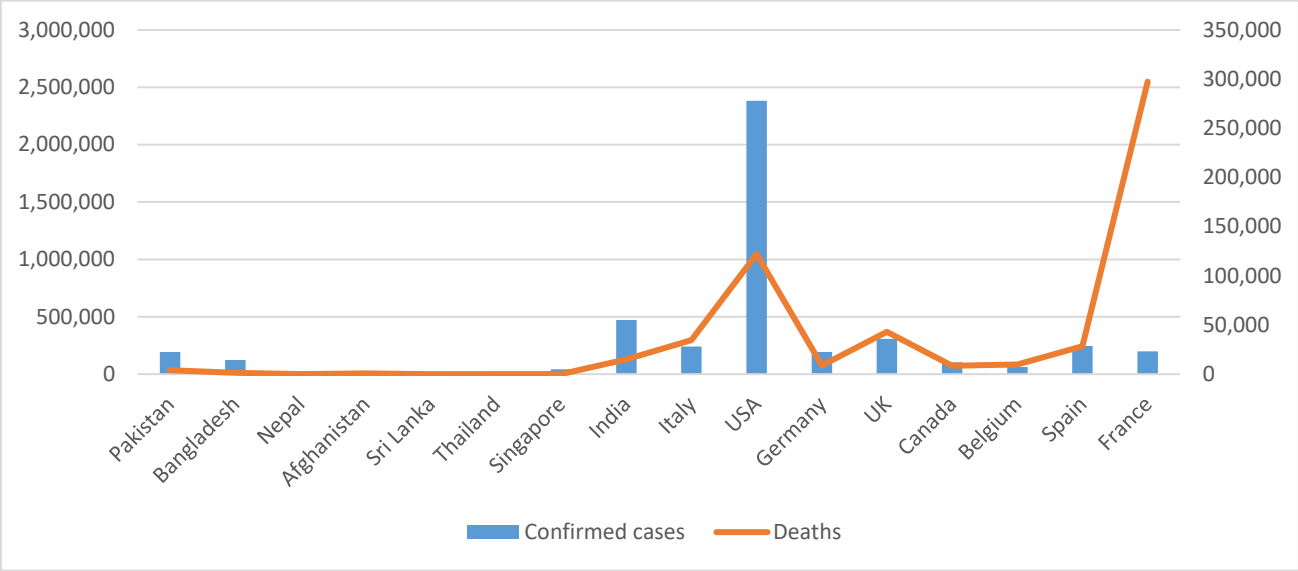

Figure 1: COVID-19 confirmed cases and death stats across some American, European and Asian countries

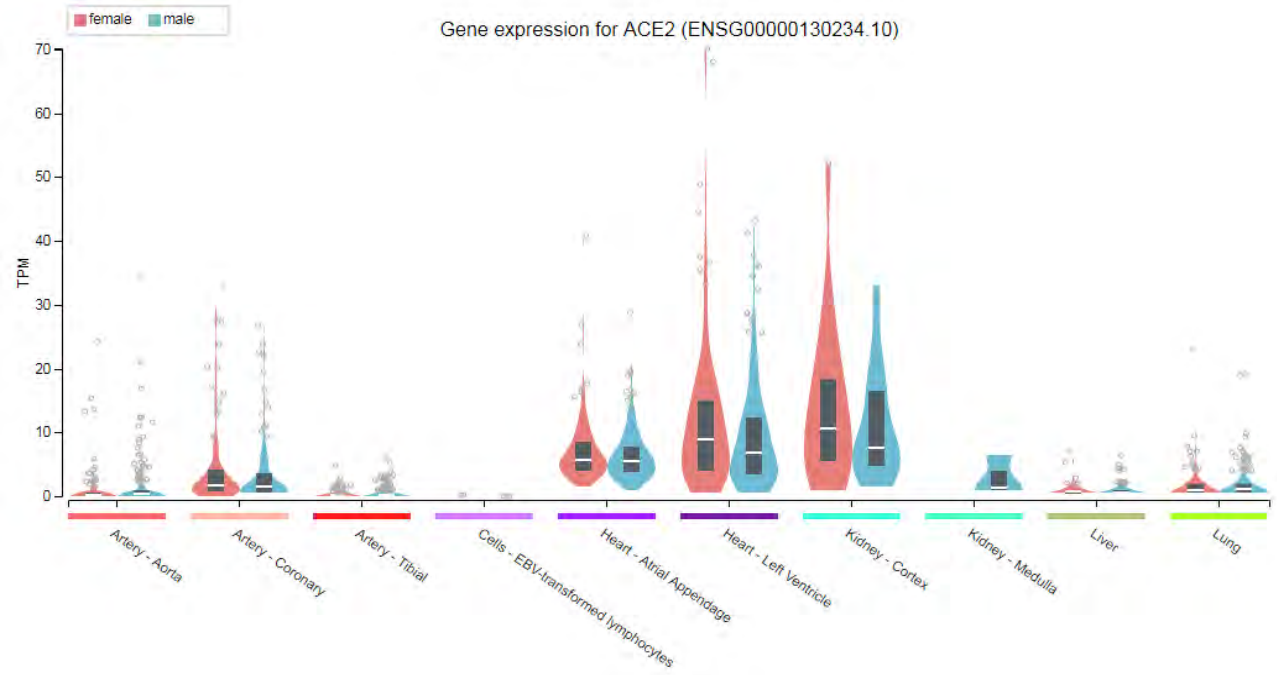

Figure 2: ACE2 Expression in major tissues associated with COVID-19 mediated damage

