

**Master of Science in Public Health**



**Impact of Vision Assessment on Functional Needs of Low Vision patients  
visiting to Tertiary Eye Hospital of Rawalpindi district**

**By**

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**Islamabad, Pakistan**

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## **Declaration**

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This dissertation is the result of an independent investigation. Where my work is indebted to others, I have made acknowledgments.

I declare that this work has not been accepted in substance for any other degree, nor is it currently being submitted in candidature for any other degree

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## **Abstract**

### **Background:**

Low vision remains a major healthcare problem in both developed and developing countries. The growing numbers of the visually impaired who can no longer be treated by optical, medical, or surgical treatments pose a challenge to eye care professionals. LVAs, as part of a complete low vision service, can significantly improve patients' residual vision permitting them to complete daily life requirements.

### **Objective:**

The study aims to do visual assessment of low vision patients, to access the functional needs of low vision patients and to find association between functional needs with visual profile and socio-demographics factors of patients.

### **Methodology:**

A cross-sectional study was carried out in Alshifa Trust Eye Hospital Rawalpindi. A total 80 low vision patients participated in the study. Data was collected using adapted questionnaire. Then data was analyzed using SPSS version 26.0. Chi-square test of association was applied to examine the association between socio-demographics and vision assessment with functional needs of patients.

### **Results:**

Out of total 80 patients greater number of male participants 60% were participated in the study as compared to female. The mean age was 35.1 ( $\pm$  13.3) with a range of 18-60 years. 70% of participants were the offspring of consanguineous marriage. The main cause of low vision was

nystagmus. The majority of the patients were using spectacles for near and distance. There was improved functional needs (educational needs, social needs and daily life activities) of patients who were utilizing of low vision services.

**Conclusion:**

In conclusion, an increase in the awareness of visual deficit. Functional needs were assessed by visual assessment and it showed that who were on regular follow-up and using their proper Low Vision aids had improved functional needs than those who were not availing low vision services.

**Key words:** Low vision, visual impairment, functional needs, vision assessment

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## List of Abbreviations

WHO	World Health Organization
LVC	Low Vision Care
VI	Vision Impairment
ECPs	Eye Care Practitioners
QOL	Quality Of Life
LVA	Low Vision Aids
LVDs	Low Vision Devices
ICD	International Classification of Diseases
VRQOL	Vision-Related Quality Of Life
LVA	Low Vision Assessment



## CHAPTER 1: INTRODUCTION

Visual impairment is a public health concern with intense socioeconomic significances in both the developing and the developed world (Abu-Yaghi et al., 2022). Vision plays a fundamental role in our daily lives and any limitation to it can negatively influence daily life activities. 90% of the world's blind people live in underdeveloped countries. Globally there are 2.2 billion people who are visually impaired (Abu-Yaghi et al., 2022). The incidence of visual impairment is on the rise globally, with a heavier burden on developing nations. However utilization of low vision services is still low in these countries (Jose et al., 2016).

According to the World Health Organization (WHO), the majority of visually impaired individuals are in fact people with low vision (246 million people as compared to almost 40 million people who are legally blind). Low vision is defined as visual acuity (VA) of equal or less than 6/18 but equal or better than 3/60 in the better eye, or a visual field of less than 20 degrees after the best correction of refractive errors and (Baarah et al., 2018) available medical, surgical and/or pharmacological treatments (Abu-Yaghi et al., 2022).

Almost every patient with impaired vision has difficulty performing vision-related routine work, which can lead to a poorer quality of life and significant societal consequences. Adults above 80 years represent 70% of those with significant vision impairment (Baarah et al., 2018)

Visual impairment, which contains both low vision and blindness, is an important public health concern that affects not only individual but their family and society as well (Ovenseri-Ogbomo et al., 2016). Everywhere in the world with a huge percentage of these cases being avoidable if appropriate treatment such as glasses, contact lenses, low vision aids or medical practices are available, without treatment or if treatment is ineffective, vision impairment can cause major

disability and have a poor impact on daily activities and chances for participation in society. The disability consequence from low vision means that these individuals often have suffering with functional and emotional wellbeing.

Vision impairment (VI) and blindness have a direct effect on individuals' financial prospects, employment opportunities, educational fulfillment, and also increasing the risk of mortality. Its coexistence with other impairments or disabilities (e.g., deafness, intellectual disability, locomotor disability) might bound the personal growth to a huge level (Woodhouse et al., 2014). Moreover in older individuals vision impairment not only pointedly weakens the quality of life, apparent in the link between vision impairment and depression, but also impairs parallel conditions such as cognitive impairment and the vulnerability to fall (Bourne et al., 2021). In this new era as the advancement of technologies the burden of diseases also shifting from communicable to non-communicable diseases and age-related conditions (Liu et al., 2017).

Visual impairment have many causes which diverge according to region and income-level, with a majority of age-related macular degeneration, diabetic retinopathy and glaucoma over cataracts, in high-income regions, and an opposite trend in lower-income regions. Population progression and ageing can effect in a greater prevalence of visual impairment,(Flaxman et al., 2017) although VI should not merely be approached from the outlook of ageing. Visual health policies, as any health policy, should concentrate not only on providing appropriate resources, including efficient eye care services and properly trained optometrists,(González-Méijome, 2019) but also on population authorization by promoting visual health knowledge.

Low vision is a widespread term used for diseases causing in reduced vision that cannot be completely corrected even after cure. Low vision services work well in monitoring the functional and psychological impacts of visual impairment(M. Shah & Khan, 2020). It also increases the



quality of life and daily living skills of the individual. The goal of any vision rehabilitation is to allow patients to lead fruitful lives.

The impact of low vision assessment on an individual's life can be important, including, social, daily life activities, economic, psychological and educational. However, providing low vision assessment to those affected can help to improve some of these impacts. Low vision refers to a variety of situations that cause reduced vision that cannot be fully corrected with low vision services. The eventual objective of vision rehabilitation is to allow patients to lead productive and fulfilling lives (Jose et al., 2016).

Patients with low vision usually experience poorer vision-related quality of life and mental health compared to individuals without visual impairment. Some low-vision patient required expert consultation to address their specific needs. Low vision intervention involves making the most of a person's residual vision to make him/her independent in carrying out the activities of daily living (Alrasheed et al., 2021) The use of low vision services has been shown to contribute to a decline in depressive symptoms. Low vision care (LVC) services significantly improve reading, access to information, emotional well-being, and overall quality of life (Liu et al., 2017).

Even though, low vision assessment benefits patients by improving their quality of life, the awareness about the services among eye care practitioners (ECPs)(Jose et al., 2016) and the uptake of low vision services continues to be relatively low even in developed countries. Low vision assessment intentions to improve the use of remaining vision after severe vision loss, but also aims to communicate services in order to increase visual functioning in daily life routine in a better way. Additional aims contain serving individuals to adjust to everlasting vision loss and educating psychosocial functioning. These skills encourage independence and lively involvement

in society. Low vision rehabilitation should eventually improve quality of life (QOL) for individuals who have visual impairment (van Nispen et al., 2020).

Low vision services can be given by capable ophthalmologists, optometrists, or low-vision therapists. To increase patients' vision and attain vision-related goals, these facilities include adapted, doctor-patient approach. Depending on their requirements and level of satisfaction, patients can select from a diversity of therapy modalities. Low vision aids include various old-style and electronic methods (such as sun protection, reading aids, and color vision boosters), and surgical options (such as retinal prostheses)(M. Shah & Khan, 2020). These exercise and rehabilitation methods can help patient's ambition, become more moveable, identify faces, write and read more clearly, see colors more undoubtedly, and feel less nervous.

The best effective process to lessen the grade of disability related with visual impairment is to provide low vision aids (LVAs) as a part of a complete low vision rehabilitative facility (Senjam, 2021). When dispensed properly, these modest magnifying devices can improve residual vision and allow individuals with reduced sight to complete their daily tasks such as reading. The accomplishments of low vision services depends on extending the work of a low vision provider from merely prescribing LVAs, into counseling and training individuals with impaired vision.

In developing countries like Pakistan mostly people are unaware of low vision services. They adjust their daily routine according to use their residual vision and unable to visit any tertiary eye care hospital for improving their life style by attaining low vision services. The main aim of this study is to assess the functional needs like educational or vocational, social needs and daily life activities of patients with impaired vision who attend low vision assessment and using

appropriate devices and came to know that how much these devices or assessment will change one's life. The results of this study will be used to improve the assessment and treatment technique where patient will not satisfy and change it according to patients functional needs where he want to use his or her vision for most. Low vision services aims to enhance the use of residual vision after severe vision loss, but also purposes to teach skills in order to increase visual functioning in daily life. Other aims include helping individuals to adjust to permanent vision loss and refining psychosocial functioning. These skills encourage freedom and lively involvement in society. Low vision rehabilitation should eventually increase quality of life (QOL) for individuals who have visual impairment(van Nispen et al., 2020).

## **1.1 Rationale:**

Visual impairment is a foremost health concern all over the world. It is responsible for much individual suffering and financial hardship. Low vision services are the last hope for individuals to reduce the impact of impaired visual acuity and this demands a holistic approach to be applied in all fields of life of low vision patient.

Pakistan is a developing country with limited resources and financial constraints, which can impact the availability and affordability of low vision services. Low vision is a common and growing problem, mostly among the older population. Mostly patients do not aware about the services provided to visual impairment patients and those who attain these services still face difficulties in their daily routine activities. The purpose of this study is to assess the low vision patients who visiting tertiary eye care hospital for low vision assessment or services and to assess the impact of these services on their functional need like educational or vocational, social and daily life activities. This study will include low vision patients as they have chance to make use of their remaining vision through different low vision aids to improve their quality of life,

confidence and independence and through proper assessment they will be able to do their daily tasks easily.

This will contribute to existing literature so to develop interventions to improve low vision patients.

## **1.2 Objectives:**

1. To visually assess low vision patients by visual assessment who visiting to tertiary eye hospital Rawalpindi.
2. To assess the functional needs of low vision patients.
3. To find association between functional needs with visual profile and socio-demographics factors of patients.

## **1.3 Operational definitions:**

### **1.3.1 Low vision:**

Visual impairment is a major public health challenge. According to World Health Organization (WHO) visual impairment encompasses both low vision and blindness. A person with low vision is one who has impairment of visual functioning even after treatment and/or standard refractive correction, and has a visual acuity of less than 6/18 to light perception, or a visual field of less than 10 degree from the point of fixation, but who uses, or is potentially able to use, vision.

### **1.3.2 Low vision services:**

Specified care that helps people with visual impairment make most of their remaining vision and maintain their quality of life.

### **1.3.3 Functional needs:**

Functional needs are those which are required for a person to live his life better. The study includes three basic functional needs which are educational needs, social needs and daily life activities.

### **1.3.4 Low vision assessment:**

A low vision assessment (LVA) determines how you can make use of your

## **CHAPTER 2: LITERATURE REVIEW**

### **2.1 Context of Low Vision and its assessment:**

The visual system is one of the most significant sensory systems and it is the main source of integration between individuals and the external settings (Awan et al., 2018). Visual impairment including low vision and blindness can have an important impact on the wellbeing and quality of life of an individual. Low vision refers to visual abilities less than that required for efficiently performing the essential daily activities.

