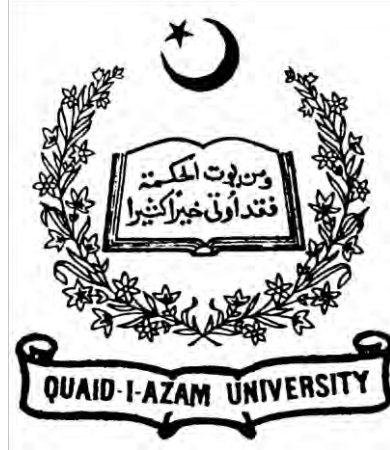


Master of Science in Public Health



**EFFECT OF TRAINING SESSIONS ON
TEACHER'S AWARENESS REGARDING EYE
HEALTH OF STUDENTS IN REMOTE AREAS OF
PUNJAB: A QUASI EXPERIMENTAL STUDY**

By

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Islamabad, Pakistan

(2023)

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A QUASI EXPERIMENTAL STUDY**

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(362854-PIO/MSPH-2021)

Dissertation submitted in partial fulfillment of the requirement for
the degree of:

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to

**Al-Shifa School of Public Health, PIO, Al Shifa Trust Eye Hospital,
Faculty of Medicine
Quaid-e-Azam University,
Islamabad.**

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Declaration

In submitting this dissertation, I certify that I have read and understood the rules and regulations of DPH and QAU regarding assessment procedures and offences and formally declare that all work contained within this document is my own apart from properly referenced quotations.

I understand that plagiarism is the use or presentation of any work by others, whether published or not, and can include the work of other candidates. I also understand that any quotation from the published or unpublished works of other persons, including other candidates, must be clearly identified as such by being placed inside quotation marks and a full reference to their source must be provided in proper form.

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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MSPH (2023)

Date: 13-03-2023

DEDICATION

I dedicate this dissertation to the memory of my father, whose unwavering love, guidance, and support throughout my academic journey were instrumental in shaping who I am today.

Abstract:**Background:**

The World Health Organization (WHO) has identified childhood blindness as a top priority; as approximately 18.9 million children aged 0-14 years suffer from vision impairment, with 1.4 million being blind. Nearly half of these cases could have been prevented or treated to preserve or restore vision. In South Punjab, access to quality healthcare and awareness of eye health is limited, leading to untreated eye issues in school-going children and poor academic performance.

Objectives:

Current study was conducted to assess the awareness of public school teachers and to evaluate the effect of eye care training sessions regarding eye health among students, in remote areas of Punjab, Pakistan.

Methodology:

This is a study that was conducted in public primary schools in remote areas of South Punjab, Pakistan, in which total 92 teachers was collected from 23 schools through multi-stage sampling, and data was collected using specially designed questionnaires that were translated into Urdu. Before the screening intervention program, baseline teacher awareness regarding student eye health was evaluated through the questionnaires. The intervention involved educational session and distribution of literature. Post-program questionnaires were administered to evaluate changes in awareness. SPSS version 21 was used to analyze the data, and the effect of the training session on teacher awareness was checked using a paired t-test.

Results:

Out of total 92 respondents, majority were females (n=66, 71.7%) and were 20-30 years of age (n=846, 50.0%). Majority of teachers having bachelor's degree (n=39, 42.4%). Results of paired t-test of awareness of teachers regarding eye diseases and conditions pre and post intervention (-6.28 ± 2.20), awareness regarding warning signs is (-4.69 ± 3.79),

Awareness regarding eye care pre and post Intervention (-4.77 ± 2.96) and awareness regarding preventive measures pre and post Intervention (-3.46 ± 2.87).

Conclusion:

In addition to technical training, educational sessions can also play a vital role in sustaining teacher interest in school-based health intervention programs and have an overall impact on community health. The study recommends that providing training to teachers can be an effective approach to enhancing the eye health of students.

Key Words:

Eye Health, Awareness, Training Session, Remote Areas, Intervention

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I owe my supreme gratitude towards my parents for their unconditional love and support for me. They have always supported me in each and every phase of the life. Whatever I am and wherever I am, is just because of the altruistic love of my parents. Their prayers have made me strong enough to face every problem and difficulty of the life.

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LIST OF ABBEREVIATION

WHO	World Health Organization
LMIC	Low middle income countries
ED	Eye Diseases
WS	Warning Signs
EC	Eye Care
PM	Preventive Measures
UN	United Nation
BCVA	best-corrected visual acuity
VA	Visual acuity
IRB	Institutional Review Board

CHAPTER 1: INTRODUCTION

The control of childhood blindness is one of the priorities of the World Health Organization (WHO). An estimated 18.9 million children aged 0–14 years have vision impairment, of whom 1.4 million are blind. It is estimated that in almost half of the children who are blind the underlying cause could have been prevented, or the eye condition treated to preserve vision or restore sight. Unfortunately, eye health was not integrated into WHO's global school health initiative, which was launched in 1995 (World Health Organization, 2015). The health promoting schools initiative mainly focused on a wide range of health topics such as physical activity, nutrition, substance use, sexual health, hand washing, eating disorders and oral health, but the effectiveness of this initiative has been documented in few areas of health. In recent years, child eye health or school eye health has been advocated and implemented worldwide. The school eye health activities mainly include school vision screening, refractive error correction, spectacle wearing compliance, and prevention of trachoma and vitamin A deficiency. (Paudel et al., 2019)

Undiagnosed and uncorrected refractive errors in childhood can negatively affect the development of vision and cause students to have low academic success and even quit school before graduation. (Maples, 2001)

The year 2020 marks the culmination of the global initiative to eliminate avoidable blindness, VISION 2020: The Right to Sight VISION 2020 was set up to eliminate avoidable blindness by 2020. It was formed from a partnership between WHO and a Task Force of the IAPB and launched in 1999. The rationale was that the number of people blind in the world was increasing due to population growth, ageing and

inadequate eye care services in many LMICs; yet 80% of all blindness was preventable or treatable with proven cost-effective interventions. The strategy that was developed and followed was to developing primary and secondary level eye care services at the district level of health care through human resource and infrastructure development to address the major diseases causing avoidable blindness, which at that time were: cataract, refractive error and low vision, trachoma, onchocerciasis and blindness in children. This initiative provided the framework for national programmes to address eye health over the past 20 years. In 2019, WHO published the *World report on vision*, (Burton et al., 2021) Which was endorsed by the 73rd World Health Assembly in 2020. The report and resolution call for the advancing of eye health as an integral part of universal health coverage, by implementation of integrated people-centred eye care, following the approach outlined in a broader health services framework. (Burton et al., 2021)

The visual system

Vision is the most dominant of human senses. The eye, its associated adnexal tissues, and visual pathways within the brain are very intricate (Fig.1). All these elements need to function well together to achieve clear vision. The transparent optical elements at the front of the eye (cornea and lens) focus light onto retinal photoreceptors. These transduce light stimuli into neuronal impulses with which the brain creates a three-dimensional image. Vision requires structural and physiological integrity of the eyes, brain, and their connections. Disruption of any part of this pathway causes vision impairment. (Burton et al., 2021)

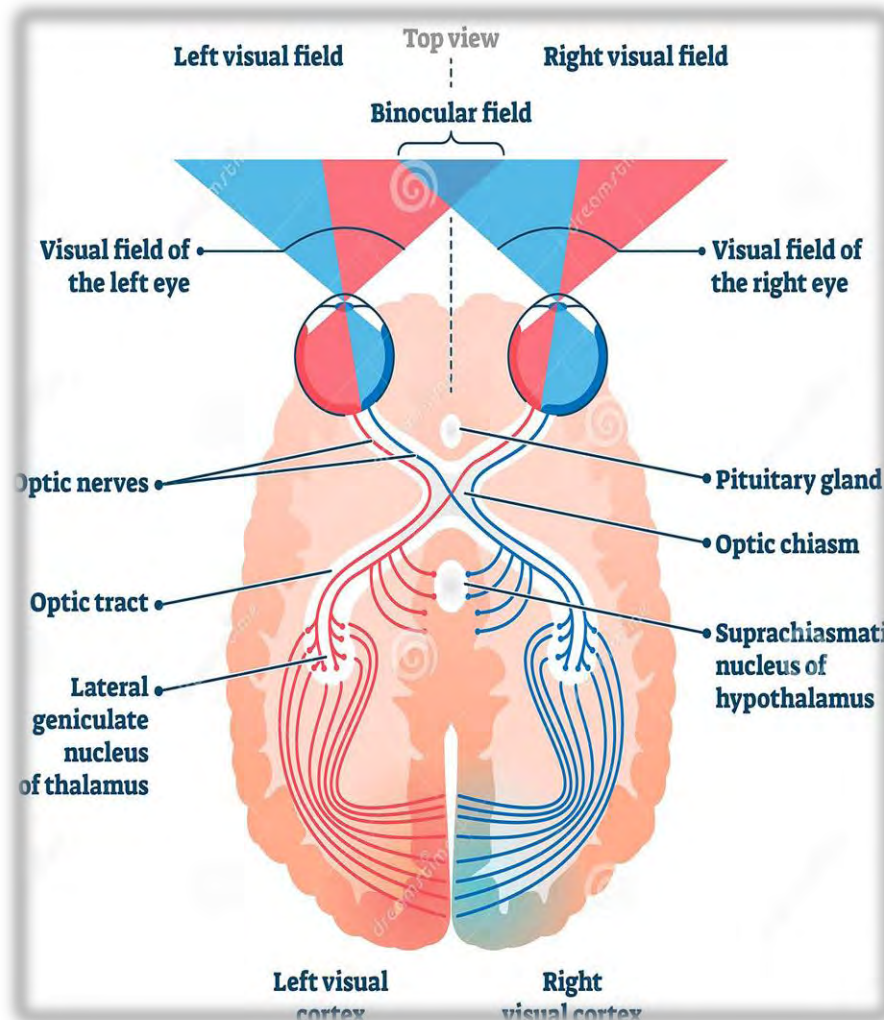


Figure 1: Visual pathway (Lindsay, G. W. 2021)

Burden of visual impairment and blindness

The World Health Organization estimates that 19 million children are visually impaired, among whom, 1.4 million are blind. Childhood blindness is an excellent indicator of the state of child health and primary care services in a country. Childhood blindness is important not just due to the number of children blind but also because the number of years that the surviving child has to live with blindness (blind years lived). Childhood blindness is next only to adult cataract in terms of the number of blind person years lived.