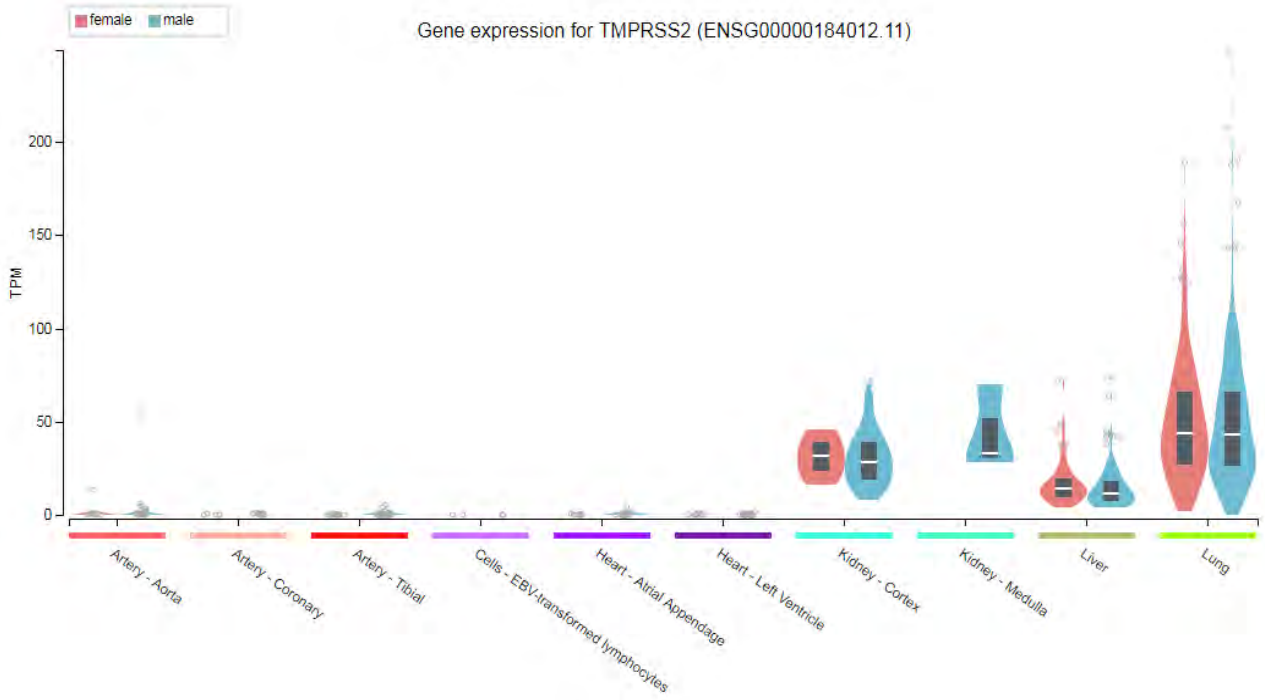

Figure 3: ACE2 Expression in males and females in major tissues associated with COVID-19-mediated damage