Low vision, though not considered as blindness, has massive social and economic consequences in terms of economic loss and loss of efficiency. Furthermore, if vision impairment occurs early in life, it has reflective functional and psychological effects. In order to lessen the degree of handicap connected with visually impaired individuals, the most active method is providing them low vision devices (LVDs) as a part of low vision services with the aim to greatly improve their residual vision. In developing countries, rehabilitation of visually impaired children is a challenge, due to the lack of knowledge among some health care providers about the existence of such services and the associated financial implications.(Shaaban et al., 2009)

Low vision services can contain the prescription of low vision aids, orientation and mobility therapy, adaptive techniques, and occupational therapy. Naturally, a strategy for low vision rehabilitation is developed around an individual patient's needs, impairments, and type(s) of vision loss (e.g. visual acuity, peripheral fields, and contrast sensitivity). A rehabilitation proposal must also be approachable to the local culture and environment, as disabilities in different locations may cause different work limitations due to flexible factors such as local occupational requirements and environmental challenges.(Ehrlich et al., 2020)

A significant proportion of these cases can be prevented through proper treatment such as glasses, contact lenses, low vision aids, medical or surgical treatment and millions of people remain at risk of visual loss due to the lack of eye-care services.. According to a study, when visual impairment exists with other disabilities like deafness, mobility issues, or intellectual disability, then it can further bound the progress of an individual (Lupón et al., 2018)

## **2.2 Worldwide burden:**

Globally, there are 1.1 billion people who are visually impaired in which 295 million almost 3.5% of world population are living with moderate to severe visual impairment. 258 million with mild VI which is 3.3% of total population, 510 million are with near VI (6.5%) and almost 43 million are blind (0.5%). Among all these 90% can be prevented and treated. (Haileamlak, 2022)

Almost 89% of VI population are living in developing countries. Health inequities consequence in a greater burden of blindness and vision impairment among women and traditional minorities in all regions of the world. Visual impairment costs patients, their families, and communities globally more than US\$3 trillion once a year. Thus, the burden of visual impairment not only disturbs vision but also obstructs the expansion and development of complete societies and the bigger society.(Forrest et al., 2023)

Despite the circumstance that the prevalence of visual impairment and low vision is growing, the acceptance remains to be comparatively low in the developing countries like Pakistan. There are studies that have been done to recognize the establishment and acceptance of low vision facilities globally.(Jose et al., 2016)

### **2.3 Lower middle income countries scenario of low vision:**

Over one billion individuals globally now live with visual impairment (VI), the majority in low- and middle-income countries (LMICs) like Pakistan. Eye health programs goal to decrease avoidable blindness, but their achievement depends upon effective execution. In communities and schools screening is regularly conducted. By this we individuals are identify whether they have vision problems or not. The following steps contain provision of primary eye care services and refractive correction, and referral to hospital eye services when needed. In communities-based screening programs there are various stages where patients may be missed, they may not attend the initial services or may lost the follow up. They may be not visit to the referral hospital for further treatment. This leads to remaining unmet need despite an otherwise high volume, effective screening programme. Patients with more complex eye care needs failing to attend hospital ophthalmology appointments after a problem is identified. These patients are often those with the most serious ophthalmic problems, so failure at this phase can effect in significant disability.(Khan et al., 2022)

There can be significant barriers to attending a hospital appointment and adherence to hospital recommendation after vision screening is low (around 30%) even after provision of education, incentive packages, and secondary financial support. While these interventions do overcome some socioeconomic barriers, evidence-based approaches tailored to the resident setting are needed to achieve an acceptable level of adherence and to ultimately improve vision (Katibeh et al., 2020).



## **2.4 Low vision:**

Low vision is universal term for circumstances that result in decrease in eyesight that is not totally reversible low vision services successfully reduce the functional and psychological effects of visual impairment. It also improves the quality of life and daily living skills of the individual.

World health organization (WHO) international classification of diseases (ICD-10) defines a person with low vision as one with visual acuity between 6/18-3/60 in the good eye and field of vision between 20 and 30 degrees. The WHO working definition of LVA defines a person with low vision as one who has a visual impairment or visual functional impairment even after treatment of the ocular pathology and or refractive error correction with a vision of less than 20/60 to a perception of light or a visual field of fewer than 10 degrees from the point of fixation.(S. C. Ganesh et al., 2018)

Low vision can be consequence of a variety of ocular and general disorders. These disorders can be both inherited or acquired. Examples include genetic retinal disorders like retinitis pigmentosa and ocular albinism, diabetic retinopathy, cataract, glaucoma and age-related macular degeneration. A study showed most of the people had age-related macular degeneration (62%). These conditions affect vision at diverse age groups with variable amounts depending on the primary disorder and time of onset, often intensely inducing the achievement of daily activities and productivity (Abu-Yaghi et al., 2022).

Low vision assessment reveals the crucial role it plays in addressing the functional needs of individuals with visual impairment. Studies highlight the positive correlation between comprehensive assessments and improved quality of life, highlighting the importance of assistive technologies. Many studies reveal that patients with low vision live their life easily after using

assistive devices. A major upgrading in the visual performance of patients after the treatment and training on the use of LVAs, connected with patients' satisfaction, approves the significance of growing low vision rehabilitative services and increasing the public awareness of its presence and benefits (Shaaban et al., 2009).



Figure 1 Telescopes for distance, near and intermediate distance



Figure 2 Optical aids for near tasks

## **2.5 Functional needs:**

More than 250 million people are blind or visually impaired worldwide. In low middle income countries like Pakistan there is high prevalence of eye disease due to aging of the population. In Pakistan, vision impairment has been related with increased falls, depression, social isolation, hopelessness and decreased independence and vision-related quality of life (VRQOL). While up to 85% of patients who get low vision services may experience improved functioning and VRQOL.(Ehrlich et al., 2020)

Accordingly, it is important for practitioners to understand the clinical and demographic factors that are linked with impairments in patients with VI. A study by Brown et al recognized the prevalence for 13 different concerns in patients with low vision in the United States (Brown et al., 2014). They stated that difficulty in reading was the far most common problem, followed by driving, using assistive devices, difficulty in stairs climbing, in-home activities, lighting and glare, and social interactions. Some concerns varied as a function of age, visual acuity, or sex of the patient. Few studies from Asia have studied the factors associated with specific functional limitations in low vision, and they were concentrated on a highly precise population, a single disease, or were restricted by a predefined set of survey questions(S. Ganesh et al., 2013).

Based on previous reports, it was predicted that that some eye diseases like retinal dystrophies and glaucoma mainly associated with peripheral visual field problems that cause mobility difficulty, but not associated with tasks like reading and facial identification that entail good central vision. Age was significantly associated with greater difficulty recognizing faces. Functional difficulties of those with congenital and acquired diseases did not seem to differ, despite the opportunity that individuals with congenital vision loss might be more likely to adopt

compensatory strategies. Therefore did not express struggle in performing tasks that would otherwise be challenging.

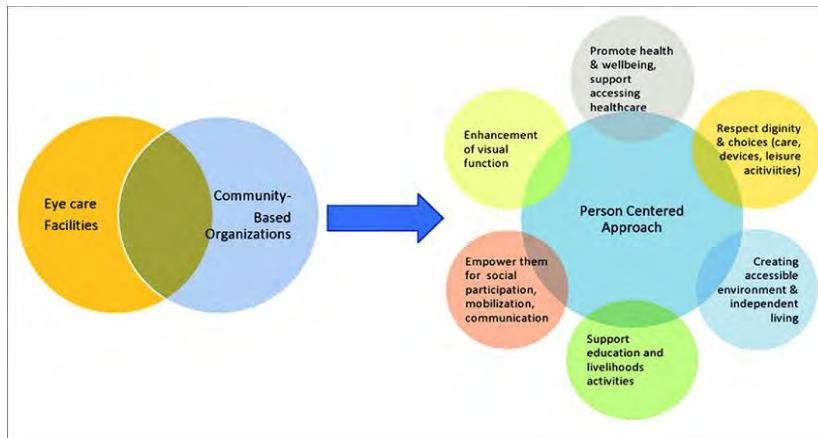


Figure 3 The Clinico-Social model of low vision service

The Clinico-Social model of low vision service (Senjam, 2021)

## 2.6 International guidelines about Low Vision:

Blind and low vision patients come from all kinds of backgrounds. Many are aged, some are young. They may be sportsmen and women, gardeners, farmers, chess players, teachers, typists, musicians, lawyers, housewives, computer programmers, physiotherapists, social workers, telephonists, parents etc.

Such people have many capabilities and can attain many things despite visual impairment or blindness, but there are times when they will grow and welcome practical support. There are some guidelines on below table which should to be remember for the courtesy of these patients and many more beside these.

Table 1 Guidelines about low vision

1.	Meeting and Greeting	<ul style="list-style-type: none"> <li>• Always ask first before offering any help and do not be offended if it is refused. Some people have had very bad experiences of what a sighted person thinks is being helpful!</li> <li>• Be precise if giving instructions – giving directions by pointing and saying, ‘it is down there on the right’, is not much help and very thoughtless</li> <li>• The use of a white cane does not necessarily mean that a person is totally blind</li> <li>• In some countries a person is accompanied by a guide dog but the animal must never be distracted. Often it is the animal who receives attention and the owner ignored! Together they usually make a good working team and rarely need extra help</li> <li>• Once into a conversation, never leave without saying you are doing so. Do not allow the blind person the embarrassment of talking into the air!</li> </ul>
2	Approach and Attitude	<ul style="list-style-type: none"> <li>• Always treat a blind person normally; speak first and introduce yourself</li> <li>• Shake hands but only if a hand is offered</li> <li>• It is also politeness to look at him/her during conversation and adopt the same level of position, e.g., sit or stand</li> </ul>

		<ul style="list-style-type: none"> <li>• Do not be afraid of using normal language and include words like ‘look’, ‘see’, ‘read’, remembering that blind and visually impaired people have exactly the same vocabulary as sighted people</li> <li>• Explain noises and silences and do not shout</li> <li>• Do not expect or invite others to speak for blind people. Do not be afraid to ‘touch’ but be sensitive to cultural differences.</li> </ul>
3	Guiding	<ul style="list-style-type: none"> <li>• Always consider a person's age and any other disabilities</li> <li>• Never presume where the person wants to go. Ask for details of where and how he/she would like to be guided. It is not uncommon to see a person being propelled or steered, and at great speed! Go at their pace and, if there is space, walk side by side and always ‘hand to arm</li> <li>• If there is a guide dog, but extra help is needed, approach and walk on the other side. The animal has been trained to understand that he is still in charge and responsible!</li> <li>• Give adequate room around obstacles and hazards and plenty of time for response if you need to say, “bend your head low to avoid this tree branch!”</li> <li>• Describe any sudden changes in the environment. It is also very important to explain changes in ground surfaces and especially when moving into wide open spaces, e.g., fields.</li> </ul>

4	Walking in a single row or narrow space	<ul style="list-style-type: none"> <li>• Tell your partner of the change in surroundings and then move your own guiding arm towards the middle of your own back</li> <li>• Your partner should automatically step in behind you, still holding your arm, and together you will be able to negotiate a narrow space.</li> </ul>
5	Doorways	<ul style="list-style-type: none"> <li>• It is important to take this manoeuvre (movement) very slowly; it is not an easy one to master</li> <li>• Tell your partner if the door opens towards you or away from you</li> <li>• Go through the door with your partner on the hinge side</li> <li>• Open the door with your guiding arm; your partner should place his/her hand against the door to feel the handle</li> <li>• He/she should then follow you through and close the door behind both of you.</li> </ul>
6	Steps, Stairs and Slopes	<ul style="list-style-type: none"> <li>• Tell your partner whether the steps, stairs or slope go up or down. Going down is more difficult.</li> <li>• Allow your partner plenty of time to hold the handrail securely and judge the first step carefully</li> <li>• Go one step ahead and take a slightly longer stride on the last step to allow your partner space.</li> </ul>

7	Kerbs and Road	<ul style="list-style-type: none"> <li>• Never take risks!</li> <li>• Tell your partner if you are approaching a ‘kerb up’ or ‘kerb down’ (the step onto or off a pavement/sidewalk) and pause slightly before taking the step</li> <li>• Make sure you approach the kerb together – both facing, and at an equal distance from the kerb – taking extra care with rounded kerbs</li> <li>• Cross the road using the shortest distance and go straight across</li> <li>• Tell your partner if you are parting company after crossing the road and ensure they know which way they are facing.</li> </ul>
8	Seating	<ul style="list-style-type: none"> <li>• Never propel or steer a blind or visually impaired person backwards into a seat!</li> <li>• Guide your partner to the seat and explain what type it is – e.g., upright chair, low sofa, armchair, stool</li> <li>• Ask them to let go of your arm and place their hand on the back or the seat of the chair</li> <li>• This is sufficient help as your partner will now be able to judge the height of the seat and will be able to sit safely and at his/her own pace.</li> </ul>
9	Travelling	<ul style="list-style-type: none"> <li>• Tell your partner if he/she is getting into the back or the front seat of a car and whether it is facing left or right</li> <li>• Place your guiding hand on the door handle and allow him/her to slide his/her grip hand down your arm to the door handle</li> </ul>



		<ul style="list-style-type: none"> <li>• With his/her other hand, the car roof can be noted and your partner will lower his/her head appropriately</li> <li>• At the end of the journey, get out of the car before your partner and help them out</li> <li>• Tell them if there are wider than average gaps to cross – this is particularly important when travelling by train!</li> <li>• Always lead your partner on and off public transport.</li> <li>• In rural areas, extra help may be needed when you and your partner have to negotiate getting on and off unstable modes of transport, e.g., carts, boats, etc.</li> </ul>
10	In the Eye Hospital	<ul style="list-style-type: none"> <li>• The patient will expect eye health workers to know how to help them</li> <li>• Always apply all the principles mentioned above; be extra gentle and take time</li> <li>• Remember your patient is at the hospital because they cannot see well – sadly, an often seemingly forgotten point, even by the more senior or so-called experienced staff members!</li> <li>• Never be afraid to ask the patient's opinion about a situation specific to them and how they would like to be assisted</li> <li>• In the treatment room, always explain what you are going to do – and to which eye!</li> </ul>

		<ul style="list-style-type: none"> <li>• When providing written information, make sure it is in a readable size and font and pass it to an attending sighted carer for future reference</li> <li>• An unaccompanied patient who may be unable to hear, as well as having sight problems, may benefit from taped information to take away and share with family at home</li> </ul>
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(Stevens, 2010)

## 2.8 Low vision services in Pakistan:

Provision of services for people with untreatable visual impairment, along with cataract, trachoma, childhood blindness, and refractive error, is one of the main concern of VISION 2020, the global initiative of the WHO and the International Agency for the Prevention of Blindness.