Under-five mortality rates have been used as a proxy measure to compute the prevalence of childhood blindness in low and middle income countries due to limitations of other methods of data collection. (Gudlavalleti, 2017)

In the World report on vision

WHO has signalled an intention to change the way vision impairment is reported, moving away from only presenting visual acuity (with spectacles or contact lenses if available), to also reporting uncorrected visual acuity (without spectacles or contact lenses if worn). Including the measurement of uncorrected acuity allows for better estimation of the ongoing service need and effective coverage of refractive error correction. In prevalence surveys, vision impairment is generally reported as visual acuity in the better seeing eye. This Commission uses visual acuity categories defined on Snellen charts in metres when presenting data. Moderate and severe vision impairment (MSVI) is defined as visual acuity worse than 6/18, but equal to or better than 3/60, and blindness is defined as worse than 3/60. (Burton et al., 2021)

Public health approaches can prevent or treat most common eye diseases. Vision loss and access to eye care is greatly affected by social determinants. These encompass many issues: social exclusion, gender inequity, racism, early childhood development, educational opportunities, employment conditions, design and implementation of health systems and public health programmes, urbanisation, globalisation, and commercial determinants. (Burton et al., 2021)

Global Burden of childhood blindness

The World Health Organization defines blindness as a best corrected visual acuity of less than 3/60. Using this definition it is estimated that there are currently 37.9 million blind

people (1-4 million children 0-15 years of age, and 36-5 million adults 15 years of age or greater) worldwide. Of this figure roughly 75% of all blind people live in the developing countries of Asia (21-4 million) and Africa (7.1 million), typically in rural areas with few or drastically underused eye care facilities. At least 50% to 70% of all cases of childhood blindness and 75% of adult blindness are either preventable or curable with currently available medical or surgical technology.³ Moreover, blindness prevention and treatment strategies are among the most cost effective of all known medical interventions. (Smith, A & Smith, J, 1996). Measuring the burden of childhood eye disabilities is challenging due to their rarity, diverse causes, and varying definitions of childhood and blindness (Solebo et al., 2017).

Sensitive period of vision impairment in child

According to Wiesel and Hubel, the Critical period or Sensitive period for visual development is defined as, a period during which the normal visual input is necessary for the normal development of vision (Wiesel & Hubel, 1965).

For visual acuity and contrast sensitivity of child, there are the following three sensitive periods: The first sensitive period is called '**The period of visually driven normal development**'. With the visual input, there are some developmental changes in child during this period. The developmental changes do not occur if the visual input is absent. This period lasts till the age of 5 to 7 (Lewis, 2005). The second sensitive period is called '**The Sensitive Period for Damage**'. This is the time during which the abnormal visual input can permanently damage the visual system, like Amblyopia. Another example of damage during this period is cataract, once it developed and become dense before the age of 10 it can cause permanent damage to

visual acuity of child. This period lasts till the age of 10 (Lewis, 2005). The third sensitive period is called '**The Sensitive Period of Recovery**'. During this period there is a potential in the visual system of child to recover from visual deprivation. This period lasts till the age of 7 (Lewis, 2005; Daw, 2003).

It is commonly said that the 80% learning of child during the first 12 years of his life comes from the eyes (Ohio. 2015). It is evident from different studies that the visual problems in child adversely affect his/her achievements in school (Orfield 2001). The child's performance in school and the future of child is negatively influenced by poor vision (Seema, Vashist, Meenakshi, Manish, 2009). There are several types of disorders that, if not identified and treated properly on time, can lead to permanent vision loss in child (Ferebee, Annette, 2004).

Warning signs of visual impairment in Child

The following are some warning signs of visual problems in children that can be detected by teachers and parents (Torreno, 2015; Oakley 2012; Warning Signs of Vision Problems in Children 2015)

A child may be experiencing vision problems: inward or outward turning of the eyes, squinting, complaining of headaches, worsening academic performance, blurred or double vision, losing place while reading, holding reading material too close to the eyes, avoiding close work, experiencing eye fatigue while reading or doing schoolwork, excessively rubbing their eyes, tilting their head to see better, using a finger to keep their place while reading, consistently performing below their potential, holding objects too close or too far away to see, pre and post pointing at objects, bumping into objects, difficulty seeing at night, and experiencing excessive watering in the eyes.

Early detection and treatment of visual problems in child

Early detection and treatment of ocular problems are vital for a child's well-being. School health programs play a crucial role in preventing and addressing eye issues in children. These programs empower children to promote eye health within their families and communities, particularly concerning infectious diseases like vitamin A deficiency and trachoma (Gilbert, 2011; Pizzarello, 1998).

In many areas throughout the developing world, including Pakistan, schoolteachers have emerged as valuable community agents for healthcare. With a scarcity of healthcare professionals, utilizing teachers in health intervention efforts has become crucial. Teachers offer several advantages, including access to schoolchildren, their esteemed position within communities, and their significant daily interaction with children. Additionally, studies have demonstrated the cost-effectiveness of training teachers to screen for refractive errors and provide spectacles, effectively addressing preventable blindness. This service delivery model empowers teachers with education and training from eye health professionals, enabling them to conduct screenings and alleviate the workload of healthcare providers.

Many studies have been conducted on the eye health knowledge of teachers in different countries. There is limited evidence about eye studies with schoolteacher's awareness towards children's eye health in Pakistan. This study aimed to evaluate the effectiveness of a pre-screening education session in enhancing primary school teachers' awareness of their students' eye health. The lack of research in this area highlighted the need to assess the impact of such training programs and their implications for service delivery and sustainability. The study aimed to raise awareness among teachers regarding

various eye problems, warning signs of vision issues in children, and preventive measures to reduce the risk of eye diseases. The findings provide insights and recommendations for similar health intervention efforts in the developing world.

1.1 Rationale

Eye health education is lacking in developing countries including Pakistan due to limited availability of eye care personnel within the school setting.

As children spend most of their time in school, primary teachers' awareness of eye health problems are necessary to effect the provision of better eye health-care practices among their students. This can help in creating awareness about eye health among children, their parents, and communities and may also help in developing a school curriculum that includes eye health as an important element in messages related to overall health and well-being of the children.

In Pakistan, little is known about perspectives of teachers about eye health and its importance for student's learning. This study aims to determine the effects of the training session on primary school teacher's awareness about certain eye problems and conditions, warning signs of vision problems in children, about eye care and preventive measures of their students, in remote regions of Punjab, Pakistan.

1.2 Objectives

1. To assess the awareness of public primary school teachers regarding eye health among students, in remote areas of Punjab, Pakistan.
2. To evaluate the effect of eye care training sessions on public primary school teacher's awareness among students.

CHAPTER 2: LITERATURE REVIEW

A KAP study conducted by Mahmoud et al examined the perceptions of elementary school teachers in Ilorin, Nigeria, regarding factors influencing their pupils' eye health. Data from 172 teachers revealed that the majority recognized the importance of good eyesight (98.8%) and identified nutrition (84.9%) and lighting (74.4%) as crucial for optimal eye health. During an outbreak of epidemic keratoconjunctivitis, 61.6% of teachers would send affected students home. Teachers also reported appropriate practices such as informing parents (77.9%) and seating students with defective eyesight closer to the writing board (77.7%). These findings suggest that teachers possess adequate knowledge, attitudes, and practices that can contribute to school eye health programs.

In a survey conducted in Takeo Province, Cambodia, knowledge, attitudes, and access to eye-care services were examined. The study revealed varying levels of knowledge among participants, with high awareness of eye injuries (97%) but low awareness of diabetic eye disease (8%). Awareness of cataract was relatively high (85%), but understanding of treatment options, especially surgery, was limited. Older individuals had lower awareness of cataract and prevention of blindness, while women and people without disabilities were more likely to believe that blind children could attend school. These findings emphasize the importance of targeted educational interventions to enhance knowledge and promote access to eye-care services.

In a study conducted in Nepal, the health literacy of common ocular diseases was examined. The findings revealed varying levels of awareness among participants: cataract (49.6%), night blindness (48.3%), diabetic retinopathy (29%), glaucoma (21.3%), and trachoma (6.1%). It was observed that patients attending rural outreach clinics had lower

awareness compared to those in urban areas ($p < 0.05$). Age, gender, and literacy were found to be associated with awareness levels ($p < 0.05$). These results highlight the importance of addressing health literacy to improve knowledge and awareness of ocular diseases in Nepal.

Katibeh et al. (2014) conducted a population-based study in Iran to assess awareness of age-related eye diseases. Findings revealed varying levels of knowledge, with higher awareness for cataract (82.9%) and diabetic retinopathy (86.2%) compared to glaucoma (46.6%). Limited understanding was observed, as only 22.6% recognized glaucoma and 41.6% recognized diabetic retinopathy as treatable conditions.