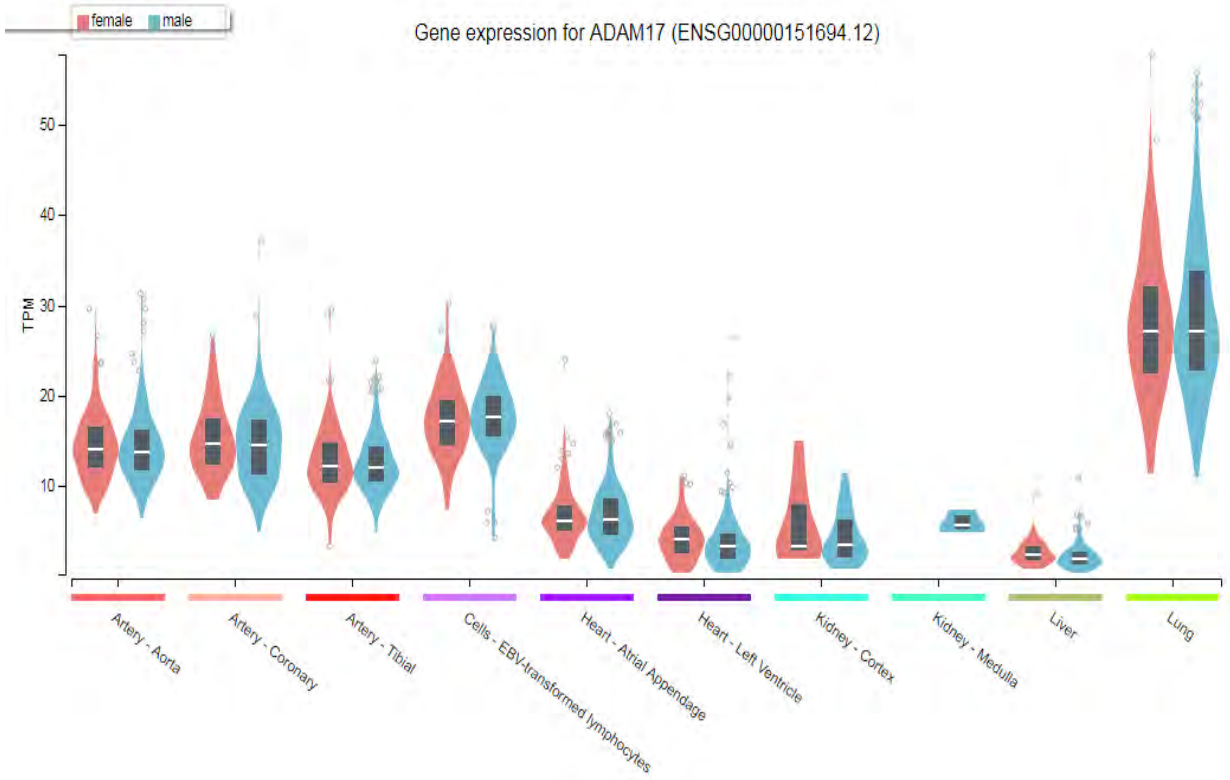

Figure 4: ADAM17 Expression in males and females in major tissues associated with COVID-19 mediated damage.

ABO Blood group variation across ethnicities and susceptibility to COVID-19

The ABO blood types proposed by Landsteiner are built on glucose residues found on the outer surfaces of human cells. Trisaccharide moieties Gal1-3-(Fuc1,2)-Gal and GalNAc1-3-(Fuc1,2)-Gal identifies the nature of A or type B blood group, whereas Fuc1,2-Gal determines the type O blood group. Even though blood group types are biologically transmitted, external conditions also have an impact on the type of blood group that will be passed on to offspring. 11 The ABO blood group has already been shown to be linked to virus proneness. Hepatitis B and the Norwalk virus, for instance, clearly have a blood group susceptibility. 12 Additionally, it was noted that people with the O blood group had a lower risk of contracting Covid-19. ABO blood type is an indicator for differential proneness to COVID-19, as it has been shown that blood group A is connected with an increased likelihood of becoming infected with COVID-19 while blood group O was related to reduced risk. These results are in line with prior research that identified similar ABO blood group probability trends for other coronavirus diseases. [13]

According to research, those with the blood group O were less likely to contract an infection than those with other blood types. According to Patrice et al., anti-A antibodies particularly prevented SARS-CoV S protein-expressing cells from adhering to ACE2-expressing cell lines. Given the nucleic acid sequence homology and ACE2 binding homogeneity between SARS-CoV and SARS-CoV, it is possible that the presence of naturally occurring anti-blood group antibodies, especially anti-A antibodies, in the blood contributes to blood group O's lower proneness to COVID-19 and blood group A's higher susceptibility. [14]

Conclusion

This review summarizes the role of gene polymorphism in rendering susceptibility to COVID-19 infection. Expression of genes like TMPRSS2, ACE-2, ADAM 10, and ADAM7 across various populations and gender can help predict the susceptible genetic makeup. Greater insight into these and other COVID-19 genes can help researchers understand the infection pattern of this pandemic.

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CASE REPORT

Tracheal crusting: A rare but fatal complication of Endotracheal Intubation

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Author`s Contribution

[1] Writing case report
[2] Data collection and editing
[3] literature review and consent
[4-5] Referencing, review

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A B S T R A C T

Endotracheal intubation is an intervention frequently performed in the hospital setting in order to protect the central airway and provide mechanical support for ventilation. The complications of the endotracheal tube include tracheitis, tracheal stenosis, tracheomalacia, and granuloma formation. Tracheal crusting following tracheitis is a very rare but fatal complication of endotracheal intubation especially in children so bronchoscopy should be compulsory in patients who have difficulty being weaned off from the ventilator and tracheal crusting should be kept in mind as a differential for weaning failure. Several cases of tracheal stenosis after extubation have been reported. However, to the best of our knowledge, there are no cases of obstructive tracheal crusting in children following tracheitis in the current literature. Here, we present the case of a 1-year-old girl who developed complications as a result of intubation.

Keywords: *Tracheal crusting, Tracheitis, Endotracheal incubation*

Introduction

Endotracheal intubation is a life-saving procedure. But it is associated with many complications such as tracheal stenosis, tracheomalacia, or granuloma formation.[1] Some of these complications can result in extubation failure, which occurs in 5 to 10% of patients intubated in ICU and is associated with a 25 - 50% increase in mortality rate.[2] Causes include all etiologies of airway obstruction, such as laryngospasm, upper airway edema, bleeding either leading to hematoma compressing the airway externally or clots internally obstructing the airway, accumulation of respiratory secretions, tracheal collapse due to tracheomalacia, and upper airway soft tissue collapse secondary to the effects of anesthetics, opioids, and muscle relaxants.[3] Airway obstruction most commonly presents as stridor which is resolved upon reintubation. Tracheal crusting is an uncommon complication of prolonged intubation and when it has been previously reported in the literature, growth of candida was seen.[4]