The Pakistan government’s nationwide plan for the avoidance of blindness contains development of low-vision services at each level of service delivery in each province. At the primary level, activities involve training of teachers in mobility and orientation and developing outreach programs. At the secondary level, the plan involve development of low vision clinics with all low vision aids, and at tertiary-level, low-vision service with early-intervention clinics in each province. Execution should allow for the existing accumulation of patients requiring assessment and services, bearing in mind the anticipated doubling by 2020 of those affected. (S. P. Shah et al., 2008)

The provision of low vision services in Pakistan presents a mixed landscape characterized by disparities in accessibility, awareness, and resources. While urban areas typically offer better access to specialized centers and clinics for low vision, rural regions face significant challenges

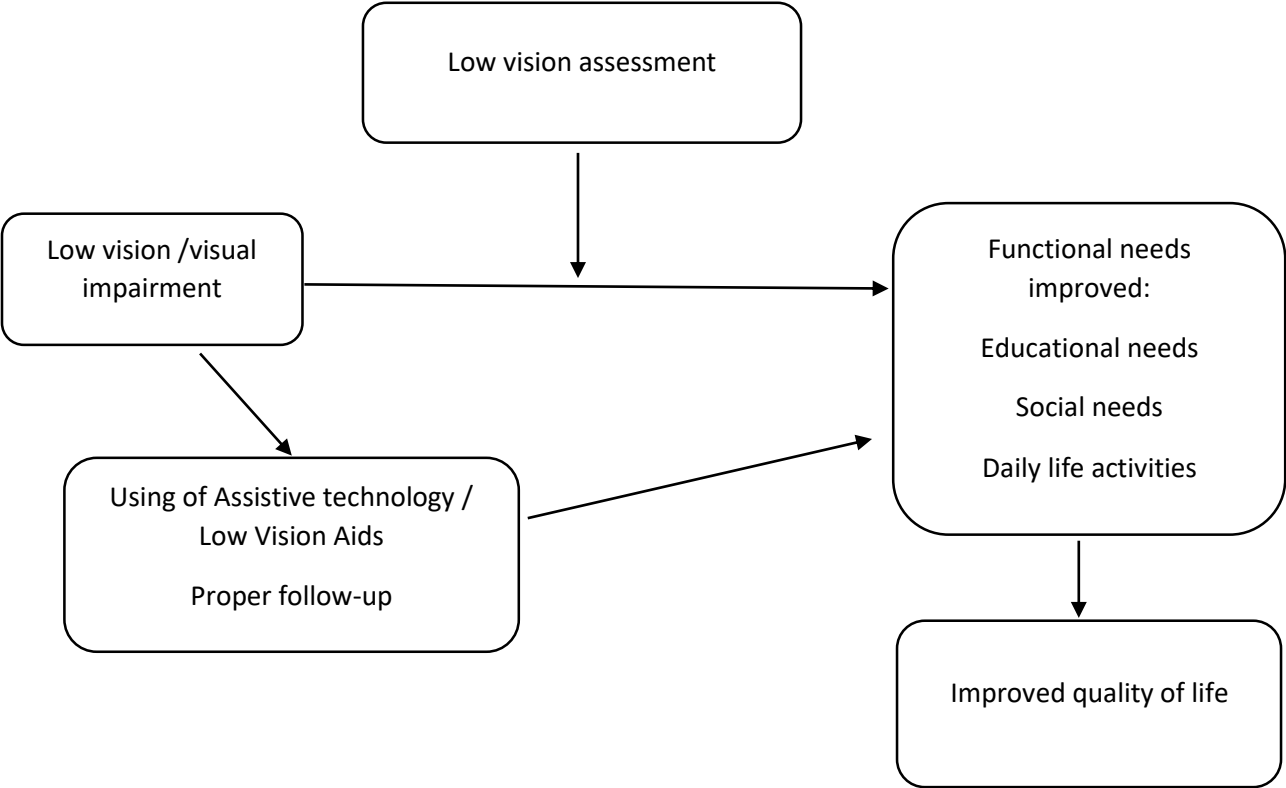
due to limited healthcare infrastructure and resources. Awareness about low vision and available services remains relatively low across the country, contributing to underutilization of existing support. The overall healthcare infrastructure also struggles with shortages of trained professionals, equipment, and funding, impacting the availability and quality of low vision services. Government support for low vision initiatives may be limited, necessitating a reliance on NGOs, charitable organizations, and private initiatives to fill the gaps. Affordability poses another barrier, with many individuals unable to access necessary aids and services due to financial constraints. Addressing these challenges requires collaborative efforts between government agencies, healthcare professionals, NGOs, and community stakeholders to improve accessibility, raise awareness, enhance infrastructure, and ensure affordability of low vision services throughout Pakistan.

## **2.9 Low vision, functional deficiency impact on society:**

Low vision and functional deficiency exert a multifaceted impact on society, spanning healthcare, education, employment, and social dynamics. The healthcare system faces increased demand for specialized services such as vision assessments, aids, and rehabilitation, straining resources and escalating costs. In education, individuals with low vision encounter barriers accessing learning opportunities, hindering academic attainment and limiting career prospects, which ultimately impacts societal productivity and advancement. Moreover, reduced workforce participation due to functional deficiency leads to unemployment or underemployment, contributing to economic disparities and impeding overall growth. Socially, limited vision impedes participation in communal activities, fostering isolation and amplifying mental health challenges, thereby burdening support systems. Additionally, reliance on caregivers intensifies, placing strain on families and caregivers while underscoring societal gaps in accommodating

diverse needs. Addressing these impacts necessitates systemic reforms, including improved accessibility, enhanced healthcare provisions, inclusive educational practices, and equitable employment opportunities, to foster a society that values and supports the well-being and contributions of individuals with low vision.

**2.10 Conceptual framework of Low Vision Assessment:**



**2.11 Published studies related research on Low Vision:**

People can suffer from the complications in their vision at any phase of their life. Visual impairment is unevenly dispersed across the different age groups. Several studies conducted in UK, USA and Germany have highlighted a greater prevalence of visual impairment in elder

individuals due to geriatric diseases(Wilde et al., 2017). From all visually impaired individuals around the world, 19 million alone are children below the age of 15 years.

Most of the world's sightless children live in the deprived regions of Africa and Asia. However, childhood blindness must persist a high significance because of the predictable number of years to be lived in blindness. Globally, the female is significantly at greater risk for being visually impaired than males. This high prevalence is due to their higher life expectancy and in some under developing countries their bounded access to health care facilities is due to traditional issues (Alswailmi, 2018).

A study done at Jorden, the collected data encompassed age, gender, referral sources, functional visual difficulties and ocular pathology. In which most participants were in the 19–60 years age group (50.0%). Fifty percent of the participants were the offspring of consanguineous marriages. The main cause of visual impairment was retinitis pigmentosa, followed by diabetic retinopathy. The majority of low vision aids were prescribed for near distance activities, and reading spectacles were the most prescribed visual aid. 89% percent of patients reported functional improvement and retained their visual aids upon follow-up.(Abu-Yaghi et al., 2022).

The purpose of low vision services is to minimize the negative effects of visual impairment on an individual's daily life. These services aim to improve the individual quality of life and help them acquire the skills necessary to live independently(Jose et al., 2016).

Some of the patients didn't use their assistive devices after low vision services due to social stigma and they feel bad for it. According to a study the highest non-acceptance rate (45.2%) was seen in patients > 60 years of age. Leading causes for non-acceptance of LVDs were social stigma in patients aged < 40 years , fear of losing a job in patients aged 41-60 years (26.1%), and

low necessity in patients aged > 60 years (30%). Handheld magnifiers had the lowest non-acceptance rate of all the devices (45%). Non-acceptance rates were higher for telescopes and non-optical devices (77.8% and 73.3% respectively (Afzal W et al., 2022).

A cross-sectional study in India, which shows that after low vision assessment the acuities improved significantly for distance and near. The most common reported difficulties were related to their academic activities like copying from the blackboard (80%), reading textbook at arm's length (77.2%), and writing along a straight line (77.2%) (S. Ganesh et al., 2013).

A study done on Egyptians which was prospective study and 55 patients with low vision were included. History taking, ophthalmic examination and evaluation of the visual functions were performed for all patients. According to requirement of patient a low vision aid was chosen after counseling. Trial of low vision aids were given in office, followed by a period of training before patients received their own low vision aids. After using these aids 76% of the patients being satisfied.(Shaaban et al., 2009).

In addition to visual impairments, old people are probable to suffer from a growing number of other disabilities and weaknesses that disturb their capability to manage with both everyday life and adaptation to numerous visual aids. Mainly related for low vision aids use is partial dexterity and difficulty maintaining posture and position during reading. Growing age and the late onset of visual loss have been shown to delay the adaptation to, and use of LVAs. Other factors that influence compliance with LVA usage are motivation, attitude, cosmesis, and educational background. It has been steadily shown that elderly will elect to use simple visual aids such as hand held magnifiers in preference to more complicated devices.(Jose et al., 2016)

Conventionally, low vision assessment has been the work of optometrists, either employed by hospitals or working independently. Their practice has generally focused on the provision of optical aids, most often which tend to be spectacle mounted and telescopic, with moderately less time being available for education and training in the techniques required for the optimal use of these aids. Results are usually not very acceptable; only 23% of patients recommended LVAs in Humphry and Thompson's review found them useful at home and 33% of patients in Mcilwaine et al's survey reported never used the aids provided.

Previously the studies done were mostly cohorts and retrospective. These studies have many missing data and the researcher mostly lost their patients in follow-up. Many studies done on limited age group mainly on 4-15 aged group and didn't consider the adult and older group. Precise studies were given on older population. This study include both adults and elder population. This was a snap shot study in which there is very less chance to loss data.

## **CHAPTER 3: METHODOLOGY**

### **3.1 Study design:**

A quantitative research approach using cross-sectional study design was carried out to assess the impact of vision assessment on functional needs of low vision patients visiting to tertiary eye hospital Rawalpindi.

### **3.2 Study Setting:**

Study was conducted in Low vision department of Alshifa Trust Eye Hospital (ASTEH) Rawalpindi.

### **3.3 Study duration:**

The study duration was about 6 months from October 2023 to March 2024.

### **3.4 Sample size:**

Sample size of 80 was taken. It was calculated from open-epi by taking prevalence of visual impairment of 5.5% and keeping confidence interval of 95% (Awan et al., 2018)

### **3.5 Sampling technique:**

The technique used for this study was non-probability purposive sampling.

### **3.6 Study participants:**

#### **3.6.1 Inclusion criteria:**

- Visually impaired patients whose vision was 6/18 or below after best correction were included.
- Patients with age above 18 years.



- Both gender were included.
- Patients who were willing to participate.

### **3.6.2 Exclusion criteria:**

- Patients who was totally blind were excluded
- Patients with any mental disorder were not taken.
- Patients who had first visit at low vision department.