2.1 Conceptual Framework:

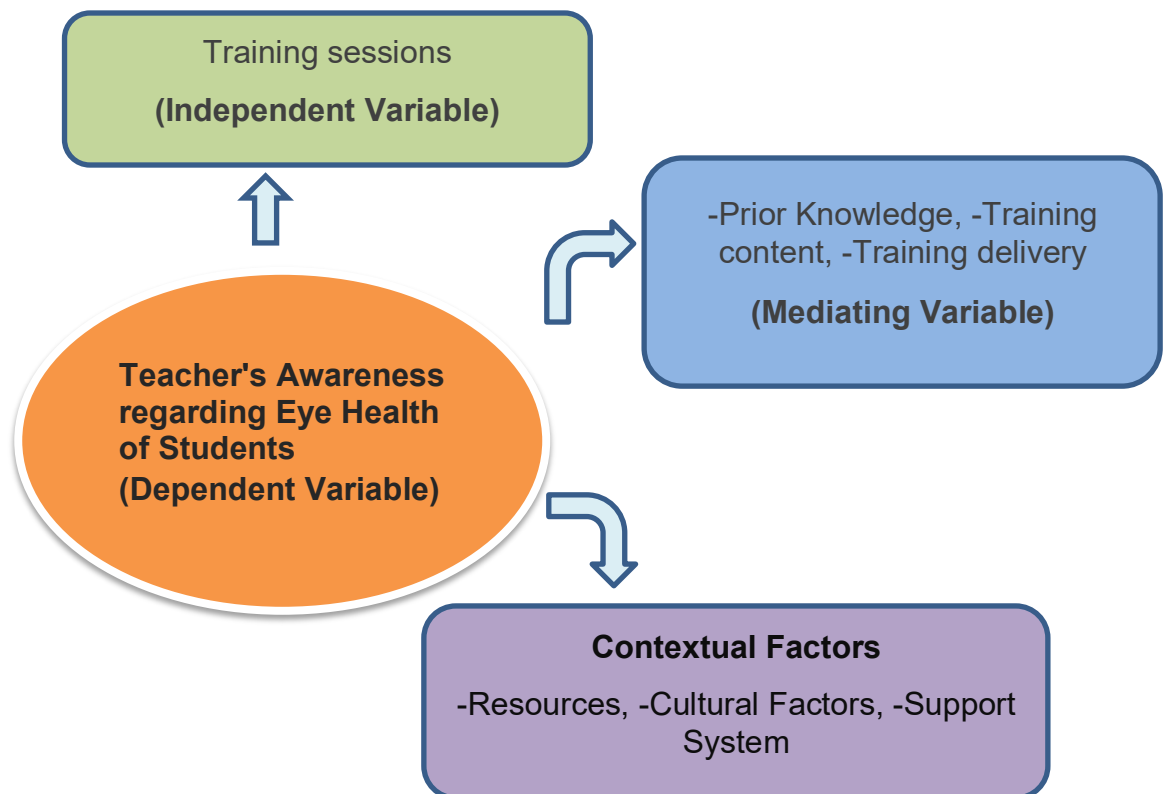


Figure 2: Conceptual Framework of Teacher's Awareness

2.2. OPERATIONAL DEFINITIONS:

2.1.1. Awareness

Having previously heard of the specific eye diseases and conditions, warning signs of vision problems in children, about eye care and preventive measures that reduces the risk of eye diseases in children.

2.1.2. Training Session

It is an organized description of the activities and resources you'll use to guide a group toward a specific learning objective.

2.1.3. Eye Health

Eye health is the state in which vision, ocular health, and functional ability is maximized, thereby contributing to overall health and well-being, social inclusion, and quality of life.

2.1.4. Teachers

Teachers of public primary schools of all ages, who spent over six months at that school.

2.1.5. Remote areas

Remote areas are those which are very far from the urban areas and are isolated community from highly populated settlements or lacks transportation links that are typical in more populated areas.

CHAPTER 3: METHODOLOGY

3.1 Research Design

A Quasi-Experimental study was carried out to assess the awareness of public school teachers regarding eye health among students.

3.2. Research Duration

The study completed in six months after Institutional Review Board (IRB) approval. i.e. August, 2022 to January, 2023.

3.3 Study Setting

This study was carried out in public primary Schools of remote areas of South Punjab.

3.4. Research Participants

Teachers in public primary schools of remote areas of South Punjab were selected on the basis of inclusion and exclusion criteria.

3.4.1. Inclusion criteria

1. Teachers of all ages.
2. Both male and female teachers included.
3. Teachers of public primary schools of remote areas.
4. Teachers who spent over six months at that school.

3.4.2. Exclusion criteria

1. Online teachers and Intern teachers.
2. Teachers who are not willing to participate in the study.

3.5 Sample Size Calculation

In this quasi-experimental study, the sample size is collected through multi-stage sampling in which every subject meeting the criteria of inclusion is selected until the

required sample size is achieved. Therefore, the sample size is not determined using statistical calculations or sampling methods.

3.6 Sampling Strategy

Multi-stage sampling strategy was used to collect the data from teachers of government primary schools in South Punjab. The steps outlined in this statement describe the sampling process for a research study in South Punjab.

The first stage involved identifying the population of interest as South Punjab (Figure 3). This is an important initial step in any research study, as it sets the boundaries for the sample and helps ensure that the results are generalizable to the larger population.



Figure 3: (South Punjab: Larger in Size, Less in Population, 2012)

Next, the researcher divides South Punjab into clusters based on geography. This is a common method for dividing a larger population into smaller, more manageable groups. The clusters selected were Rajanpur, Dera Ghazi Khan, Muzaffargarh, Bahawalnagar, Multan, Bahawalpur, Vehari, Lodhran, and Rahim Yar Khan. Nine clusters were initially identified.

The next step is to randomly select 6 out of the 9 clusters to be included in the sample. This random selection helps to ensure that the sample is representative of the larger population and reduces the potential for bias in the sample selection process.

After selecting the clusters to be included in the sample, the researcher further divides each selected cluster into smaller subgroups or areas. (appendix 2).From each subgroup, the researcher then selects randomly 2 to 3 government primary schools.

Finally, the researcher selects 4 teachers from each selected government primary school, on average, who fulfill the inclusion criteria through nonrandom consecutive sampling.

Here is a visual representation of the flowchart for multistage sampling (Figure 4):

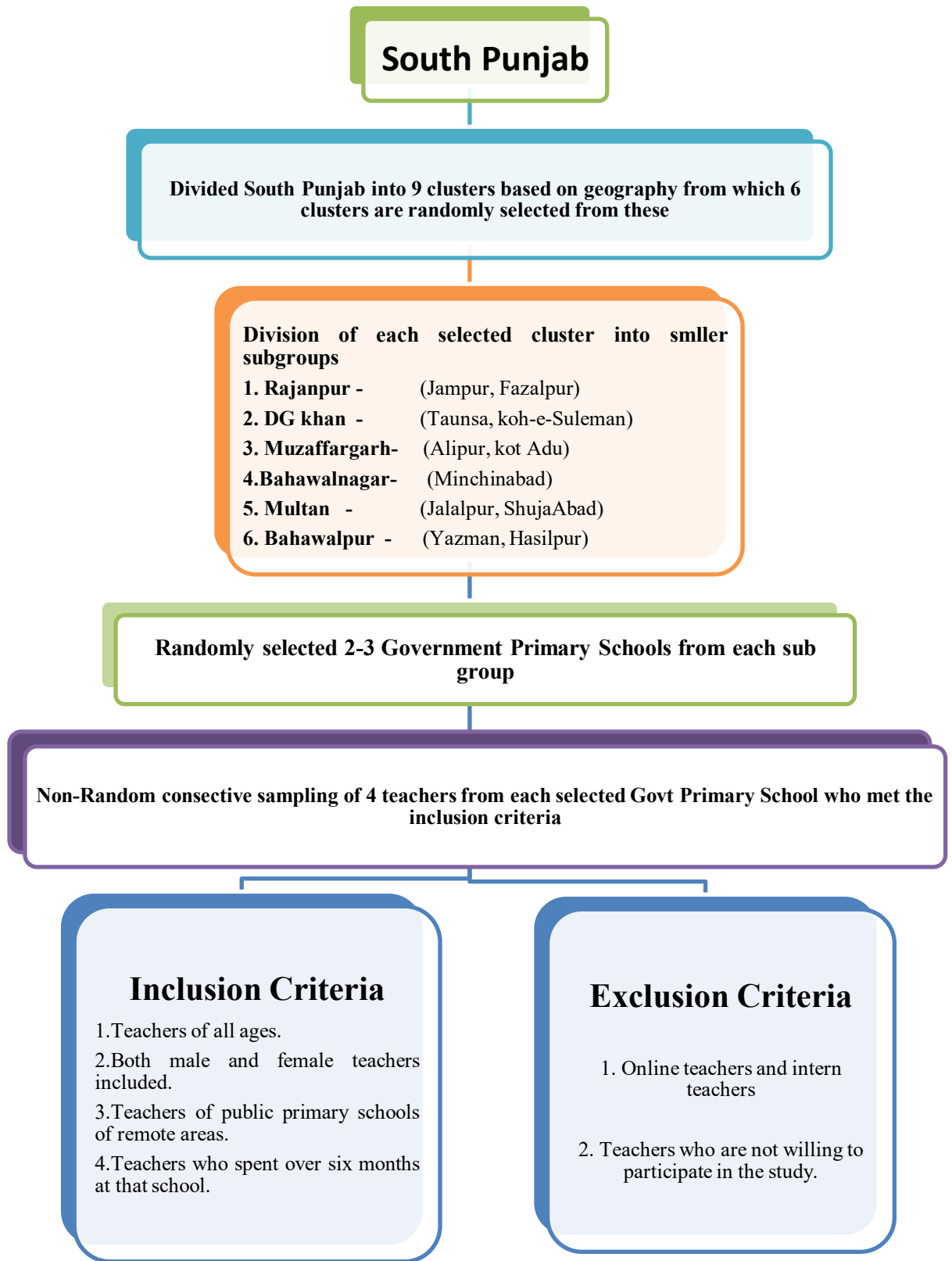


Figure 4: Multi Stage Sampling Strategy

3.7. Data Collection Instruments

3.7.1. Questionnaire Design

The questionnaire was based on research conducted in Cambodia (Ormsby et al., 2012) and adapted for Pakistan. Additional questions applying to the school context were included in the study. The questionnaire was then checked for content validity by an Ophthalmologist, Subject specialist, a public health professional and the supervisor. Under the direction of the supervisors, an organized questionnaire was developed to obtain data from the teachers of primary schools.