Case report

A 1-year-old girl was brought to the ER due to non-bilious vomiting and constipation for five days. After her workup, she was diagnosed with a case of bowel obstruction. Due to the failure of conservative management, the patient underwent exploratory laparotomy. The procedure was successful however upon extubation the patient could not be ventilated properly and had to be reintubated. After re-intubation, her oxygen saturation was maintained at 92%. Further vitals revealed a heart rate of 140 bpm and blood pressure of 80/30 mmHg. A physical exam performed at that point revealed harsh vesicular breathing on auscultation. Multiple

attempts were made to wean her off ventilator support but she could not maintain adequate oxygen saturation levels. After 9 days on ventilator support, she was weaned off successfully and her oxygen saturation was maintained at 90% on 3 liters of oxygen via the nasal cannula. After 48 hours of extubation, the patient developed tachypnea, and oxygen saturation levels fluctuated between 80-85%. Imaging studies were performed, which showed no mass in the post-cricoid region and no other concerning focal lesion however, web-like projections originating from the right glottic and supraglottic region lateral wall extending into the lumen were visualized on the lung window suggesting the presence of tracheal webs due to sequelae of long term endotracheal intubation.

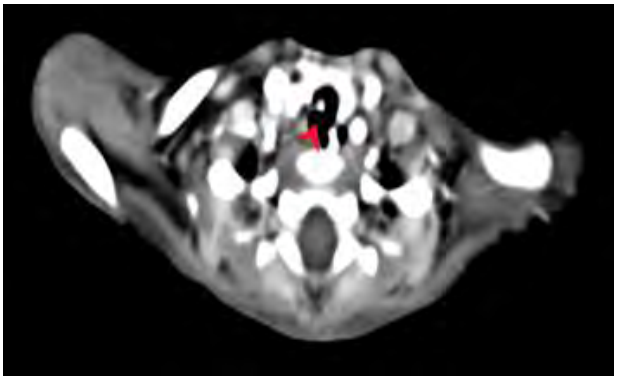

Figure 1: CT Angiogram

After the patient's vitals failed to improve, she was taken for bronchoscopy 12 days after laparotomy, which showed saddle-shaped crusting present in the distal end of the trachea. There was no other tracheal web or stenosis present. The crust was removed and pus was cleared and sent for culture and sensitivity. The tracheal culture revealed the presence of stenotrophomonas maltophilia. The patient was started on ceftazidime. The patient's condition improved significantly following the course of antibiotics. She was discharged home with the advice of chest physiotherapy and follow-up.

Discussion

Tracheal crusting is a common complication of tracheostomy but rarely has it been reported as a complication of prolonged endotracheal intubation that presented as a cause of extubation failure. A common complication of prolonged endotracheal intubation is the formation of an obstructive pseudo membrane that occurs due to local trauma at the site of the endotracheal crust, with no known predisposing factor or illness associated with it.[5] The pathophysiology is thought to be due to reduced tracheal mucosal perfusion causing ischemia and ulceration in the trachea.[5] Most cases present with respiratory distress, stridor, or hoarseness of voice that can occur from a few hours to days of extubation.[6] Several cases of tracheal stenosis after extubation have been reported. However, to the best of our knowledge, there are no cases of obstructive tracheal crusting in children following tracheitis in the current literature. Our case report is unique as it not only reports tracheal crusting as a cause of respiratory obstruction but also our report showed the growth of stenotrophomonas maltophilia. It is a multi-drug-resistant bacteria that is responsible for nosocomial infections. It can form biofilms on human bronchial epithelial cells.[7] It can cause hospital-acquired pneumonia in ICU patients. Our patient follows this trend as she also had asymptomatic colonization of stenotrophomonas maltophilia. Tracheal crusting following tracheitis is a very rare but fatal complication of endotracheal intubation so bronchoscopy should be performed in patients who have signs of respiratory distress after extubation.

Conclusion

Tracheal crusting should be in consideration, especially in children who show signs of airway obstruction following endotracheal intubation. Early detection of tracheal crusting and immediate action can reduce the morbidity and mortality associated with prolonged intubation. Tracheal crusting following tracheitis is a very rare but fatal complication of endotracheal intubation so bronchoscopy should be performed in patients who have signs of respiratory distress after extubation. Since infection with S. maltophilia can be life-threatening, care should be taken to make the correct diagnosis and prevent resistant strains from emerging in patients being treated with antibiotics for various reasons. Strict adherence to hygiene and quality control can also help reduce nosocomial infections in susceptible patients.

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CASE REPORT

Primary Sjogren's syndrome presents as recurrent meningoencephalitis

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A B S T R A C T

Primary Sjogren's syndrome is an autoimmune disease mostly affecting middle-aged females. It usually involves the exocrine glands system resulting in dryness of the mouth and eyes. It rarely involves the Central nervous system. Here we present a case of Sjogren's syndrome with a rare presentation at an unusual age. An 80 years old patient who presented with 3 episodes of recurrent aseptic meningitis in a year, was diagnosed with primary Sjogren's syndrome after extensive workup. She responded well to immunomodulatory treatment. Clinicians should consider the rare presentation and age of autoimmune diseases when facing the challenging clinical situation.