### **3.7 Data collection tool:**

Data tool was comprises of 3 sections

#### **3.7.1 Socio-demographics**

It included independent variables such as age, gender, income, marital status, family history, educational level, occupation, consanguinity of participant parents.

#### **3.7.2 Low vision assessment**

It includes the cause of low vision and visual assessment questions such as visual acuity of distance, visual acuity of near, contrast sensitivity, color vision, visual fields. It also includes questions related to previous devices used by participant and for how long he or she using it. In this section we also assessed that whether the participant navigates independently or not.

#### **3.7.3 Functional needs**

This section further divided into educational or vocational needs, social needs, daily life activities and patient perspective. This section was about patient's basic life needs that were

fulfilled after the low vision services. Questions of this section assess the impact of low vision services on the participant's functional needs and how much these services made their life easier.

### **3.7.4 Pilot testing:**

The reliability of the research questionnaire was established through pre-testing on a sample of 15 participants (who were visually impaired), which accounted for 10% of the proposed sample size. The pre-test was piloted on an adapted questionnaire on the study topic and aimed to evaluate the acceptability, feasibility and validity of questionnaire. Any uncertainties observed throughout the pilot study were addressed, and the data collected from the pilot study was not included in final analysis. The reliability calculated for this study through cronbach's alpha which was 0.84

### **3.7.5 Formal data collection:**

Data was collected through adapted validated questionnaire using visual function index (VF-14) and visual function questionnaire (VFQ-25). Changings were made in the questionnaire after the pilot study. The questionnaire included socio-demographics of the participants (n=11), low vision assessment (n=13) and functional needs includes education and vocational (n=8), social (n=7) and daily life activities (n=6). In the end of questions of patient compliance was added (n=3). Every question was mandatory to attain the complete filled questionnaire. Participation in the study was voluntary.

## **3.8 Study variable:**

### **3.8.1 Dependent variable:**

Functional needs (Educational needs, social needs and daily life activities)

### **3.8.2 Independent variable:**

Socio-demographic characteristics and vision assessment were independent variable.

### **3.9 Data collection procedure:**

The data for the study was collected through adapted validated questionnaire administered to agreeable participants who visiting to tertiary eye hospital Rawalpindi. The respondents were informed about the topic of research and its helpful influence on society before data was collected. The measures used were precisely adapted and altered for this study.

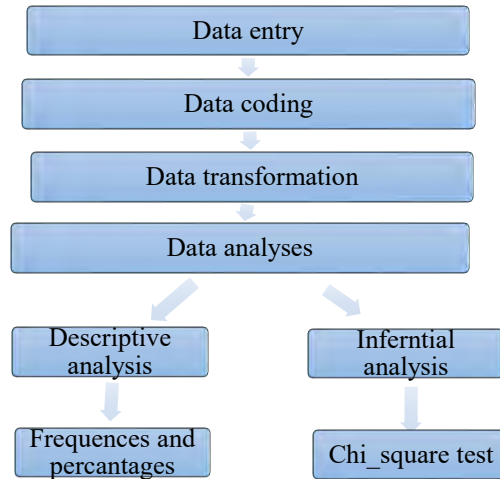
### **3.10 Ethical consideration:**

Prior to conducting research, approval from Al-Shifa School of Public Health's ethical committee was obtained through an IRB approval letter, and permission from tertiary eye care hospital of Rawalpindi was obtained through a permission letter.

Informed consent was taken from every participant included in the study that was ensure that information of every individual was confidential. The collected data from the participants will only be utilized for research purpose and will not results in any personal benefits or harms to the participants.

### **3.11 Data analysis:**

Statistical Package for Social Sciences SPSS version 26.0 was used for data analysis. The data was meticulously coded and negative items were subjected to reverse coding.



### 3.11.1 Descriptive statistics:

Categorical variables were analyzed through frequencies and percentages. Data was presented by use of bar chart and pie chart.

### 3.11.2 Inferential statistics:

Chi-square test was performed to check the association between vision assessment and functional needs (educational needs, social needs and daily life activities) of patients of low vision.

Educational needs categorize into two parts improved educational needs when score was below 24.36 and not improved educational needs when score was above 24.36 after low vision services.

After taking mean score 21.13 of social needs it was categorized into 2 improved social needs when score was below 21.13 and not improved social needs when score was above 21.13.

Categorized daily life activities into 2. Below 18.03 score presents improved daily life activities and above it showed not improved daily life activities.

## Chapter 4: Results

### 4.1 Descriptive:

A total of 80 respondents were included in this study. Table 2 revealed that greater number of male participants (n=48, 60%) were participated in the study as compared to female (n=32, 40%). The mean age was 35.1 ( $\pm$  13.3) with a range of 18-60 years. Group 36-60 years had the smallest number of participants (n=18, 22.5%). Urban population was greater (63.7%, n=51) than rural one Greater number of participant were unmarried (n=47, 58.8%). 63.7% (n=51) of individuals had positive family history of visual impairment. 52.5% (n=42) families were living in joint system. Most of the participant (53.8%) doing indoor work which include office work, shopkeeper, online jobs, teaching. Higher number of participant were educated at secondary level (n=37, 46.3%). Out of total only 35% (n=28) had family income > 50,000. Consanguinity of parents were also present in 70% of participant history. Most of the participants were suffered from nystagmus (n=25, 31.3%). 51 of the total had congenital disease (63.7%) and about 17.5% had severe distance visual impairment of visual acuity <1/76 with correction. Greater number of participants (52.5% n=42) has mild near visual impairment of visual acuity 0.8-1 M with correction. 51.2% (n=44) had visual field defects and 55% (n=41) had color vision defects. About 28 participants had good contrast sensitivity. 56.3% (n=45) were using low vision devices remaining of 43.8% (n=35) were using only spectacles or not using any device. Mostly of them were using magnifier (n=23, 28.7%) for their near tasks.58.8%, n=47 participant were using glasses for near whereas 98.8%, 79 were using distant glasses. All the participant (100%) included in study didn't had any mobility problems.

Table 2 Demographic characteristics of study population n=80

<b>Characteristics</b>		<b>Frequency (f)</b>	<b>Percentage (%)</b>
<b>Age</b>	<b>15-30</b>	39	48.8
	<b>31-45</b>	23	28.7
	<b>46-60</b>	18	22.5
<b>Gender</b>	<b>Male</b>	48	60
	<b>Female</b>	32	40
<b>Residence</b>	<b>Rural</b>	29	36.3
	<b>Urban</b>	51	63.7
<b>Marital status</b>	<b>Married</b>	33	41.3
	<b>Unmarried</b>	47	58.8
<b>Family living</b>	<b>Joint</b>	42	52.5
	<b>Nuclear</b>	38	47.5
<b>Education level</b>	<b>Illiterate</b>	12	15.0
	<b>Primary level</b>	31	38.8
	<b>Secondary level</b>	37	46.3
<b>Occupation</b>	<b>Not working</b>	32	40.0
	<b>Indoor work</b>	43	53.8
	<b>Outdoor work</b>	5	6.3
<b>Family Income</b>	<b>&lt; 20k-30k</b>	15	18.8
	<b>&gt;30k-50k</b>	37	46.3
	<b>&gt;50k</b>	28	35.0
<b>Distance V.A with</b>	<b>&lt;6/19-6/48</b>	22	27.5
<b>Correction</b>	<b>&lt;6/48-1/76</b>	44	55.0
	<b>&lt;1/76</b>	14	17.5
<b>Near V.A with correction</b>	<b>0.8-1M</b>	42	52.5

	<b>2M-4M</b>	37	46.3
	<b>&gt;4M</b>	1	1.3
<b>Contrast sensitivity</b>	<b>&lt;1.65-1.05</b>	28	35.0
	<b>0.90-0.45</b>	44	55.0
	<b>0.30-0.00</b>	8	10.0
<b>Visual field</b>	<b>Defective</b>	41	51.2
	<b>Not defective</b>	39	48.8
<b>Color vision</b>	<b>Defective</b>	44	55.0
	<b>Not defective</b>	36	45.0

#### Percentage of patients who were previously using devices:

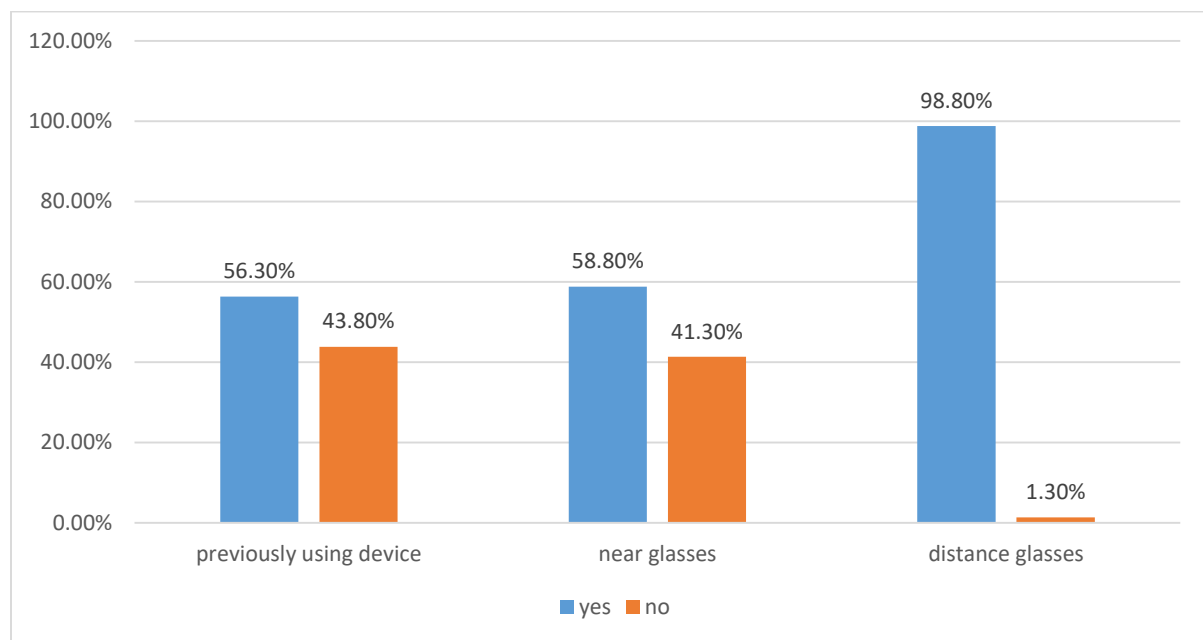


Figure 4 percentage of previously using device

Figure 4 Shows percentage of participant using previously any low vision device was 56.3%, near vision glasses was 58.8% and distance glasses 98.8%.

**Frequency and percentage of family history and consanguinity:**

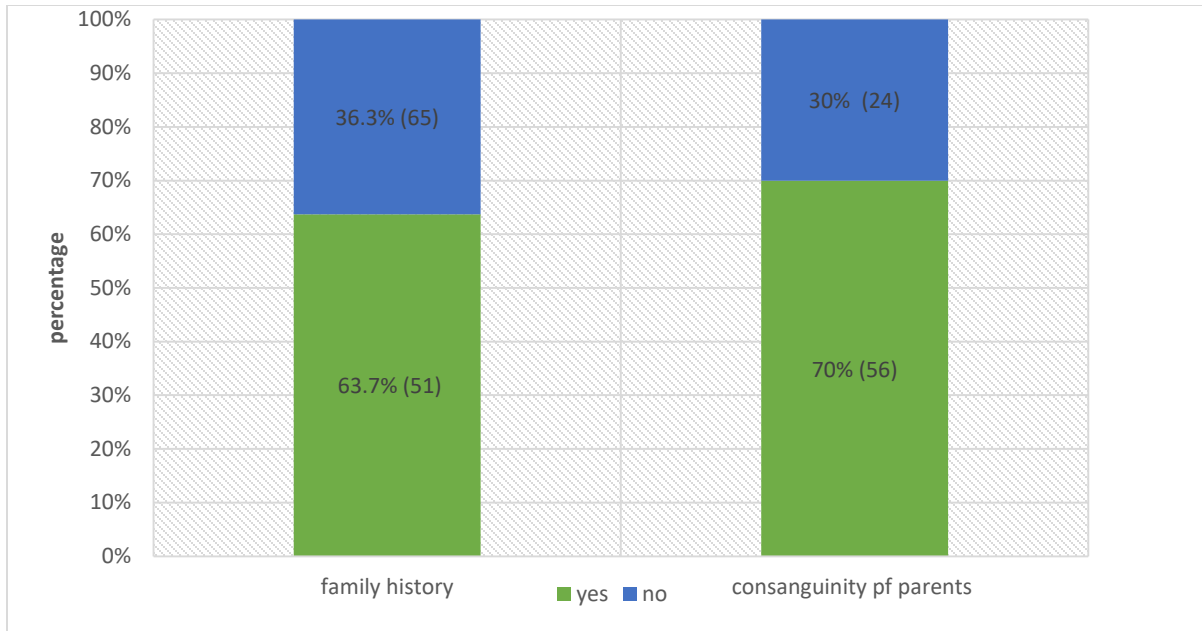


Figure 5 Frequency and percentage of family history and consanguinity of parents

Figure 5 shows the percentage of family history was positive in 63.7% n=51 participants and consanguinity of parents was not present in 30.0% n=24.