For the purpose of extracting information from the chosen respondents, a structured questionnaire with closed and open-ended queries was developed and translated into Urdu language. The questionnaire was developed to collect data regarding socio-demographic characteristics of the respondents, awareness about certain eye problems and conditions, warning signs of vision problems in children, about eye care and preventive measures that reduces the risk of eye diseases in children. Questionnaire is attached in Annexure-I.

3.7.2. Content of the Questionnaire

The questionnaire contained five major sections:

1. **First part** included questions related to socio-demographic characters of teachers in which there are total 10 questions age, gender, education, employment status, teaching experience, teaching experience in this school. It also included some questions related to history of eye disease or using glasses, children in family having any eye issue, seen children with vision problems and eye activity at your school.

There were in total, 42 items for measurement of the level of awareness in teachers regarding eye health of their students:

2. **Second part** consisted of total 12 items or questions, relating to general awareness about common childhood eye diseases.
3. **Third part** included 12 questions about symptoms/warning signs to observe in the classroom (e.g. squinting, reading ability, involvement in activities, and academic achievement).
4. **Fourth part** consisted of 10 questions about eye care and prevention.
5. **Fifth part** included 8 items which were related to awareness of teachers, regarding the preventive measures that reduce the risk of eye diseases in children.

The questionnaire was translated into Urdu, Pakistan's national language. It was then piloted in three public primary schools. The revised questionnaire was self-administered, in paper format, and comprised closed-ended multiple choice questions.

3.7.3. Intervention

After the completion of the Pre-Intervention questionnaire, the education intervention was implemented. This intervention was consisted of two forms which were training session and distribution educational materials. The goal of the intervention was to educate the teachers about eye health of their students.

Teachers Training

The teachers' training session aimed to build the capacity of teachers in addressing eye health issues in their students. Recognizing the crucial role teachers play in students'

lives, the session focused on equipping them with knowledge and skills to identify common eye diseases such as myopia, hyperopia, astigmatism, amblyopia, vitamin A deficiency, conjunctivitis, and strabismus. Teachers learned to recognize symptoms associated with these conditions, including blurry or double vision, itching, watering, eye fatigue or strain, headaches, and difficulty reading or focusing. By enhancing teachers' awareness, the training session aimed to empower them in supporting students' eye health.

Promoting students' eye health requires encouraging regular eye exams and educating parents about its significance. In the classroom, creating a conducive environment involves adjusting lighting, promoting breaks from screens, and ensuring appropriate distance from screens and books. As teachers, prioritizing our own eye health through regular exams, eye protection, and healthy habits sets a positive example for students, fostering their own eye health awareness and practices.

In the training session, teachers were educated about the significance of healthy food for maintaining good eye health. As teachers, you play a vital role in your students' overall development, including their eye health. Emphasizing the importance of nutrition, research highlights its role in preventing eye diseases. Teachers were introduced to key nutrients such as Vitamin A, C, E, omega-3 fatty acids, lutein, and zeaxanthin, which promote healthy eyes. By incorporating this knowledge into their classrooms, teachers can contribute to the well-being of their students' eyes.

Teachers play a vital role in promoting good eye nutrition among students. Vitamin A, found in carrots, sweet potatoes, and spinach, prevents blindness. Vitamin C, in citrus fruits and bell peppers, protects eyes from damage. Vitamin E in nuts and seeds guards

against oxidative stress. Omega-3 fatty acids in oily fish support eye health. Lutein and zeaxanthin in green leafy vegetables like kale and spinach are crucial for maintaining healthy eyes. By incorporating these foods into classroom activities and educating students, teachers can encourage healthy eating habits and prioritize eye health.

Teachers have a valuable role in promoting good eye health practices to students and their families. Educate them about the potential harms of using rose water and rubbing eyes, advising them to seek professional help for eye-related issues and to clean their eyes gently. Additionally, raise awareness about the importance of taking breaks from screen time, maintaining distance and posture, and following the 20-20-20 rule. Emphasize good hygiene practices like frequent handwashing and avoiding touching eyes with unclean hands to prevent eye infections.

Distribution of Educational material:

The intervention also included the distribution of educational materials, such as pamphlets, posters, and flyers, which provide information on the nutrients essential for maintaining healthy eyes, the foods that are rich in these nutrients, and tips for incorporating them into daily meals. It also included the information on common eye diseases that can affect children, their symptoms, and preventive measures that can be taken. This information can help teachers to identify potential eye-related issues and seek appropriate care. (Annexure 4)

Distributing educational materials to primary school teachers can empower them to promote healthy eye habits among students. These materials can include tips on taking breaks from screen time, maintaining proper reading distance and posture, and wearing eye protection. By providing teachers with this knowledge, we can enhance their ability

to make informed decisions and prevent eye-related issues in students. In conclusion, distributing educational materials to teachers is an effective intervention to improve student's eye health.

The training focused on eye diseases, warning signs of vision problems in children, eye health maintenance, and preventive measures. After the intervention, a post-intervention questionnaire was administered to assess changes in teachers' awareness of students' eye health. This allowed for an evaluation of the impact of the educational intervention on their knowledge and understanding.

3.8 Study Variables

3.8.1 Outcome Variable

The major construct of the questionnaire was to assess teacher's awareness. The outcome variable was "*teacher's awareness*" which was measured by using four validated scales; First scale is awareness regarding Eye diseases, which consists of twelve items, while, the other scales are awareness regarding warning signs of vision problems (include twelve items), awareness regarding eye care (include ten items) and awareness regarding preventive measures (include eight items).

3.8.2 Independent Variable

In this study the independent variable was "*training session*" of teachers verbally and through literature distribution regarding eye health of students. This refers to a specific intervention that is being manipulated or controlled to investigate its effect on the dependent variable that is awareness, which is the outcome being measured.

3.9. Data Collection Process

3.9.1. Pilot Testing

Pilot testing was performed before starting the formal data collection procedure by including 10% of the actual sample size. The performa was tested for potential changes, but no major modifications were made after pilot testing. A question on teaching experience was added to the demographic section. Pilot testing showed a reliability coefficient of 0.627 for the awareness questionnaire. In order to improve reliability, changes were made to the questions and coding, resulting in a Cronbach's alpha coefficient of 0.752, indicating increased reliability. The data from pilot testing was not included in the final analysis.

3.9.2. Data Collection

All the teachers of the selected public primary schools of south Punjab were approached. At each step of the research process, a written statement of informed consent, with assurance of confidentiality, was obtained from each teacher and only those teachers were selected who agreed to take part in the research process and fulfilled the inclusion criteria.

Once consent was obtained, the teachers completed a Pre-Intervention questionnaire, assessing their awareness of students' eye health. An education intervention, including a training session and educational materials, was implemented, focusing on the topics covered in the questionnaire. After the intervention, the same questionnaire was administered to evaluate the effectiveness of the session and potential improvement in awareness.

The questionnaire consisted of four sections. "Section A" focused on demographic characteristics, while "Section B" assessed awareness of specific eye problems and conditions using a dichotomous scale. "Section C" measured teachers' awareness of warning signs of vision problems in children using a scoring system. "Section D" evaluated awareness of eye care through 10 items with response options of "yes," "no," and "don't know," resulting in a total score range of 0 to 20.

"Section E" of the questionnaire focused on awareness of preventive measures to reduce the risk of eye diseases in children, consisting of eight items with response categories of "Yes=2," "No=0," and "Don't know=1." The score range for this section was 0 to 16, with a maximum score of 16 if all items were answered "Yes" and a minimum score of either 0 or 8 depending on the response category. The reliability of the questionnaires was assessed using the test-retest method with a one-week interval for ten participants.

3.10. Data Analysis Procedure

Code book was developed and data was entered in Statistical Package for Social Sciences (SPSS) version 26. After careful data entry, data was checked for any error before proceeding to the further analysis. After data cleaning, data transformation was carried out for certain variables. Data analysis was done in two phases; descriptive analysis and inferential analysis (Figure 5).

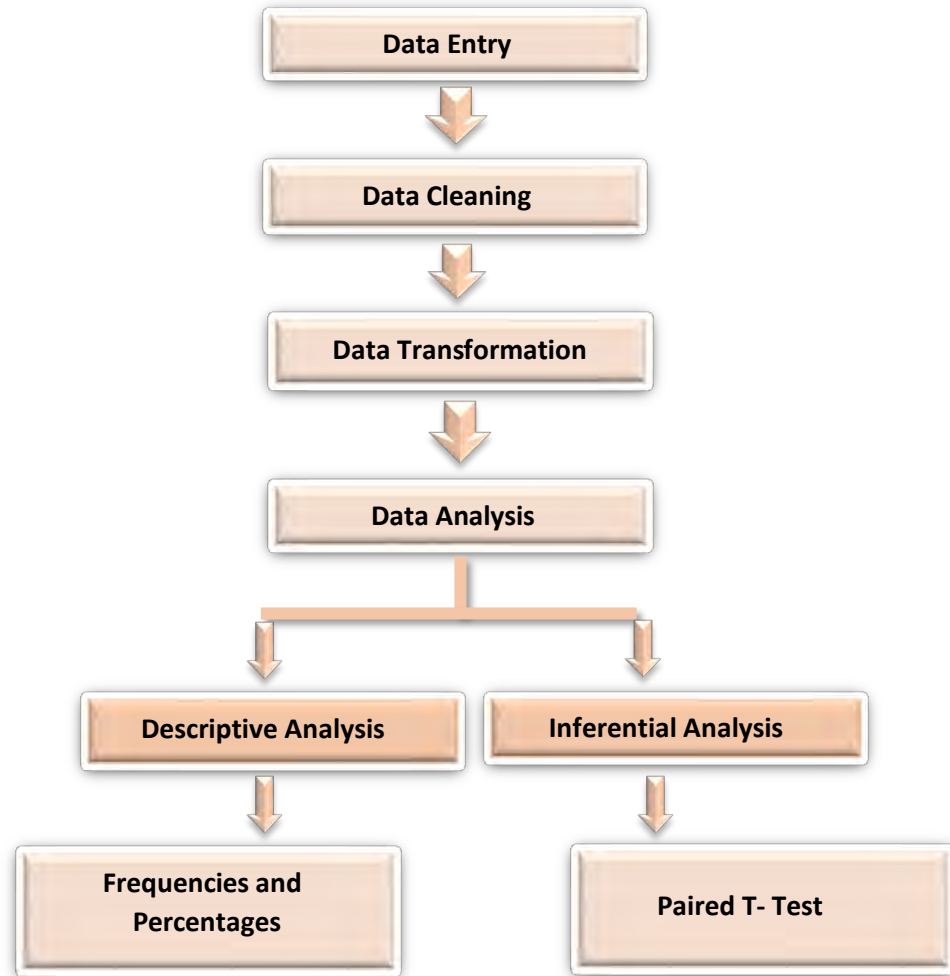


Figure 5: Data Analysis Plan

3.10.1. Data Transformation

Each variable of awareness was transformed into a categorical variable upon entering in SPSS. Reverse coding of three required items in Section E (awareness regarding preventive measure that reduces the risk of eye diseases in children) was done, which involved transforming the response categories of certain variables to align with the scoring system used in study. Total score for each awareness variable was calculated and categorization was done as per the instructions of the original scales.