Keywords: *Sjogren's syndrome, Meningitis, Central nervous system*

Introduction

Sjogren's syndrome (SS) is a chronic autoimmune inflammatory condition marked by impaired lacrimal and salivary gland activity, resulting in eye and mouth dryness. However, multisystem involvement can occur in it. The age of onset is 40-60yrs with female predominance.[1] Central Nervous System (CNS) manifestations occur in 25% of patients, ranging from diffuse symptoms to focal white matter lesions.[2] Meningoencephalitis and pachymeningits have been described in the literature as a rare manifestation of SS. [3, 4] Here we present a case of an 80-year-old female with recurrent episodes of meningoencephalitis secondary to Sjogren's syndrome.

Case report

An 80-year-old diabetic female was brought to Emergency Reception (ER) with a short history of fever and headache followed by depressed consciousness. There was no associated vomiting, photophobia, fits, body weakness, or falls. On examination in ER, she was febrile (100 F), and GCS was 11/15 with signs of meningeal irritation. The rest of the examination was normal. She experienced the same illness twice; 6 and 11 months back. In between the episodes, she remained normal. She was investigated extensively to look for the cause of recurrent meningoencephalitis (Table 1).

MRI brain with contrast showed diffuse Pachymeningitis. CTA showed no significant abnormality in vessels. In her previous admissions, she received IV acyclovir and a short course of steroids, she responded well within 48hrs and had full functional and cognitive recovery within a week. This time she was given only supportive care, and her improvement was slightly delayed

but like her previous admissions, she regained her prior functional status. To look for the cause of this recurrent aseptic pachymeningitis, Antineuronal and anti-paraneoplastic antibodies (CSF), Whole body CT scans were done that was unremarkable except for enlarged parotid glands on CT scan as an incidental finding. After excluding other causes, her autoimmune profile was sent that showed strong Positive ANA, Anti SSA, and SSB antibodies. The test results were confirmed by two laboratories 15 days apart. So the cause of her recurrent aseptic meningitis/pachmeningitis turned out to be Sjogren's syndrome (Figure 1a, b).

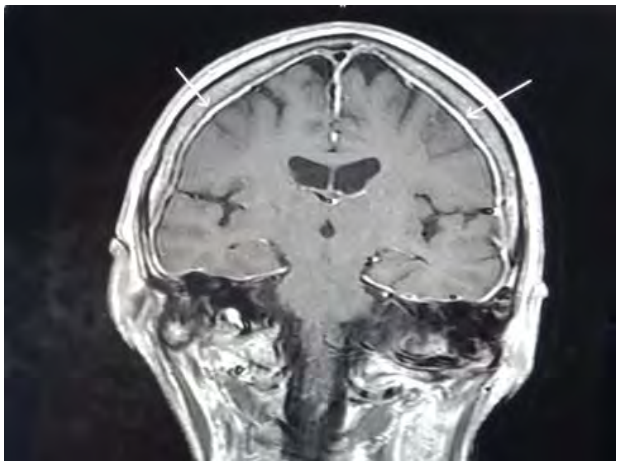

Figure 1a: Contrast-enhanced MRI brain coronal section. Arrows pointing towards enhanced pachymeninges.

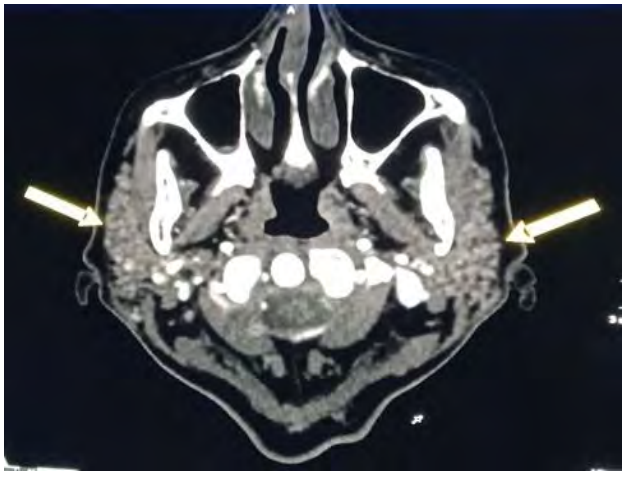

Figure 1b: Arrow indicating diffuse hypertrophied parotid glands

On exploring, the patient gave a history of easy fatigability, weight loss, occasional oral soreness, and arthralgia. However, there was no H/o head and neck radiation, organ transplant, or any drug use other than gliclazide. Normocytic normochromic anemia and parotid gland hypertrophy also favored the diagnosis of SS. Furthermore, she had a dry tongue, and multiple dental caries, a slit lamp examination showed dry and keratinized conjunctiva and cornea, and Schirmer's test was positive in both eyes. As her CNS symptoms had resolved completely when the diagnosis was made, and there was no indication requiring high-dose steroids so she was started on Hydroxychloroquine 200mg once daily. The patient is still under follow-up and has neither developed any further episodes of aseptic meningitis nor any other disease flare in the last 1year.