**Comorbidities related to low vision:**

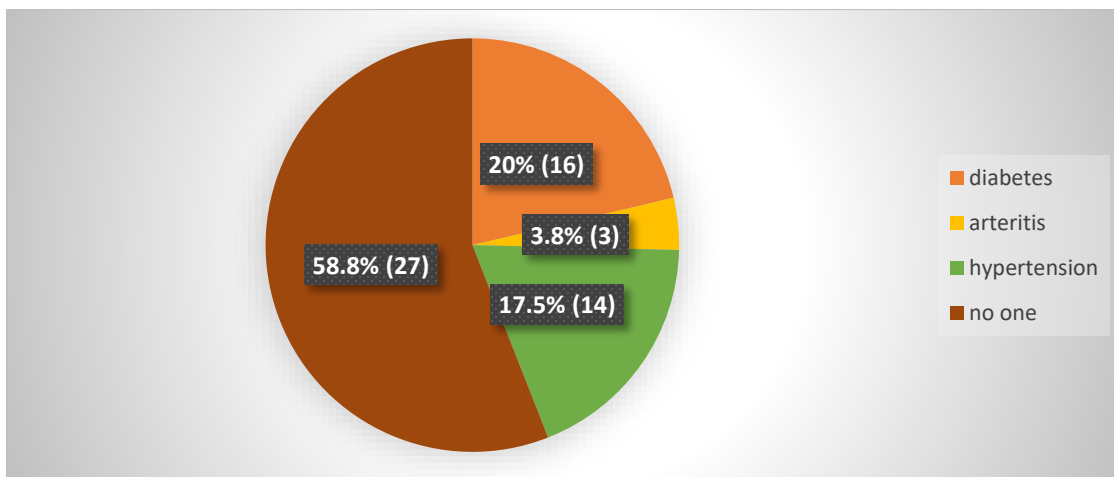


Figure 6 Frequency and percentage of comorbidities



This showed that mostly (52%) of the patients didn't had any of comorbidity while greater number of patients suffering from diabetes 20% (n=16). Minimum number of patient had arteritis (4%).

### Primary causes of low vision:

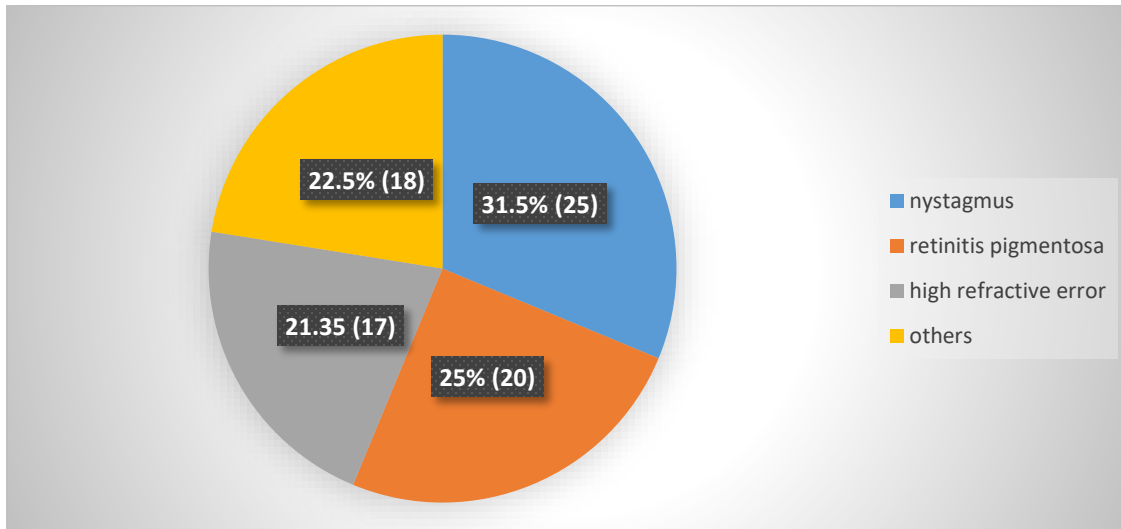


Figure 7 Frequency and Percentage of primary cause of low vision

It is showed that mostly 31.5% of the participant had nystagmus which result in causing of low vision. 21.3% had high refractive error which include both myopia and hypermetropia. 22.5% had other causes which includes albinism, amblyopia, diabetic retinopathy, age-related macular degeneration.

## Type of devices used by low vision participants according to age:

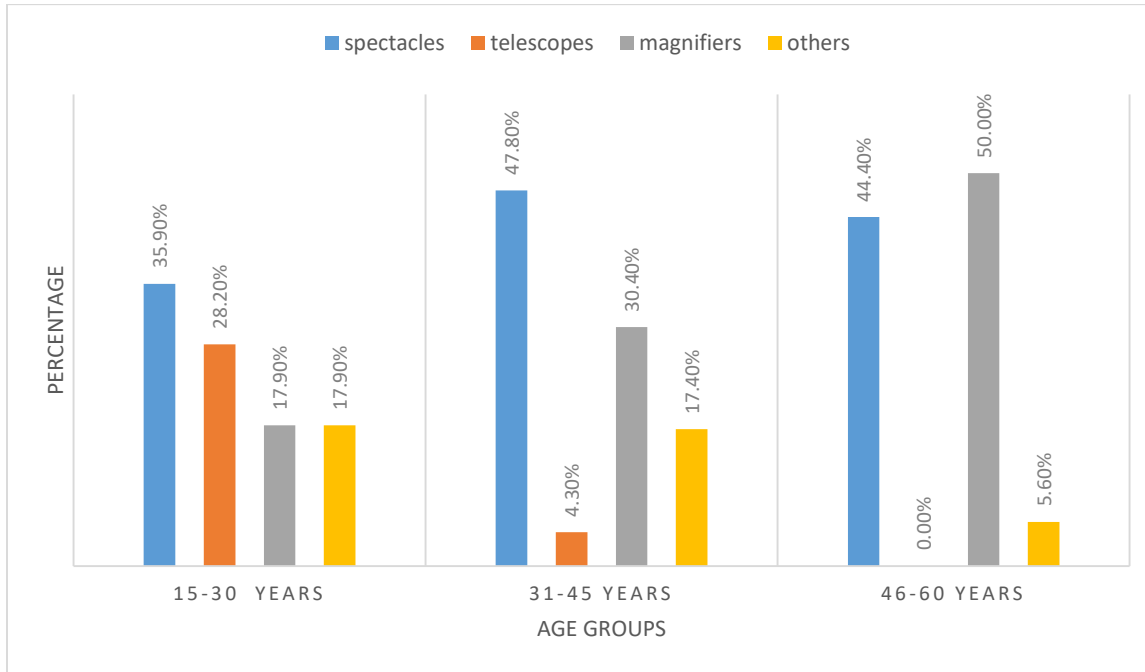


Figure 8 percentage of low vision aids using by participants according to age

Figure 8 showed that in group 1 (15-30years) maximum number (28.2%) of telescopes for distant task like viewing white board and television. Maximum magnifiers (50.0%) were used in old age (46-60 years) for their near task and no telescope were used in this age group. Other devices used in age 15-30 years were vista view and mounted telescopes. In remaining groups other devices include bar magnifiers and different software's like Sara and topaz.

### 4.2 Descriptive statistics of educational needs:

Results showed that 36.3% (n=29) participants had rarely difficulty in reading ordinary prints in newspaper or book with devices. 6.3% had always glare problems when they trying to see books. There were 37 participants (46.3%) who tend to confuse colors. Only 5% had always problem in adjusting of darkness after being in bright light. Participants who didn't had any problem in

carrying out activities or projects that require a lot of visual concentration and attention were only 2.5% (f=2). 30.0% had sometimes problem in reading a sign or recognizing a picture when it is on some distance. 1.3% had rarely difficulty in reading arm length distant books. Participant who always feel frustrated a lot of the time as they needed a lot of help from others were 5.0% f=4. After taking mean score 24.36 of educational needs. Educational needs categorize into two parts improved educational needs when score was below 24.36 and not improved educational needs when score was above 24.36 after low vision services. The summary of variables of educational needs is given below in table 3

Table 3 Descriptive of outcome variable (educational needs)

<b>Sr</b>	<b>Variables</b>	<b>Never % (f)</b>	<b>Rarely % (f)</b>	<b>Sometimes % (f)</b>	<b>Often % (f)</b>	<b>Always % (f)</b>
<b>1</b>	<b>How much difficulty do you have reading ordinary print in newspapers or text books?</b>	3.8 (3)	36.3 (29)	36.3 (29)	18.8 (15)	5.0 (4)
<b>2</b>	<b>I have problems with lights around me causing glare when I'm trying to see books?</b>	2.5 (2)	27.5 (22)	33.8 (27)	30.0 (24)	6.3 (5)
<b>3</b>	<b>I tend to confuse colors</b>	8.80 (7)	46.3 (37)	13.8 (11)	26.3 (21)	5.0 (4)
<b>4</b>	<b>It takes me a long time to adjust to darkness after being in bright light</b>	0.0 (0)	21.3 (17)	42.5 (34)	26.3 (21)	10.0 (8)
<b>5</b>	<b>I have problems carrying out activities or projects that require a lot of visual concentration and attention.</b>	2.5 (2)	31.3 (25)	27.5 (22)	33.8 (27)	5.0 (4)
<b>6</b>	<b>I have trouble reading a sign or recognizing a picture when it is on some distance</b>	1.3 (1)	28.7 (23)	30.0 (24)	30.0 (24)	10.0 (8)

<b>7</b>	<b>I feel frustrated a lot of the time as I need a lot of help from others</b>	7.5 (6)	30.0 (24)	23.8 (19)	33.8 (27)	5.0 (4)
<b>8</b>	<b>Having difficulty in reading text books at an arm length.</b>	1.3 (1)	31.3 (25)	23.8 (19)	35.0 (28)	8.8 (7)

### 4.3 Descriptive statistics of social needs:

Table 3 shows social needs after vision assessment and using different devices in which 7.5% were feel frustrated a lot of time as they need help from others while using device. 26.3% were often stay at home most of the time. 1.3 % had never difficulty in noticing objects off to the side while they were walking along. There were 30 (37.5%) participants who sometimes faced difficulty in reading street signs or stores names. Only 23.8% had rarely difficulty in observing people reaction while talk. Only 10.0% of participants had always difficulty in visiting with people in their homes, at parties and restaurants. After taking mean score 21.13 of social needs it was categorized into 2 improved social needs when score was below 21.13 and not improved social needs when score was above 21.13 after low vision assessment. Detailed summary of social needs given in below table no.4

Table 4 Descriptive statistics of outcome variable (social needs)

Sr	Variables	Never	Rarely	Sometimes	Often	Always
		% (f)	% (f)	% (f)	% (f)	% (f)
1	I have much less control over what I do I have to rely too much on what other people tell me	10.0 (8)	25.0 (20)	45.0 (36)	17.5 (14)	2.5 (2)
2	I worry about doing things that will embarrass myself or others	1.3 (1)	37.5 (30)	33.8 (27)	27.5 (22)	0.0 (0)
3	I stay home most of the time	7.5 (6)	37.5 (30)	25.0 (20)	26.3 (21)	3.8 (3)
4	How much difficulty do you have reading street signs or the names of stores?	3.8 (3)	22.5 (18)	37.5 (30)	31.3 (25)	5.0 (4)
5	How much difficulty do you have noticing objects off to the side while you are walking along?	1.3 (1)	21.3 (17)	35.0 (28)	31.3 (28)	11.3 (9)
6	How much difficulty do you have seeing how people react to things you say	1.3 (1)	23.8 (19)	45.0 (36)	18.8 (15)	11.3 (9)
7	How much difficulty do you have visiting with people in their homes, at parties, or in restaurants?	3.8 (3)	28.7 (23)	30.0 (24)	27.5 (22)	10.0 (8)

#### 4.4 Descriptive statics of daily life activities:

Only 3.8% (f=3) participant had no difficulty in going down steps, stairs in dim light. About 11.3% participants reported that they had difficulty in matching their own clothes. 10.0 % had never faced problems in judging the level of liquid in container while pouring. There were 35.0% (28) participants who had sometimes difficulty in finding something on a crowed shelf. 3.8 %

had always difficulty in recognizing faces of friends and family in average room. After taking mean score of 18.03 for daily life activities. Categorized daily life activities into 2. Below 18.03 score presents improved daily life activities and above it showed not improved daily life activities. Summary of daily life activities is given in table 5 below.