By computing the variables separately for pre- and post-intervention, which involved calculating the mean scores for each variable in each group, we were able to compare the changes in each variable before and after the intervention. Continuous variables were expressed as mean \pm SD. The Paired t-test was used to determine statistical differences in continuous variables between the two groups.

3.10.2. Descriptive Analysis

All the data was analyzed by using SPSS version 26. The nominal and ordinal variables (like gender, education status, duration of teaching, employment status and questions related to awareness regarding eye health) were presented as frequencies, percentages, bar charts and pie charts.

3.10.3 Inferential Analysis

Reverse coding and data computation was done before to application of test. After computing pre and post variables, the minimum and maximum obtained values for awareness of teachers regarding eye diseases (ED) pre intervention were ranges from 0 to 10 and for post intervention it was 4 to 12. For awareness regarding warning signs (WS) pre intervention obtained values ranges 11-24 and for post intervention it was 15-24. For awareness regarding Eye care (EC) pre intervention obtained values ranges 6-17 and for post intervention it was 13-20 And for awareness regarding preventive measures (PM) pre intervention obtained values ranges 4-15 and for post intervention it was 10-16.

The outcome continuous data containing mean score of pre and post intervention was checked for “*Normality*”. The histograms for all awareness variables, including awareness of eye diseases, warning signs, eye care, and preventive measures, showed a

bell-shaped curve (Annexure 1), it is an indication that the data for each variable is normally distributed.

The statistical tests confirmed normality i.e. Shapiro-Wilk test and the Kolmogorov-Smirnov and suggested that the data for each variable is distributed around the mean in a symmetrical fashion. This means that the mean, median, and mode are all approximately equal, and the distribution can be described by its mean and standard deviation, so, as our data is normally distributed, parametric tests such as the paired t-test can be used to analyze the data, as this test assume normality.

Then the effect of training session on the teacher's awareness regarding eye health of students for pre and post intervention was assessed using paired T test by comparing the means of two related samples, such as pre- and post-intervention measurements in the same group of teachers.

The p-value <0.05 was considered as showing statistically significant results, meaning that there are significant differences observed in the mean scores between the pre- and post-intervention groups.

3.10.4. Validation of questionnaire

Face validity and content validity was assured with the help of Subject specialist (Ophthalmologist), Public Health Professional and Supervisor.

3.10.5. Reliability of Scales:

In order to calculate the reliability of these questionnaires, the method of test-retest was used during a one-week time span for ten patients. The reliability of the questionnaire was assessed using Cronbach's alpha test, and the obtained correlation coefficients exceeded 0.752 (Appendix A). The questionnaire consisted of four sections, with a total

of 42 questions. The first part (Section A) included 10 questions about demographic characteristics. The awareness scale used a 3-point Likert scale, with response categories of "Yes=2", "No=0", and "Don't know=1".

3.10.6. Data Management

Data was entered and recorded into statistical package for social sciences (SPSS) version 21. All the filled questionnaires were placed in a safe place where no irrelevant person could reach and see the personal data of respondents.

3.11. Ethical Considerations

Before starting formal data collection, approval from Institutional Review Board (IRB) of Al-Shifa School of Public Health Rawalpindi, Pakistan has been taken (Annexure-4). Permission letter from the Head of Department of Al-Shifa School of Public Health was obtained regarding access to public primary schools of South Punjab. Permission was taken from the principals of targeted public primary schools for conducting research. Patients were explained the purpose of the research and consent was taken from each participant (Annexure-3). Participants were assured for the confidentiality of their data. Data was entered in SPSS anonymously. After data entry, hard copies of collected were kept at a safe place.

CHAPTER 4: RESULTS

4.1. Socio- Demographic Characteristics of teachers

The chapter offers an analysis of the data collected through the questionnaire. The data gathered from respondents is analyzed using the SPSS.

Age

The study had a total of 92 respondents, each belonging to a different age group. Out of these, 46 respondents (50.0%) were aged between 20-30 years, while 33 respondents (35.9%) were aged between 31-40 years and 13 respondents (14.1%) were aged between 41-50 years. The analysis will focus on these age groups and the results will be presented in a simplified manner.

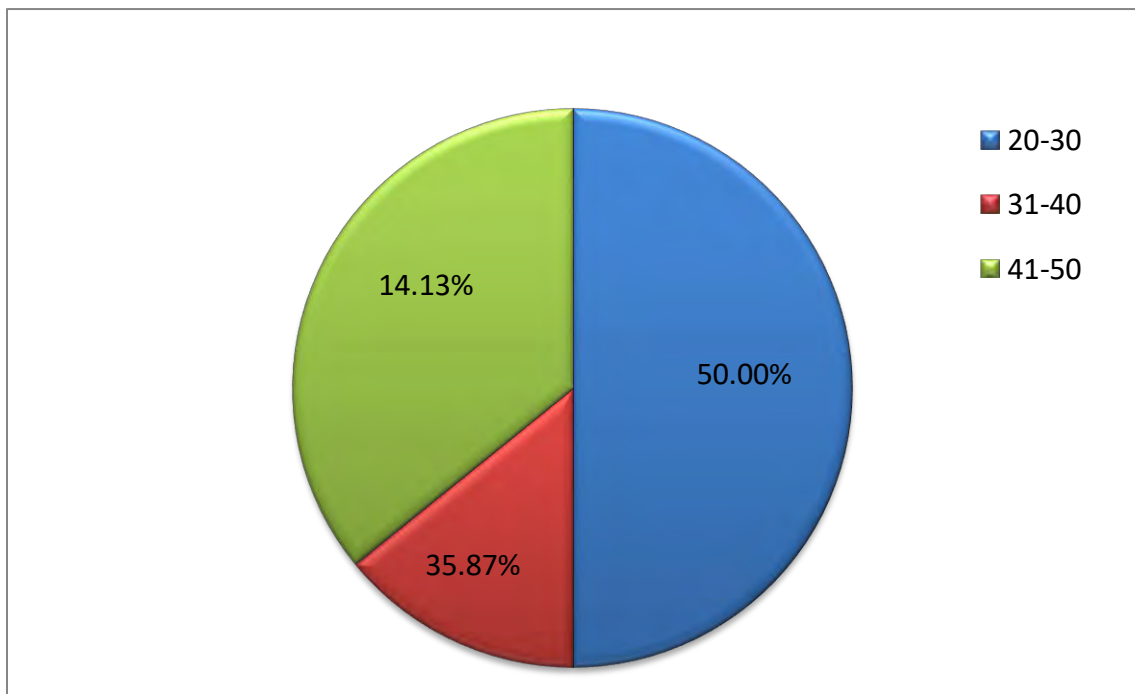


Figure 6: Percentages of Age of Teachers

Gender

92 teachers were included in the study in which the total number of female teachers was 66 (71.7%) and the total number of male teachers was 26 (28.3%). The analysis will be conducted from this sample and results will be simplified on to the whole population.

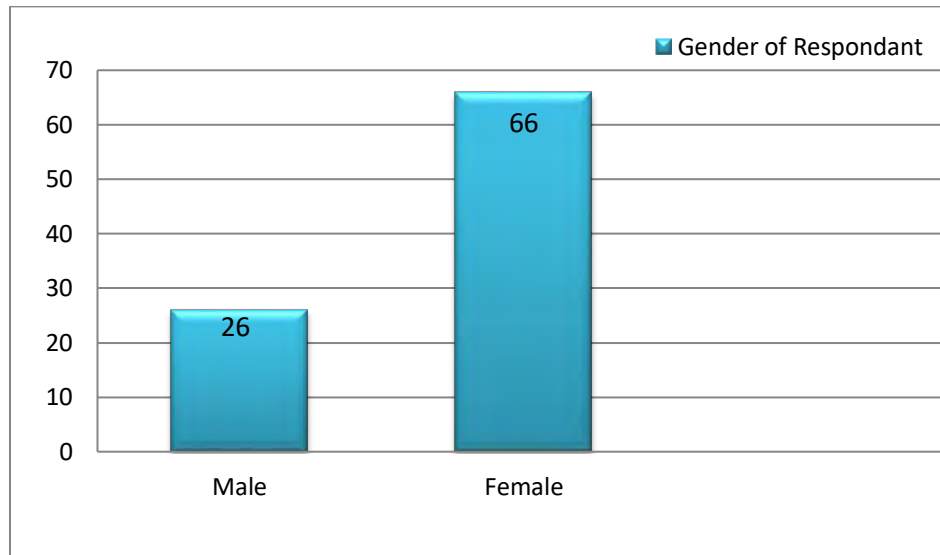


Figure 7: Gender of Teachers

Employment status

With respect to the employment status of the teachers, the table shows that more than 94% of teachers was working as full-time, and only a few 5 (5.4%) was doing part-time job.