Discussion

The case under discussion describes a rare presentation of Sjogren's syndrome (recurrent aseptic meningoencephalitis / pachymeningitis) at an unusual age. We diagnosed the case after extensive laboratory workup because the presentation and age both were very rare for any autoimmune disease. We used the 2016 American College of Rheumatology / European League Against Rheumatism (ACR-EULAR) criteria for our diagnosis of SS, our case satisfied the criteria for diagnosis with a score of 4 [positive anti-SSA/Ro antibody (score 3), positive Schirmer's test (score 1).[5]

In literature, Lee et al. reported a young patient with recurrent aseptic meningitis secondary to SS who could not meet ACR-EULAR criteria, and their diagnosis was supported by diagnostic scintigraphy.[6] Rossi, R et al. also describe the case of a 58-year-old female presenting with signs of meningism along with CN IV deficit, SS was confirmed by salivary gland biopsy and was resolved with steroid therapy with dexamethasone.[7] Both cases had diffuse leptomeningeal enhancement on brain imaging,[6, 7] whereas our case had diffuse pachymeningeal enhancement. On the other hand, only a couple of cases of SS-related pachymeningitis have been reported, those presented with a variable focal deficit but none had recurrent aseptic meningitis. [4, 8, 9]

Unusual age, and rare clinical and radiological presentation made the case peculiar. Secondly, we excluded all other possible causes in addition to fulfilling ACR/EULAR criteria. Furthermore, follow-up after a year with no recurrence of neurological symptoms also strengthened our case.

Table 1: Summary of lab investigations in three admission

Lab parameters	1st admission (Aug 2019)	2nd Admission (March 2020)	3rd Admission (September 2020)
Blood film	Normocytic normochromic anemia	Normocytic normochromic anemia	Normocytic normochromic anemia
C-reactive protein	0.5	0.4	0.5
ESR	-	-	53
Renal profile	WNL	WNL	WNL
Liver profile	WNL	WNL	WNL
HBA1C level	8.9%	8.1%	8%
B12 level	-	-	WNL
Serum Folate	-	-	WNL
Serum Ionized Calcium	-	-	WNL
ACE levels	-	-	WNL
Vit D levels	-	-	WNL
TSH	Normal	Normal	WNL
Anti-HIV Antibodies	-	-	Negative
Anti HCV antibodies	-	-	Negative
Shyphilis serology	-	-	Negative
Urine routine analysis	Protein +1	-	Normal
Cardiac workup (ECG, ECHO)	Normal	Normal	Normal
CSF Routine analysis	Proteins 111mg/l Cells< 5 (100% L) Glucose 112mg/dl (more than 50% of serum blood sugars at that time) LDH 35	Protein 67mg/l Cells 29 (100% L) Glucose 157mg (more than 50% of serum blood sugars at that time) LDH 28	Proteins 95mg/dl Cells 36 (100% L) Glucose 157mg (more than 50% of serum blood sugars at that time) LDH 121
CSF gram stain	negative	negative	negative
CSF Mycobacterium TB PCR and culture	negative	negative	negative
CSF for fungal stain and Culture	negative	negative	negative
CSF for HSV I & II PCR	Target not detected	Target not detected	Target not detected
CSF bacterial Culture	No growth	No growth	No growth
CSF cytology for malignant cells	No malignant cells seen	No malignant cells seen	No malignant cells seen

WNL= within normal limit

Conclusion

Clinicians should consider the rare presentation and age of autoimmune diseases when facing a challenging clinical situation.

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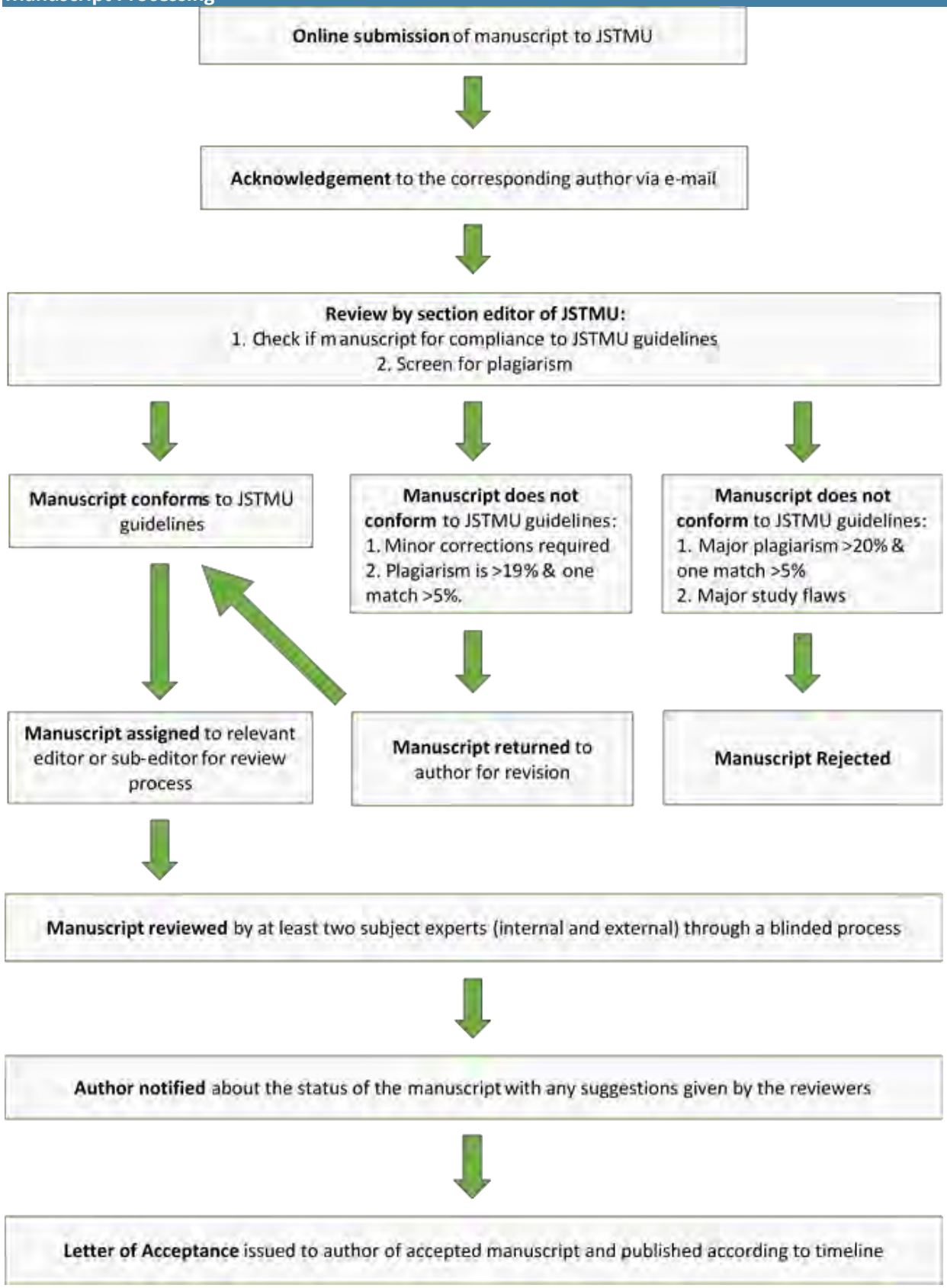