Table 5 Descriptive of outcome variable (daily life activities)

<b>Sr</b>	<b>Variables</b>	<b>Never % (f)</b>	<b>Rarely % (f)</b>	<b>Sometimes % (f)</b>	<b>Often % (f)</b>	<b>Always % (f)</b>
<b>1</b>	<b>How much difficulty do you have going down steps, stairs, or curbs in dim light or at night?</b>	3.8 (3)	22.5 (18)	35.0 (28)	22.5 (18)	16.3 (13)
<b>2</b>	<b>How much difficulty do you have picking out and matching your own clothes?</b>	0.0 (0)	23.8 (19)	36.3 (29)	28.7 (23)	11.3 (9)
<b>3</b>	<b>When pouring liquid, I have trouble judging the level of the liquid in a container, such as the level of coffee in a cup.</b>	10.0 (8)	27.5 (22)	40.0 (32)	20.0 (16)	2.5 (2)
<b>4</b>	<b>Sometimes when I reach for an object, I find that it is further away (or closer) than I thought.</b>	17.5 (14)	18.8 (15)	28.7 (15)	28.7 (23)	8.8 (7)
<b>5</b>	<b>How much difficulty do you have finding something on a crowded shelf?</b>	12.5 (10)	23.8 (19)	35.0 (28)	23.8 (19)	5.0 (4)
<b>6</b>	<b>How much difficulty do you have to recognize the faces of family or friends when they are across an average size room?</b>	6.3 (5)	26.3 (21)	33.8 (27)	30.0 (24)	3.8 (3)

#### 4.5 Descriptive statistics of patient perspective:

Figure 9 shows that (n=64, 80.0%) participants were using their device properly after prescription to improve their functional needs and about of 55.0% of participants were helped by device in their daily life. Only 32 (40.0%) had improved quality of life after using low vision devices.

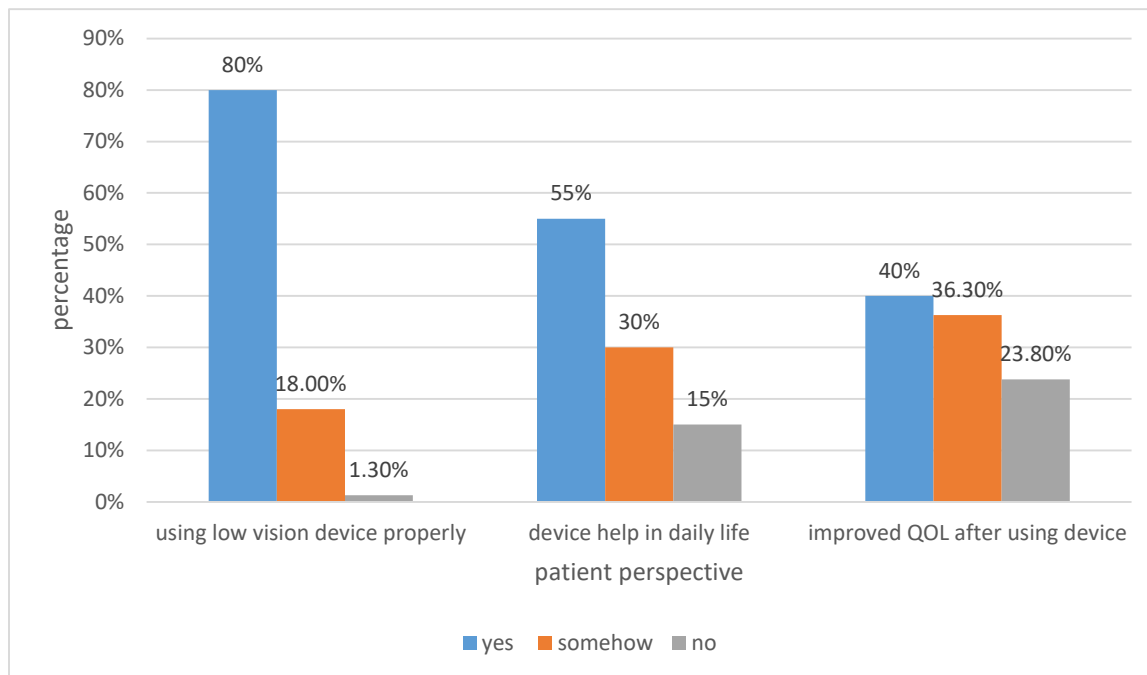


Figure 9 percentage of patient perspectives regarding low vision aids

#### 4.6 Inferential statistics

Association of functional needs (educational needs) with socio-demographics characteristics, vision assessment and participant perspective:

To find association of functional needs (educational needs) with socio-demographics, vision assessment and participant perspectives. Pearson Chi-square test of association and fisher exact

test where cell count was less than 5 was performed after confirming the assumption of test. All the p-value  $<0.005$  were considered statistically significant.

Results of chi-square test showed that educational needs of visually impaired participant with vision assessment and with using low vision aids were significantly associated with age ( $p=0.05$ ) as it was not improved with increase of age as good educational needs were greater 56.4% (22) in young age group 15-30 years after vision assessment. Urban participants had greater number (68.6%) of improved educational needs and residence had significant association with it ( $p=0.03$ ). Educational needs had also significant results with educational level ( $p=0.05$ ) and family income ( $p=0.00$ ) as with increase of income educational needs became improved. Educational needs were 85.5% (24) who had family income of  $>50k$ . It had also significant association with consanguinity of parents ( $p=0.02$ ) that those who had positive consanguinity didn't had improved educational needs (51.8%). It was also significantly associated with primary cause of low vision ( $p=0.03$ ). Visual field defects had also greater percentage of not defective fields 69.2% and had significant association ( $p=0.02$ ) with educational needs. Color vision ( $p=0.04$ ) and how much device help in their life ( $p=0.00$ ) also had high significant association. Educational needs were also significantly associated with quality of life of participant become improved (71.9%) after using low vision devices ( $p=0.001$ ).but it was insignificantly associated with gender, marital status, family history, occupation, comorbidities, distance and near visual acuity with correction and contrast sensitivity. A summary of significant association of educational needs with socio-demographics, vision assessment and participant perspective variables is given in table 6.



Table 6 Association of functional needs (educational needs) with socio-demographics characteristics, vision assessment and participant perspective:

	Variables	Educational needs		Chi-square (df)	p-value
		Improved	Not improved		
		% (N)	% (N)		
<b>Age</b>	<b>15-30</b>	56.4(22)	43.6(17)	4.90 (2)	<b>0.052</b>
	<b>31-45</b>	56.5(13)	43.5(10)		
	<b>46-60</b>	55.6(10)	44.4(8)		
<b>Residence</b>	<b>Rural</b>	34.5 (10)	65.5 (19)	8.75 (1)	<b>0.032</b>
	<b>Urban</b>	68.6 (35)	31.4 (16)		
<b>Family income</b>	<b>&lt;20k-30k</b>	20.0 (3)	80.0 (12)	18.75 (2)	<b>0.001</b>
	<b>31k-50k</b>	48.6 (18)	51.4 (19)		
	<b>&gt;50k</b>	85.7 (24)	14.3 (4)		
<b>Consanguinity of parents</b>	<b>Yes</b>	48.2 (27)	51.8 (29)	4.89 (1)	<b>0.027</b>
	<b>No</b>	75.0 (18)	25.0 (6)		
<b>Primary cause of low vision</b>	<b>Nystagmus</b>	60.0 (15)	40.0 (10)	8.74 (3)	<b>0.034</b>
	<b>Retinitis pigmentosa</b>	30.0 (6)	70.0 (13)		
	<b>High refractive errors</b>	76.5 (13)	23.5 (4)		
	<b>Others</b>	61.1 (11)	38.9 (7)		
<b>Visual field</b>	<b>Defective</b>	43.9 (18)	56.1 (23)	5.21 (1)	<b>0.022</b>
	<b>Not defective</b>	69.2 (27)	30.8 (12)		
<b>Color vision</b>	<b>Defective</b>	47.7 (21)	52.3 (23)	4.67 (1)	<b>0.042</b>
	<b>Not defective</b>	66.7 (24)	33.3 (12)		
<b>Device help in daily life</b>	<b>Yes</b>	79.5 (35)	20.5 (9)	22.47 (2)	<b>0.001</b>
	<b>Somehow</b>	33.3 (8)	66.7 (16)		
	<b>No</b>	16.7 (2)	83.3 (10)		
<b>QOL improved</b>	<b>Yes</b>	71.9 (23)	28.1 (9)		

<b>Somehow</b>	69.0 (20)	31.0 (9)	21.22 (2)	<b>0.001</b>
<b>No</b>	10.5 (20)	89.5 (17)		

\* P-0.001 shows highly significant association.

#### **4.7 Social needs association with socio-demographics, vision assessment and participant perspective:**

Chi-square results shows that social needs were significantly associated with age (p-0.05) as with increasing age social needs were not improved after vision assessment. Greater number of good social needs 56.4% were present in lower age group 15- 30. Residence (p-0.02) and education level (p-0.01) both had significant association as with higher education level there were improved social needs after vision assessment and using low vision aids. Occupation (p-0.02) and family income (p-0.01) had significant results as <20k-30k had less improved social needs 26.7% (4) as compared >50k family income. Contrast sensitivity (p-0.01) showed significant association. It was also significantly associated with participant who using their device properly and their quality of life become improved (p-0.00). Social needs were not significantly associated with gender, marital status, family history, consanguinity of parents, comorbidities, primary cause of disease, distance and near visual acuity, visual field defects, color vision and kind of device participant using also had insignificant association with social needs. A detailed summary of significant association is given in table 7 below.