TABLE 1: Percentages and frequencies of Employment status of teachers

Employment status	Frequency	Percentage
Full-time	87	94.6
Part-time	05	5.4

Education of Teachers

Out of 92 teachers, the most common education level was Bachelor's degree, with 39 teachers or 42.4% of the sample having this degree. The next most common education level was Master's degree, with 27 (29.3%) teachers. 16 teachers or 17.4% of the sample had an Intermediate level of education. 4 (4.3%) of the sample had a Metric level of education and only 6 teachers or 6.5% of the sample had an education level categorized as Other.

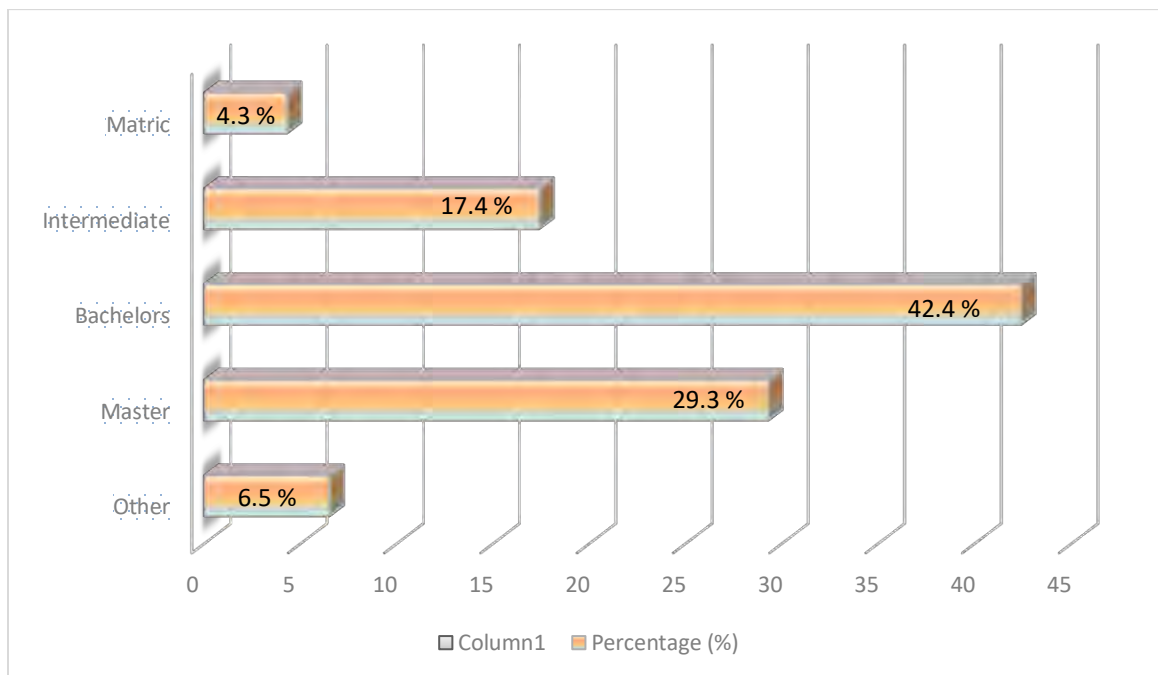


Figure 8: Percentages of Level of education of teachers

Duration of Teaching

The majority of the teachers (32.6%) reported having 1-2 years of teaching experience overall, while the remaining teachers had varying years of experience as shown in table. In terms of teaching experience at the same school, 38.0% of the teachers reported having 1-2 years of experience, which was the highest reported category. The frequency and

percentage of teachers with other levels of experience was less than those with 1-2 years of experience.

Table 2: Percentages and frequencies of Teacher’s duration of teaching

S. No	Variable	Frequency (n)	Percentage (%)
1.	Duration of teaching		
	Less than 1 year	11	12.0
	1-2 years	30	32.6
	2-5 years	15	16.3
	5-10 years	18	19.6
	More than 10 years	18	19.6
2.	Duration of teaching at this school		
	Less than 1 year	21	22.8
	1-2 years	35	38.0
	2-5 years	15	16.3
	5-10 years	15	16.3
	More than 10 years	6	6.5

Children with vision problems

The first set of data shows the responses of teachers to the question "Are there any children in your family who have an eye issue?" Out of the total 92 respondents, 51 indicated that there are children in their family who have an eye issue, 37 indicated that there are no children in their family with an eye issue, and 4 respondents were unsure.

Therefore, the majority of respondents (55.4%) answered yes to the question, while 40.2% answered no, and 4.3% were unsure.

Table 3: Children in your family or teaching experience with vision problems

S. No	Variable		Frequency (n)	Percentage (%)
1.	Are there any children in your family who have an eye issue?	Yes	51	55.4
		No	37	40.2
		Unsure	04	4.3
2.	In your teaching experience have you ever seen children with vision Problems?	Yes	74	80.4
		No	18	19.6

Among teachers with teaching experience, 80.4% reported having seen children with vision problems, while 19.6% indicated they had not encountered such children. A total of 74 respondents acknowledged having observed vision issues among students, while 18 respondents reported not witnessing any vision problems in their teaching experience.

Having any eye disease or using spectacles:

When asked about the presence of any eye disease or the use of spectacles, 36% of the teachers in the sample reported having an eye disease or using spectacles, while 64% of the teachers reported not having any eye disease or not using spectacles.

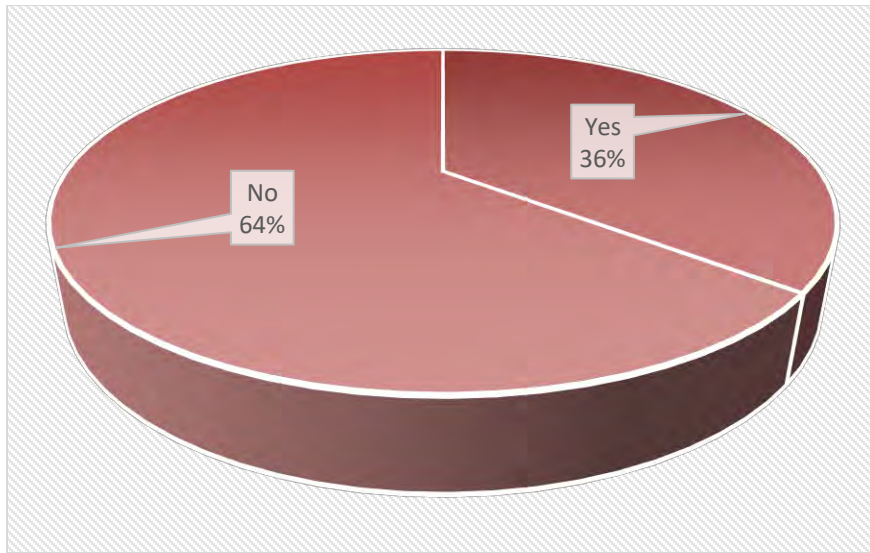


Figure 9: Percentages of teachers having disease or using spectacles

Eye related activity taken place at your school

Among teachers with teaching experience, 80.4% reported having seen children with vision problems, while 19.6% indicated they had not encountered such children. A total of 74 respondents acknowledged having observed vision issues among students, while 18 respondents reported not witnessing any vision problems in their teaching experience.

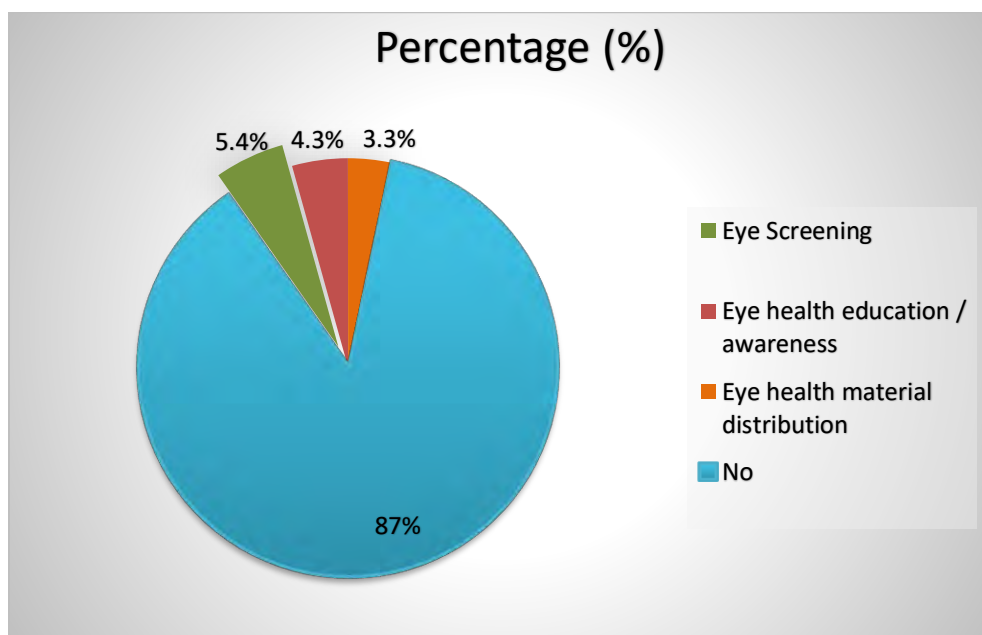


Figure 10: Percentages of eye related activities taken place at your school

4.2. Descriptive Results for Outcome Variable:

4.2.1. Comparison of awareness regarding Eye Diseases pre and post Intervention

The table below summarizes the results of the comparison of awareness regarding various eye diseases pre and post intervention. The results show that the intervention had a significant positive impact on awareness regarding all the eye diseases and conditions listed, as the percentage of participants who answered "Yes" increased substantially for each condition. The largest increases were seen for refractive errors, conjunctivitis (pink eye), and any eye disease that spreads from one person to another, with post-intervention percentages exceeding 90% for each.