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Initial decision to review	1-2 weeks after submission
Decision after review	6-8 weeks after submission
Anticipated timeframe for suggested revisions	3-4 months (with flexibility if needed)
Time to online publication	1-2 months after acceptance
Time to print publication	Within 3 months of acceptance

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The manuscript(s) submitted to JSTMU should not be more than allowable words limit (mentioned in relevant sections below) and NOT more than 5 Tables and/or figures excluding abstract (250 words), acknowledgments and references. The text of the manuscript should be doubled spaced with one-inch margin on all sides. The font should be in size 12 Times New Roman and all pages should be numbered. A certificate, signed by the author and co-authors should be accompanied along with the manuscript stating that the article has been read and seen by all authors and have not been submitted or published in another journal or elsewhere in a report or textbook. Any copyright material, if used, should be accompanied with a permission letter from the copyright owner by the corresponding author. The manuscript should be checked for spelling and grammatical errors before submission. Authors should write the Keywords in the manuscript below the abstract. *

A. Original Research Articles

The Journal considers original articles that are, cohort study, case-control study, clinical trials, intervention study, epidemiological assessment, cross-sectional study, meta-analysis, cost-effective analysis, decision analysis, study of screening and diagnostic test, other observational studies, and qualitative studies such as focus group discussions, in-depth open-ended survey etc. Articles based on thesis maybe submitted provided the data is not more than three years old.

Each original article must contain:

Title page *

Title page should contain the following information:

1. Complete title of the article
2. Name(s) of author(s)
3. Department(s)
4. Institution(s) at which work was performed
5. Official phone/fax number, mobile phone number, personal e-mail address of the corresponding author, and institutions address.

Abstract

The abstract should be structured and NOT more than 250 words. The abstract must be written under the following subheadings:

1. Introduction
2. Objectives
3. Methodology
4. Results
5. Conclusion

Text

Text must be arranged under the following headings:

1. Introduction
2. Methods
3. Results
4. Discussion
5. Conclusion(s)
6. Acknowledgements (if any)

Introduction: Should provide brief review of relevant literature in such a way that it highlights the importance of the study and that the purpose of the study should be clearly stated. The articles used in the review of literature should be properly referenced by Vancouver Style.

Methods: Should include the setting(s), the subjects (participants), sampling methods and sample size, if used, type of study design used, and other procedures that were conducted. The Methods section should be brief, crisp and detailed enough to enable the reader to replicate the study in another setting. Commonly used procedures and methods need not be described but require a reference to the original source.

Results: Should include the factual findings of the research study done and, presented in the form tables or figures. Each table and figures should be properly labelled with headings and numbers (e.g. Table

No. 1, Figure No. 1) on separate pages. The write-up of results in the text should highlight the important findings without duplication of presentations displayed in the tables or figures. *Explanation of the findings should be reserved for the Discussion section.*

Discussion: Should highlight the important findings comparing and contrasting the study's results with that of other similar researches published and it should be appropriately referenced. Discussion should be concise and supported by the presented data.

Conclusion: Is restricted to the study and is drawn from the results and discussion.

Acknowledgements: If any, should be placed at the end of the text and before references.

References: *

References should be cited consecutively in SUPERSCRIPT as NUMERICAL without parentheses and should appear AFTER the punctuation marks (. , ; : ? ! " etc.) in the text/sentence. The final bibliography should be in the order in which they are quoted/cited in the text and written in *Vancouver Style*.