Table 7 Social needs association with socio-demographics, vision assessment and participant perspective

Variable	Social needs		Chi-square (df)	p- value	
	Improved	Not improved			
	% (N)	% (N)			
<b>Age</b>	<b>15-30</b>	56.4 (22)	43.6 (17)	<b>4.67 (2)</b>	<b>0.053</b>
	<b>31-45</b>	52.2 (12)	47.8 (11)		
	<b>46-60</b>	38.9 (7)	61.1 (11)		
<b>Residence</b>	<b>Rural</b>	34.5 (10)	65.5 (19)	<b>5.11 (1)</b>	<b>0.023</b>
	<b>Urban</b>	60.8 (31)	39.2 (20)		
<b>Education level</b>	<b>Illiterate</b>	16.7 (2)	83.3 (10)	<b>8.59 (2)</b>	<b>0.014</b>
	<b>Primary level</b>	48.4 (15)	51.6 (16)		
	<b>Secondary level</b>	64.9 (24)	35.1 (13)		
<b>Occupation</b>	<b>Not working</b>	37.5 (12)	62.5 (20)	<b>7.68 (2)</b>	<b>0.025</b>
	<b>Indoor work</b>	65.1 (28)	34.9 (15)		
	<b>Outdoor work</b>	20.0 (1)	80.0 (4)		
<b>Income of family</b>	<b>&lt;20k-30k</b>	26.7 (4)	73.3 (11)	<b>8.60 (2)</b>	<b>0.014</b>
	<b>31k-50k</b>	45.9 (17)	54.1 (20)		
	<b>&gt;50k</b>	71.4 (20)	28.6 (8)		
<b>Contrast sensitivity</b>	<b>&lt;1.65-1.05</b>	78.6 (22)	21.4 (6)	<b>13.55 (2)</b>	<b>0.013</b>
	<b>0.9-0.45</b>	34.1 (15)	65.9 (29)		
	<b>0.30-0.00</b>	50.0 (4)	50.0 (4)		
<b>Using device properly</b>	<b>Yes</b>	60.9 (39)	39.1 (25)	<b>15.28 (2)</b>	<b>0.042</b>
	<b>Somehow</b>	6.7 (1)	93.3 (14)		
	<b>No</b>	100 (1)	0.0 (0)		
<b>Device help in daily life</b>	<b>Yes</b>	75.0 (33)	25 (11)	<b>23.46 (2)</b>	<b>0.001</b>
	<b>Somehow</b>	29.2 (7)	70.0 (17)		

	<b>No</b>	8.3 (1)	91.7 (11)		
<b>QOL</b>	<b>Yes</b>	75.0 (24)	25.0 (8)		
	<b>Somehow</b>	55.2 (16)	44.8 (13)	23.49 (2)	<b>0.001</b>
	<b>No</b>	5.3 (1)	94.7 (18)		

\* P-0.001 shows highly significant association.

#### **4.8 Daily life activities association with socio-demographics, vision**

##### **assessment and patient perspective:**

Results showed that. Daily life activities had significant associated with gender (p-0.02) that daily activities were good in male patients 66.7% were greater than female. Not working patients had greater number of not improving daily life activities 62.5% (20) as compared to indoor and outdoor occupations hence it was significantly associated with daily life activities (p-0.01).

Distance and near visual acuity (p-0.03 and p-0.00) results in significant as daily life activities were improved (86.4% and 71.4%) with mild vision impairment. Contrast sensitivity shows high significant results (p-0.00). Patients with contrast sensitivity of <1.65-1.05 had improved daily life activities of 85.7% after vision assessment and using of different low vision devices. No visual field defects patients had improved daily life activities (69.2%) and results was significant (p-0.02). Kind of devices participants using also shows significant association (p-0.03). it had a very high significant association of device help them in daily life and their quality of life became improved (p-0.00). Daily life activities association with age, residence, marital status, family history, income of family, education level, consanguinity of parents, primary cause of low vision and color vision was insignificant. A detailed summary of significant results is given in table 8.

Table 8 Daily life activities association with socio-demographics, vision assessment and patient perspective:

Variable	Daily life activities		Chi-square (df)	p- value	
	Improved	Not improved			
	% (N)	% (N)			
<b>Gender</b>	<b>Male</b>	66.7 (32)	33.3 (16)	5.29 (1)	<b>0.021</b>
	<b>Female</b>	40.6 (13)	59.4 (35)		
<b>Occupation</b>	<b>Not working</b>	37.5 (12)	62.5 (20)	7.79 (2)	<b>0.011</b>
	<b>Indoor work</b>	69.8 (30)	30.2 (13)		
	<b>Outdoor work</b>	60 (3)	40.0 (2)		
<b>Distance V.A with correction</b>	<b>&lt;6/19-6/48</b>	86.4 (19)	13.6 (3)	11.80 (2)	<b>0.032</b>
	<b>&lt;6/48-1/76</b>	47.7 (21)	52.3 (23)		
	<b>&lt;1/76</b>	35.7 (5)	64.3 (9)		
<b>N.V with correction</b>	<b>0.8-1M</b>	71.4 (30)	28.6 (12)	8.92 (2)	<b>0.001</b>
	<b>2M-4M</b>	40.5 (15)	59.9 (22)		
	<b>&gt;4M</b>	0.0 (0)	100 (1)		
<b>Contrast sensitivity</b>	<b>&lt;1.65-1.05</b>	85.7 (24)	14.3 (4)	15.22 (2)	<b>0.001</b>
	<b>0.9-0.45</b>	40.9 (18)	59.1 (26)		
	<b>0.30-0.00</b>	37.5 (3)	62.5 (35)		
<b>Visual field</b>	<b>Defective</b>	43.9 (18)	56.1 (23)	5.21 (1)	<b>0.022</b>
	<b>Not defective</b>	69.2 (27)	30.8 (12)		
<b>Kind of devices using</b>	<b>Spectacles</b>	54.5 (18)	45.5 (15)	14.29 (3)	<b>0.032</b>
	<b>Telescopes</b>	25.0 (3)	75.0 (9)		
	<b>Magnifiers</b>	52.2 (12)	47.8 (11)		
	<b>Others</b>	100 (12)	0.0 (0)		
<b>Device help in daily life</b>	<b>Yes</b>	79.5 (35)	20.5 (9)	21.78 (2)	<b>0.001</b>
	<b>Somehow</b>	25.0 (6)	75.0 (18)		

	<b>No</b>	33.3 (4)	66.7 (8)		
<b>QOL</b>	<b>Yes</b>	81.3 (26)	18.8 (6)		
	<b>Somehow</b>	48.3 (14)	51.7 (15)	15.79 (2)	<b>0.001</b>
	<b>No</b>	26.3 (5)	73.7 (14)		

\* P-0.001 shows highly significant association.

#### **4.9 Association of functional needs with socio-demographics, vision**

##### **assessment and participant perspective:**

Functional needs was the computed variable of educational need, social needs and daily life activities. Mean score for functional need was 4. Below 4 values were considered as improved functional needs and above 4 were not improved functional needs. Functional needs showed significant results with occupation (p-0.02). Rural patients (65.5%, 31) had not improved functional needs then urban ones and it was significantly associated with functional needs after vision assessment (p-0.02). Illiterate patients had more not improved functional needs 83.3% than educated ones and educational level had a good association with functional needs (p-0.01). Family income of >50k shows improved functional needs of 71.4% (20) and had significant association with functional needs (p-0.01). Contrast sensitivity (p-0.00) and visual field defects (p-0.02) also had strong association. Good contrast sensitivity results in greater number of improved functional needs (78.6%) and defective visual fields shows greater number of not improved functional needs 61.0% (25). Patients using devices properly and those devices help them in their daily life both had significant results (p-0.01, p-0.00). Quality of life of participant improved after using devices for their functional needs. Hence improved functional needs had significant results with quality of life (p-0.00). There were (n=41) 51.2% of participant whose

functional needs were good with vision assessment and using low vision devices. Age, gender, marital status, family history, primary causes of low vision, comorbidities, consanguinity of parents, distance and near visual acuity, color vision and kind of devices used by patients had insignificant results with functional needs. A detailed summary of significant association between functional needs with socio-demographics, vision assessment and participant perspective is given in table 9.

Table 9 Association of functional needs with socio-demographics, vision assessment and participant perspective

Variables	Functional needs		Chi-square (df)	P-value	
	Improved % (N)	Not improved % (N)			
<b>Occupation</b>	<b>Not working</b>	37.5 (12)	62.5 (20)	7.68 (2)	<b>0.023</b>
	<b>Indoor work</b>	65.1 (28)	34.4 (15)		
	<b>Outdoor work</b>	20 (1)	80 (4)		
<b>Residence</b>	<b>Rural</b>	34.5 (10)	65.5 (19)	5.11 (1)	<b>0.023</b>
	<b>Urban</b>	60.8 (31)	39.2 (20)		
<b>Education</b>	<b>Illiterate</b>	16.7 (2)	83.3 (10)	8.59 (2)	<b>0.013</b>
	<b>Primary level</b>	48.4 (15)	51.6 (16)		
	<b>Secondary level</b>	64.9 (24)	35.1 (13)		
<b>Family income</b>	<b>&lt;20k-30k</b>	26.7 (4)	73.3 (11)	8.60 (2)	<b>0.012</b>
	<b>31k-50k</b>	45.9 (17)	54.1 (20)		
	<b>&gt;50k</b>	71.4 (20)	28.6 (8)		
<b>Contrast sensitivity</b>	<b>&lt;1.65-1.05</b>	78.6 (22)	21.4 (6)	13.55 (2)	<b>0.011</b>
	<b>0.9-0.45</b>	34.1 (15)	65.9 (4)		
	<b>0.30-0.00</b>	50 (4)	50.0 (4)		

<b>Visual field</b>	<b>Defective</b>	39.0 (16)	61.0 (25)		
	<b>Not defective</b>	64.1 (25)	35.9 (14)	5.03 (1)	<b>0.021</b>
<b>Use device properly</b>	<b>Yes</b>	90.2 (37)	69.2 (27)		
	<b>Somehow</b>	7.3 (3)	30.8 (12)	7.91 (2)	<b>0.012</b>
	<b>No</b>	2.4 (1)	0.0 (0)		
<b>Device help in daily life</b>	<b>Yes</b>	80.5 (33)	28.2 (11)		
	<b>Somehow</b>	17.1 (7)	43.6 (17)	23.46 (2)	<b>0.001</b>
	<b>No</b>	2.4 (1)	28.2 (11)		
<b>QOL</b>	<b>Yes</b>	58.5 (24)	20.5 (8)		
	<b>Somehow</b>	39.0 (16)	33.3 (13)	24.49 (2)	<b>0.001</b>
	<b>No</b>	2.4 (1)	46.2 (18)		

\* P-0.001 shows highly significant association.



## CHAPTER 5: DISCUSSION

Visual impairment remains a major healthcare problem in both developed and developing countries. The growing numbers of the visually impaired who can no longer be treated by optical, medical, or surgical treatments pose a challenge to eye care professionals. LVAs, as part of a complete low vision service, can significantly improve patients' residual vision permitting them to complete daily tasks easily. Low vision patients faced a lot of problems during their educational period and other aspects of life, to overcome the situation low vision aids plays a vital role to improve the functional needs of patients to help them in academic career and other daily life activities. LVDs are vital in vision rehabilitation. Using assistive technology to its full potential is a practicable and feasible method to maintain independence of low vision patients. For this purpose, not only we need effective services but we also must have comprehensive and adequate coverage of services. These services need to address not only vision but also the social, psychological, emotional, functional and economic consequences of low vision.

In the present study impact of vision assessment on functional needs (educational, social and daily life activities) of low vision patients who were using low vision aids was done. Assessing of functional needs after vision assessment and using of LVAs was done by using adaptive tools from the previous studies. The main findings of the studied population reported that functional needs became improved (51.2%) after getting vision assessment and use of different low vision aids in their life. And about 58.5% quality of life became better after improving of functional needs.

There were total 80 patient included in the study whose age ranges from 18-60 years. Male patients (60%, 48) were greater than female patients. The present study showed a significant association of functional needs with occupation ( $p=0.02$ ), residence ( $p=0.02$ ), education level ( $p=$

0.01), family income (p-0.01), contrast sensitivity (p-0.01), visual field defects (p-0.02), patients using device properly (p-0.01), device help in daily life routine (p-0.00) and improving quality of life (p-0.00). The study showed no significant association with other socio-demographics like age, gender, family history, family living and comorbidities. It also had no association with causes of low vision, distant and near visual acuity, color vision, and mobility of patient.

This study include vision assessment and its impact on functional needs of low vision patients.

There was improving in functional needs (educational needs, social needs and daily life activities) of patients after utilization of low vision services. A previous study reported that 54.8% of patients were benefited from LVAs who effectively used optical aids. Based on a large number of surveys carried out in several countries over the last 30 years, it is clear that the prescription of LVAs cannot result in a 100% success rate. Despite clinicians' best efforts, not all patients can be helped.

A study showed that 89% of patients reported improvement in functional needs after utilization of LVAs (Abu-Yaghi et al., 2022). A similar study conducted in Egypt found that 56% of patients showed improvement in near and far tasks after visual acuity correction (Shaaban et al., 2009). Another study from turkey reported 46% of success rate of functional needs which include vocational, social and driving needs (DemirKilinç et al., 2013).