TABLE 4: Descriptive summary of Awareness of teachers regarding eye diseases Pre and Post Intervention

Sr. No	AWARENESS ABOUT EYE DISEASES		Pre-Intervention	Post- Intervention
			Frequencies (Percentages)	Frequencies (Percentages)
1	Have you heard about congenital cataract?	Yes	38 (41.3)	86 (93.5)
		No	54 (58.7)	6 (6.5)
2	Have you heard about Glaucoma?	Yes	28 (30.4)	70 (76.1)
		No	64 (69.6)	22 (23.9)
3.	Have you heard about Crossed Eyed/Squint	Yes	48 (52.2)	88 (95.1)
		No	44 (47.8)	4 (4.3)
4.	Have you heard about Refractive errors?	Yes	66 (71.7)	91 (98.9)
		No	26 (28.3)	1 (1.1)

5.	Have you heard about Night Blindness?	Yes	44 (47.8)	83 (90.2)
		No	48 (52.2)	9 (9.8)
6.	Have you heard about conjunctivitis (Pink Eye)?	Yes	31 (33.7)	90 (97.7)
		No	61 (66.3)	2 (2.2)
7	Have you heard about vitamin A Deficiency?	Yes	50 (54.3)	87 (94.6)
		No	42 (45.7)	5 (5.4)
8	Have you heard about Ocular injury? Trauma?	Yes	50 (54.3)	88 (95.7)
		No	42 (45.7)	4 (4.3)
9	Have you heard about Amblyopia (Lazy Eyes)?	Yes	16 (17.4)	71 (77.2)
		No	76 (82.6)	21 (22.8)
10.	Have you heard about Nystagmus?	Yes	9 (9.8)	77 (83.7)
		No	83 (90.2)	15 (16.3)
11.	Have heard about ptosis?	Yes	10 (10.9)	79 (85.9)
		No	82 (89.1)	13 (14.1)
12.	Do you know any eye disease or condition which spreads form one person to another?	Yes	27 (29.3)	87 (94.6)
		No	65 (70.7)	4 (5.4)

4.2.2. Comparison of awareness regarding warning signs of vision problem pre and post Intervention

The table presents the comparison of awareness regarding warning signs of vision problems before and after intervention. Participants' responses are categorized as "Yes," "No," or "Don't know" for each warning sign. The results indicate a significant increase in awareness after the intervention. Prior to the intervention, few participants recognized the warning signs, such as holding a book too close to the eyes. However, after the intervention, a substantial percentage of participants identified these signs, demonstrating improved awareness. Similar increases were observed for other warning signs, such as sensitivity to light and poor academic performance. Overall, the intervention successfully enhanced teachers' awareness of vision problem warning signs.

TABLE 5: Descriptive summary of Awareness of teaching regarding warning signs

S. No	AWARENESS ABOUT WARNING SIGNS		Pre-Intervention	Post- Intervention
			Frequencies (Percentages)	Frequencies (Percentages)
1	Do you think this warning sign of vision problem if child holds a book too close to his/her eyes?	Yes	83 (90.2)	89 (96.7)
		No	3 (3.3)	3 (3.3)
		Don't know	6 (6.5)	0 (00.0)
2	Do you think is this warning sign of vision problem if child squeezes his/her eyes while looking at the black board?	Yes	79 (85.9)	92 (100.0)
		No	9 (9.8)	0 (00.0)
		Don't know	4 (4.3)	0 (00.0)

3	Do you think is this warning	Yes	63 (68.5)	80 (87.0)
	sign of vision problem if child	No	17 (18.5)	4 (4.3)
	frequently rubs his/her eyes?	Don't know	12 (13.0)	8 (8.7)
4	Do you think is this warning	Yes	53 (57.6)	80 (87.0)
	sign of vision problem if	No	12 (13.0)	4 (4.3)
	Child tilts his/her head to see better?	Don't know	27 (29.3)	8 (8.7)
5	Do you think is this warning	Yes	65 (70.7)	82 (89.1)
	sign of vision problem if	No	16 (17.4)	5 (5.4)
	child closes one eye to read or see better?	Don't know	11 (12.0)	5 (5.4)
6	Do you think is this warning	Yes	62 (67.4)	86 (93.5)
	sign of vision problem if	No	10 (10.9)	1 (1.1)
	Child has sensitivity to light?	Don't know	20 (21.7)	5 (5.4)
7	Do you think is this warning	Yes	47 (51.1)	85 (92.4)
	sign of vision problem if	No	16 (17.4)	5 (5.4)
	Excessive tearing in child's eye?	Don't know	29 (31.5)	2 (2.2)
8	Do you think is this warning	Yes	51 (55.4)	83 (90.2)
	sign of vision problem if	No	21 (22.8)	6 (6.5)
	Child avoids activities which require near vision, such as	Don't know	20 (21.7)	3 (3.3)

	reading of homework?			
9	Do you think is this warning sign of vision problem if Child avoids activities which require distance vision, such as participating in sports or other recreational activities?	Yes No Don't know	38 (41.3) 38 (41.3) 16 (17.4)	70 (76.1) 13 (14.1) 9 (9.8)
10	Do you think is this warning sign of vision problem if child is complaining of headache of tired eyes?	Yes No Don't know	64 (69.9) 15 (16.3) 13 (14.1)	81 (88.0) 3 (3.3) 8 (8.7)
11	Do you think is this warning sign of vision problem if Child avoids using a computer because it hurts his/her eyes?	Yes No Don't know	52 (56.5) 29 (31.5) 11 (12.0)	75 (81.5) 7 (7.6) 10 (10.9)
12	Do you think is this warning sign of vision problem if Poor academic performance than usual?	Yes No Don't know	42 (45.7) 30 (32.6) 20 (21.7)	73 (79.9) 10 (10.9) 9 (9.8)

4.2.3. Comparison of awareness regarding eye care pre and post Intervention

Overall, the findings suggest that the eye care intervention had a positive impact on the awareness and knowledge of school teachers regarding eye health of students. Teacher awareness of preventable blindness increased from 53.3% to 91.3% after the intervention. Knowledge about the influence of a healthy diet on eye health improved from 68.5% to 95.7% post-intervention.

Teacher awareness of hygiene for eye health increased from 73.9% to 93.5%, and knowledge about the importance of classroom lighting for visual performance improved from 81.5% to 97.8% post-intervention.

The intervention improved teachers' awareness of preventive measures for protecting school children's eyes, with an increase from 63.0% to 97.8% post-intervention. Knowledge about appropriate reading and writing distance also improved, rising from 8.7% to 55.2% post-intervention. Additionally, more teachers were willing to grant leave to students with eye problems, increasing from 59.9% to 80.4% post-intervention. The intervention raised students' awareness of the need for eye screening before school admission. (59.8% to 82.6%) and increased their willingness to grant leave to peers with eye problems (59.9% to 80.4%).

TABLE 6: Descriptive summary of Awareness of teachers regarding Eye Care

Sr.#	AWARENESS ABOUT EYE CARE		Pre-	Post- Intervention
			Intervention	Frequencies
			Frequencies (Percentages)	Frequencies (Percentages)
1	Can some types of blindness be prevented?	Yes	49 (53.3)	84 (91.3)
		No	9 (9.8)	0 (00.0)
		Don't know	34 (37.0)	8 (8.7)
2	What do you think a child with severe visual impairment (that cannot be treated with glasses) should go to school?	Yes	45 (48.9)	73 (79.3)
		No	28 (30.4)	17 (18.5)
		Don't know	19 (20.7)	2 (2.2)
3	If child come to you with red eye, watering form eye, thing or pain in eyes, will you give him/her leave form school?	Yes	55(59.9)	74 (80.4)
		No	25(27.2)	18 (19.6)
		Don't know	12(13.0)	0 (00.0)
4	Does healthy diet affects eye health?	Yes	63 (68.5)	88 (95.7)
		No	20 (21.7)	0 (00.0)
		Don't know	9 (9.8)	4 (4.3)
5	Do you know what is the appropriate working distance for writing or reading form the note book?	Yes	8 (8.7)	60 (5.2)
		No	56 (60.9)	55 (16.3)
		Don't know	28 (30.4)	70 (18.5)

6	Is hygiene including hand washing essential for eye health?	Yes	68 (73.9)	86 (93.5)
		No	13 (14.1)	0 (00.0)
		Don't know	11 (12.0)	06 (6.5)
7	Is taking any special preventive measures protect the eyes of school children?	Yes	58 (63.0)	90 (97.8)
		No	15 (16.3)	1 (1.1)
		Don't know	19 (20.7)	1 (1.1)
8	Is eye screening one of the requirements before children can be admitted?	Yes	55 (59.8)	76 (82.6)
		No	10 (10.9)	3 (3.3)
		Don't know	27 (29.3)	13(14.1)
9	Are you aware that lighting in the class room play an important part in visual performance of children?	Yes	75 (81.5)	90 (97.8)
		No	8 (8.7)	1(1.1)
		Don't know	9 (9.8)	1(1.1)
10	Are you aware of all problems related to eye health?	Yes	32 (34.8)	69 (75.0)
		No	48 (52.2)	20 (21.7)
		Don't know	12 (13.0)	1. (3.3)

4.2.2. Comparison of awareness regarding Preventive Measures pre and post Intervention:

Based on the results, it can be seen that the intervention significantly improved participants' awareness of preventive measures. After the intervention, 100.0% of teachers recognized the importance of wearing sunglasses outdoors, compared to 88.0% before. Additionally, 98.9% of teachers acknowledged the significance of regular eye examinations, up from 77.2% pre-intervention. The intervention improved awareness

among teachers, but some showed decreased awareness afterward. For example, the percentage of teachers aware that rubbing their eyes is not recommended decreased from 58.7% to 84.8%. Misconceptions persisted, with some teachers still believing eye rubbing can be beneficial despite being informed otherwise.