Citation Example:

Equal amounts of dietary carbohydrates have variable blood glucose response considerably as a function of specific food ingested.[1]

Bibliography/References Example:

1. Wolever TMS, Yang M, Zeng XY, Atkinson F, Brand-Miller JC. Food glycemic index, as given in Glycemic Index tables, is a significant determinant of glycemic responses elicited by composite breakfast meals. *Am J Clin Nutr* 2006; 83(6):1306–12.
   DOI: https://doi.org/10.1093/ajcn/83.6.1306

B. Meta -Analysis/ Systematic Reviews

Meta-analysis are systematic, critical assessments of literature and data sources pertaining to clinical topics, emphasizing factors such as cause, diagnosis, prognosis, therapy, or prevention, and that includes a statistical technique for quantitatively combining the results of multiple studies that measure the same outcome into a single pooled or summary estimate. All articles or data sources should be searched for and selected systematically for inclusion and critically evaluated, and the search and selection process should be described in the manuscript. Inclusion and exclusion criteria must be mentioned. Details of searching articles and search engines used should be clearly stated. The specific type of study or analysis, population, intervention, exposure, and tests or outcomes should be described for each article or data source. These should be described in the Method section. The data sources should be as current as possible, ideally with the search having been conducted within several months of manuscript submission. Authors of reports of meta-analyses of clinical trials should submit the PRISMA flow diagram and checklist. Authors of meta-analyses of observational studies should submit the MOOSE checklist. Follow EQUATOR Reporting Guidelines. The text **should NOT exceed 6000 words** excluding abstract, references, tables and figures.

Each of the sections of these articles should include specific sub-sections as follows:

Structured Abstract: (Not exceeding 250 words):

1. Objectives
2. Methodology
3. Results
4. Conclusion

Text should be organized under the following headings:

Introduction:

1. Rationale
2. Objectives
3. Research question

Methods:

1. Study design
2. Participants, interventions, comparators
3. Systematic review protocol
4. Search strategy
5. Data sources, studies sections and data extraction
6. Data analysis

Results:

1. Provide a flow diagram of the studies retrieved for the review
2. Study selection and characteristics
3. Synthesized findings

Discussion:

1. Summary of main findings
2. Risk of bias
3. Limitations
4. Conclusions

** For all other information including title page, typing and reference style, please follow the original articles instructions.*

C. Systematic Review (without meta-analysis): Review articles

Systematic Reviews/ review article are critical evaluation and assessments of scientific literature and other sources of data relating to health sciences topics, emphasizing factors such as cause, diagnosis, prognosis, therapy, or prevention. Systematic Reviews without meta-analysis are published as Review articles; those with meta-analysis are published as Original Investigations.

Systematic Reviews should include the following:

1. Abstract (Unstructured abstract of no more than 350 words)
2. Introduction (150-250 words)
3. Methods (150-250 words)
4. Results (1000-1250 words)
5. Discussion (1000 words)
6. Conclusions (2-3 sentences)

Maximum length: **Should NOT exceed 3500 words of text** (not including abstract, tables, figures, acknowledgments, references), with no more than a total of 5 tables and/or figures and no more than 50-75 references.

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D. Case Reports/Case Series

The journal will consider only those case report/series that represent very rare case(s), or epidemic diseases that are new or emerging, or first observation(s) of some emerging phenomenon or disease. They should have clinical significance and may also include observation of new adverse effect(s) of a drug, vaccine, or procedure or other unique observations, etc. Informed written consent of the patient or next of kin (if patient is not alive or comatose/disabled) should be obtained before submission of the manuscript. A covering letter from the authors that convincingly describe the merits of the case in the light of the mentioned criteria and it's educational or scientific merits should be sent along with the manuscript.

Case Report /case series should contain a single paragraph abstract and text **should NOT exceed 1000 words** (excluding abstract, references, tables and figures) with maximum 10 bibliographic references and either three figures or three tables. Each case report must contain:

1. Abstract (unstructured - should not exceed 120 words)
2. Introduction
3. Case Presentation
4. Discussion
5. Conclusion
6. Competing interest
7. Patient consent

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E. Rapid/Special /Short Communications

Rapid/Special/Short communication should be complete work, such as COMPLETE results of a short RESEARCH study, NOT a preliminary report and **should NOT exceed 1500 words** with one figure and/or one table. An editorial decision will be provided rapidly without reviews.

F. Letters to Editor

Letters should only be written on a specific article in the most recent publication of journal. The letter should be objective and provide constructive opinions offer some academic or clinical interest to the readers.
Letters **should NOT exceed 400 words** of text and 5 references, 1 of which should be to the recent article. It should not have more than 3 authors. The text should include the full name, academic degrees, and institutional affiliation for author and the email address for the corresponding author. Letters considered for publication shall be forwarded to the author of the cited article for possible response. The editor reserves the right to shorten these letters, delete objectionable comments, make other changes, or take any other suitable decision to comply with the style and policies of the journal. For writing and references style, follow the same instructions listed above.

Letter in Reply

Replies by authors should not exceed 500 words of text and 6 references. They should have no more than 3 authors.

G. Editorial

The topics of the editorial are decided by editorial board and/or Editor-in-Chief. Editorial is written either by one member of the editorial board or some expert on that topic invited by the Editor-in-Chief. As a convention, the editorial addresses relevant areas of interest that may pertain to a range of areas influencing health and health care sciences.

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