Consanguinity of parents had a great role in developing of disease as this study reported consanguinity rate of 70% and 52.5% showed a positive family history. Mostly of the families living were joint. While a study conducted in Jordan showed 50% of consanguinity and 38.8% family history of their presenting ocular diseases (Abu-Yaghi et al., 2022). Our results showed 67.3% of disease cause was congenital were also in agreement with Uprety, et al, who revealed that 50% of the causes of low vision congenital (Uprety et al., 2016). The reason for this high

proportion of hereditary/congenital anomalies in this study may be due to inter-family marriages, which are common in Pakistan. Most of these conditions were not treatable but prevention is possible through genetic counseling. This study showed great number of patients who works indoor like teaching, shopkeeper, online jobs and office work. Higher number of patients were educated to secondary level and most of them were male patients.

This study report on the specifics of prescribing LVAs for the visual impairment patients who under-went evaluation. This was driven by the functional needs of patients as assessed by the low vision specialist. The majority of patients were prescribed with aids for near tasks like reading and writing (58.8%), most prescribed LVAs were reading spectacles. Majority were reported improvement in their educational needs functionality. Telescopes for far tasks were used by 15% and 41.3% were using spectacles. Functional needs improved with spectacles were 57.6%, telescope 41.9% and magnifiers 43.5%. Other study in contrast with a report by Shah et al, 17 which showed that spectacles were prescribed for 66.2% of low vision patients and telescopes to 33.8%.

Most of our studied population suffered from nystagmus which was the leading cause of low vision with percentage of 31.3% and followed by retinitis pigmentosa. Cause of low vision was not significantly different between males and female ( $p=0.61$ ). The study results were slightly different from previous study which showed that albinism, retinitis pigmentosa and congenital glaucoma were the primary causes and was not significantly associated with gender ( $p=0.89$ ) (Alrasheed et al., 2021). A study in central Europe showed retinitis pigmentosa as the main cause (Baarah et al., 2018). Other study in Austria reported inherited retinal and choroidal diseases were the primary cause of VI. A study in Saudi Arabia showed optic atrophy was the main cause

for low vision (Glatz et al., 2022). Another research in India majority of LV cases were caused by either retinal disease or amblyopia (S. C. Ganesh et al., 2018).

The study finds that 36.3% had rarely difficulty in reading ordinary prints while 8.8% had always difficulty in reading at arm length distance. A study previously conducted revealed that most commonly patients difficulties were related to their studying/reading habits like copying from the blackboard, reading textbook at arm's length, and writing along a straight line (S. Ganesh et al., 2013).

Vision assessment and LVAs has a great influence on the life of low vision patients. After taking low vision services their dependency ratio decreases to some level. As this study reported that vision assessment and LVAs had impact on the functional needs (educational needs, social needs and daily life activities) of low vision patient. It showed that there was 56.3% of educational needs, 51.2% of social needs and 56.3% of daily life activities improvement. Previous study conducted in Sudan states that LVAs improved the patient's quality of life through visual rehabilitation. And improved their basic daily life needs (Alrasheed et al., 2021).

To examine the association of vision assessment and LVAs with patient compliance which showed 40.0% of the improving quality of life of low vision patients. Out of total 80.0% of patients using their device properly and 55% of patients had improvement of their daily tasks. And patients reported that the service was sufficient to meet their need. Some of patients were not satisfied by the procedure they said that there was no such difference in their functional needs, they want to improve the procedure in counselling session. Mostly of them want to decrease the time of follow-up. Patients want to increase the training session for LVA use as many of them have the device but cannot know how to use it.

We consider that low vision clinics must deliver proper training, and encourage patients to use LVAs, which necessitates further time and skilled staff. If visual assessment is to be successful, patients must accept the diagnosis of visual impairment and use their prescribed LVA in public, as required. Better psychological status and motivation at the time of rehabilitation has been shown to be related with better outcome.

### **Strengths:**

- The current study was conducted in Low Vision department, previously very less number of studies were conducted in low vision clinics.
- This study reported functional needs in 3 dimensional aspects of life like educational needs, social needs and daily life activities.
- Awareness in visual deficits and advocacy increased.
- Counselling sessions were done to use their residual vision and make their life better.
- Rehabilitation facilities were provided.
- The study findings may help to clarify and facilitate the work of physicians for vision assessment and prescribing optimally actual optical aids and improving the quality and effectiveness of low vision rehabilitation via additional patient follow-up and training in the use of LVAs.

### **Limitations:**

- Time duration was less i.e., 6 months.
- It was a snap-shot give glimpse into a real problem.
- Additional research required for more investigation.

- This study did not represent the barriers faced by visually impaired patients while using their low vision devices.
- This study also not shows the barriers towards the affordability and accessibility of devices.
- More research on the psychological and psychosocial factors that contribute to this process is required.

### **CONCLUSION:**

Low vision problems are common with a higher frequency in males than females. Nystagmus, retinitis pigmentosa, and high refractive errors are the most common cause of low vision in age 15-60 years. By visual assessment of Low Vision patients the functional needs (educational needs, social needs and daily life activities) were assessed. Association between functional needs and socio-demographics characteristics along with vision assessment showed significant association. The majority of LVAs were prescribed for near distance tasks, and reading glasses were the most prescribed visual aid. Mostly patients were using spectacles. Fifty-one percent of patients reported improved functional needs with vision assessment and LVAs. In conclusion, an increase in the awareness of visual deficit and its effects are needed, together with efforts to improve the treatment of visually impaired patients via the provision of quality information and support, improved rehabilitation facilities, and long-term evaluation of interventions based on measures of quality of life, patient satisfaction and psychological wellbeing, and vision.

## **RECOMMENDATIONS:**

Improving education system for the low vision patients will decrease their dependency rate as they will utilize their residual vision in a better way. Counselling session will be arrange regarding consanguinity marriages as it has a great effect on patients health. Employment should be provided for low vision patients as it will make their life better. Improving patient accessibility, screening campaigns, lowering the costs of visual aids and incorporating such services within insurance plans will further maximize the benefits of low vision services to the visually impaired. Eye care professionals should counsel patients about the importance of early diagnosis and treatment of vision problems and using low vision aids. More than half of the patients were the offspring of consanguineous marriages. Further research concerning emerging treatments for inherited eye diseases should be encouraged, and familial counselling regarding consanguinity marriages must be stressed by health care providers and policy makers.

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## APPENDIX A: CONSENT FORM

I am Hira Ajmal student of MSPH-4th semester, Alshifa School of Public Health, Alshifa Trust Eye Hospital, Rawalpindi. I am conducting research on “Impact of vision assessment on functional needs of low vision patients visiting to Tertiary Eye Care Hospital, Rawalpindi.

### **Purpose of the research:**

The purpose of the research is to find out association of vision assessment with functional needs of low vision patients.

### **Participation:**

By taking this study there is no discomfort or inconvenience to you. Your participation is strictly voluntary, and you may withdraw your participation at any time during the study without any penalty. I request you to answer as honestly as possible. It will not take more than 15 minutes to answer my questions. All the information collected will be used only for my research and will be kept confidential. Your identity & your responses will not be identifiable; all data will be sorted anonymously. No incentive will be provided for answering the questions.

Thank you for your participation in the study, your feedback is important.

I have read and understand the information sheet and agree to participate in the study.

(Check the box)

Participant’s Signature: \_\_\_\_\_

Date: \_\_\_\_\_

## APPENDIX B: QUESTIONNAIRE

Impact of low vision assessment on functional needs of low vision patient visiting to tertiary eye hospital Rawalpindi.

I have read this form and have been given the opportunity to ask questions. I gave my consent to participate voluntary in this study. Signature: \_\_\_\_\_

All information will be treated confidentially.

### Section: 1 Socio-demographics

1. Age		
2. Gender	a) Male	b) Female
3. residence	a) rural	b) urban
4. marital status	a) married	b) unmarried
5. family history	a) yes	b) no
6. family	a) joint	b) nuclear
7. education level	a) illiterate b) primary education	c) high education
8. occupation		
9. income	a) < 20k-30k	b) >30k-50k c) >50k
10. Consanguinity of parents	a) Yes	b) No

11. comorbidities	a) diabetes	c) hypertension
	b) arteritis	d) others

Section: 2 Low vision assessment:

1. What is the primary cause of participant's low vision?	a) Nystagmus	b) retinitis pigmentosa
	c) High Refractive errors	d) Others
2. Cause of disease	a) Acquired	b) Congenital
3. Have you previously visited a tertiary eye hospital for low vision assessment?	a) Yes	b) No
4. Distance V.A (with correction)	a) <6/19-6/48	b) <6/48-1/76
	c) <1/76	
5. Near V.A (with correction)	a) 0.8-1M	b) 2M-4M
	c) >4M	
6. Contrast sensitivity	a) <1.65-1.05	b) 0.90-0.45
	c) 0.30-0.00	
7. Visual field defects	a) Defective	b) not defective
8. Color vision deficiencies	a) Defective	b) not defective
9. Do you previously use any assistive devices?	a) Yes	b) No
10. What kind of devices you are using?		

11. For how long you use this device?		
12. Do you use glasses for reading	a) Yes	b) No
13. Do you use glasses for distance	a) Yes	b) No
14. Do you navigate independently?	a) Yes	b) No

Section#3 functional needs: 1----never, 2----rarely, 3----sometimes, 4----often, 5----always

1 2 3 4 5

**Educational or vocational:**

1. How much difficulty do you have reading ordinary print in newspapers or text book?					
2. I have problems with lights around me causing glare when I'm trying to see books?					
3. I tend to confuse colors					
4. It takes me a long time to adjust to darkness after being in bright light					
5. I have problems carrying out activities or projects that require a lot of visual concentration and attention.					
6. I have trouble reading a sign or recognizing a picture when it is on some distance					
7. I feel frustrated a lot of the time as I need a lot of help from others					



8. Having difficulty in reading text books at an arm length.					
<b><u>Social needs:</u></b>					
1. I have much less control over what I do I have to rely too much on what other people tell me					
2. I worry about doing things that will embarrass myself or others					
3. I stay home most of the time					
4. How much difficulty do you have reading street signs or the names of stores?					
5. How much difficulty do you have noticing objects off to the side while you are walking along?					
6. How much difficulty do you have seeing how people react to things you say					
7. How much difficulty do you have visiting with people in their homes, at parties, or in restaurants?					
<b><u>Daily tasks:</u></b>					
1. How much difficulty do you have going down steps, stairs, or curbs in dim light or at night?					
2. How much difficulty do you have picking out and matching your own clothes?					

3. When pouring liquid, I have trouble judging the level of the liquid in a container, such as the level of coffee in a cup.					
4. Sometimes when I reach for an object, I find that it is further away (or closer) than I thought.					
5. How much difficulty do you have finding something on a crowded shelf?					
6. How much difficulty do you have to recognize the faces of family or friends when they are across an average size room?					
<b><u>Patient perspective:</u></b>					
<div style="display: flex; justify-content: space-around;"> <span>Yes</span> <span>No</span> </div>					
1. Do you use your assistive devices properly					
2. Do these aids or devices helped you in your daily life?					
3. Does your quality of life become better after its use?					
4. Counselling message					

## APPENDIX C: IRB APPROVAL LETTER



**AL-SHIFA SCHOOL OF PUBLIC HEALTH  
PAKISTAN INSTITUTE OF OPHTHALMOLOGY  
AL-SHIFA TRUST, RAWALPINDI**

MSPH-IRB/16-11  
2<sup>nd</sup> Oct, 2023

### **TO WHOM IT MAY CONCERN**

This is to certify that **Hira Ajmal D/O Ajmal Said** is a student of Master of Science in Public Health (MSPH) final semester at Al-Shifa School of Public Health, PIO, Al-Shifa Trust Rawalpindi. He/she has to conduct a research project as part of curriculum & compulsory requirement for the award of degree by the Quaid-i-Azam University, Islamabad. His/her research topic, which has already been approved by the Institutional Review Board (IRB), is “**Impact of vision assessment on functional needs of low vision patients visiting tertiary eye hospital Rawalpindi**”.

Please provide his/her necessary help and support in completion of the research project. Thank you.

Sincerely,

Dr. Ayesha Babar Kawish  
Head  
Al-Shifa School of Public Health, PIO  
Al-Shifa Trust, Rawalpindi

## APPENDIX D: GANTT CHART

Activities	September 2023	October 2023	November 2023	December 2023	January 2024	February 2024
Literature search						
Synopsis writing and IRB approval						
Pilot testing						
Data collection						
Data analysis						
Write-up						
Thesis defense						