TABLE 7: Descriptive summary of Awareness of teachers regarding Preventive Measures

Sr.#	AWARENESS PREVENTIVE MEASURES		Pre-Intervention	Post- Intervention
			Frequencies (Percentages)	Frequencies (Percentages)
1	Put on your sunglasses whenever you go outdoors	Yes	81 (88.0)	92 (100.0)
		No	9 (9.8)	0 (00.0)
		Don't know	2 (2.2)	0 (00.0)
2	Get your regular eyes examination by your eye health professional	Yes	71 (77.2)	91 (98.9)
		No	11 (12.0)	0 (00.0)
		Don't know	10 (10.9)	1 (1.1)
3	Too much screen time can make it easy to fall asleep	Yes	35 (38.0)	22 (23.9)
		No	34 (37.0)	69 (75.0)
		Don't know	23 (25.0)	1 (1.1)
4	Eat eye-healthy foods (should include plenty of fruits and green leafy vegetables)	Yes	75 (81.5)	92 (100.0)
		No	4 (4.3)	0 (00.0)
		Don't know	13 (14.1)	0 (00.0)

5	Rubbing your eyes is good when you feel some irritation in them	Yes	26 (28.3)	11 (12.0)
		No	54 (58.7)	78 (84.8)
		Don't know	12 (13.0)	3 (3.3)
6	Washing your eyes with rose water helps with keeping them healthy and fresh	Yes	68 (73.9)	14 (15.2)
		No	6 (6.5)	75 (81.5)
		Don't know	18 (19.6)	3 (3.3)
7	Vitamins A,C, and E, are essential for maintaining eye health	Yes	66 (71.7)	91 (98.9)
		No	5 (5.4)	0 (00.0)
		Don't know	21 (22.8)	1 (1.1)
8	Staring at your smartphone for prolonged hours can lead to various issues such as tired, itchy, and dry eyes	Yes	67 (72.8)	72 (78.3)
		No	13 (14.1)	11 (12.0)
		Don't know	12 (13.0)	9 (9.8)

4.3. Inferential statistics

4.3.1. Awareness regarding Eye Diseases (ED):

A paired t-test was conducted to compare the mean scores of awareness regarding eye diseases before and after the intervention. The range of score for awareness regarding eye diseases is 0-12. The results showed a significant difference between the two means ($t = -27.323$, $df = 91$, $p < .05$). The mean score before the intervention was 4.55 (SD = 2.2) and after the intervention was 10.83 (SD = 1.5). Hence results prove the intervention had a positive impact on teachers' awareness regarding eye diseases. Specifically, the post-

intervention mean score was significantly higher than the pre-intervention mean score, indicating that the intervention was successful in increasing teachers' awareness of eye diseases.

Table 8: Awareness regarding Eye Diseases

Variable		Mean	Std. Deviation	T	df	Sig. (2-tailed)
Awareness regarding Eye Diseases (ED)	Pre_ED	4.5543	2.28403	-27.323	91	.000
	Post_ED	10.8370	1.52111			

4.3.2. Awareness regarding Warning Signs (WS):

A paired t-test was conducted to compare the mean scores of awareness regarding warning signs before and after the intervention. The range of score for awareness regarding warning signs is 0-24. The results showed a significant difference between the two means ($t = -11.8$, $df = 91$, $p < .05$). The mean score before the intervention was 17.25 (SD = 3.4) and after the intervention was 21.94 (SD = 2.2).

TABLE 9: Awareness regarding Warning Signs

Variable	Mean	Std.		T	Df	Sig. (2-tailed)
		Mean	Deviation			
Awareness regarding Warning Signs (WS)	Pre_WS	17.25	3.43	-11.87	91	.000
	Post_WS	21.94	2.24			

Hence results prove the intervention had a positive impact on teachers' awareness regarding warning signs. Specifically, the post-intervention mean score was significantly higher than the pre-intervention mean score, indicating that the intervention was successful in increasing teachers' awareness of warning signs.

4.3.3. Awareness regarding Eye Care (EC):

A paired t-test was conducted to compare the mean scores of awareness regarding eye care before and after the intervention. The scores for awareness regarding eye care ranged from 0 to 20. The results showed a significant difference between the two means ($t = -15.4$, $df = 91$, $p < .05$). The mean score before the intervention was 13 (SD = 2.6) and after the intervention was 17.77 (SD = 1.7). Hence results prove the intervention had a positive impact on teachers' awareness regarding eye care. Specifically, the post-intervention mean score was significantly higher than the pre-intervention mean score, indicating that the intervention was successful in increasing teachers' awareness of eye care.

TABLE 10: Awareness regarding Eye Care

Variable		Mean	Std. Deviation	T	Df	Sig. (2-tailed)
Awareness regarding Eye Care (EC)	Pre_EC	13.00	2.60	-15.43	91	.000
	Post_EC	17.77	1.73			

4.3.4. Awareness regarding Preventive Measures (PM)

A paired t-test was conducted to compare the mean scores of awareness regarding preventive measures before and after the intervention. The scores for awareness regarding preventive measures ranged from 0 to 16. The results showed a significant difference between the two means ($t = -11.5$, $df = 91$, $p < .05$). The mean score before the intervention was 11.07(SD = 2.1) and after the intervention was 14.54 (SD = 1.6).

TABLE 11: Awareness regarding Preventive Measures

Variable		Mean	Std. Deviation	T	Df	Sig. (2-tailed)
Awareness regarding Preventive Measures (PM)	Pre_PM	13.00	2.60	-15.43	91	.000
	Post_PM	17.77	1.73			

CHAPTER 5: DISCUSSION

For the current study, data of 92 public primary school teachers who were willing to participate in interventional study were collected, each belonging to a different age group. The majority of respondents were between the ages of 20-30 years (50.0%), followed by 31-40 years (35.9%) and 41-50 years (14.1%). Female teachers accounted for 71.7% of the sample, while male teachers constituted 28.3%. Most teachers (94%) worked full-time, with only 5.4% engaged in part-time employment. A significant proportion (42.4%) held a Bachelor's degree as their highest education level. Regarding eye health, 36% of teachers reported having an eye disease or using spectacles, while 64% did not have any eye disease or use spectacles.

A study aimed to evaluate the effect of education sessions on Indian school teacher awareness of childhood eye health issues, responsibility for children's eye health, and successful participation in a teacher-led eye screening health intervention program in primary schools in India. A total of 104 government-employed primary school teachers in Hyderabad, India, received three one-hour training sessions on children's eye health and screening practices. Pre- and post-intervention surveys and questionnaires were utilized to measure knowledge and attitude changes. The study found that the teachers demonstrated significant improvements in overall knowledge of eye parts and functions, common childhood diseases, and local myths, as well as significant increases in felt responsibility (45.5% to 77.8%, $p < 0.01$) for children's eye health through the course of the program. In the study the teachers demonstrated significant improvements in overall knowledge of eye parts and functions, common childhood diseases, and local myths, as well as significant increases in felt responsibility for children's eye health through the

course of the program. (Thummalapalli et al., 2013) Similarly, current study found significant improvements in awareness of teachers regarding eye diseases and conditions (-6.28 ± 2.20) and warning signs (-4.69 ± 3.79). Overall, this study highlights the importance of education and awareness-raising efforts aimed at improving eye health in children. By targeting school teachers, who are in a position to positively influence children's attitudes and behaviours towards eye health, such programs have the potential to make a significant impact on the eye health of children in India and elsewhere.

A Nigerian KAP study of elementary school teachers reported that 98.8% of teachers rated good eyesight as important or very important, identified good nutrition (84.9%) and adequate lighting (74.4%) as requirements for optimal eye health. (Mahmoud et al., 2007), and this study found out that the awareness regarding eye care pre and post Intervention is (-4.77 ± 2.96) which includes questions of nutrition for good eye health and lighting and awareness regarding preventive measures pre and post Intervention (-3.46 ± 2.87).

A hospital based cross-sectional descriptive study was conducted among 186 parents and guardians of children with epilepsy attending pediatrics neurology clinic in Southern Ethiopia found that while 60% had heard of childhood eye diseases, 36% did not know of the proper solutions (Dessalegen et al., 2021). In this study, a significant improvement in the awareness of teachers regarding eye diseases and conditions was (-6.28 ± 2.20). Observed post-intervention compared to pre-intervention, it study focused on teachers and their awareness regarding eye diseases and preventive measures, while the Ethiopia study focused on parents and guardians of children with epilepsy attending pediatrics neurology clinic in Southern Ethiopia.

Strengths:

It is the first study of its kind in Pakistan as it has the potential to generate new knowledge and insights into the issue of eye health in remote areas of Punjab. By providing evidence on the effectiveness of training sessions on teachers' awareness of eye health, the study can inform policy and practice in addressing this important public health issue in Pakistan. Therefore, the strength of the study lies in its novelty and potential impact on improving eye health in remote areas of Punjab. Study's strength also lies in its focus on remote areas, which adds to its overall contribution to the field of eye health in Pakistan.

Limitations:

Despite our sincere efforts few limitations needed to be mentioned. Intern teachers and online teachers were excluded from participation. This exclusion may have limited the diversity of perspectives and experiences included in the study. Another limitation is that private schools were not included in the study. This exclusion may have limited the representativeness of the sample, as private schools may have different levels of awareness and resources for addressing student eye health compared to public schools.

It is important to acknowledge these limitations and take them into account when interpreting the study's findings. Further research may be needed to explore the perspectives and experiences of intern teachers, online teachers, and private schools in addressing student eye health.

Conclusion:

Based on the results of this study, training sessions have a significant effect on increasing the awareness of teachers regarding the eye health of students in remote areas.

of Punjab. This study suggests that providing training to teachers can be an effective strategy to improve the eye health of students in remote areas.

Recommendations:

This highlights the need for more eye-related activities at private schools as well schools to promote eye health and prevent potential vision problems among students. Further research is recommended to explore the long-term effects of such training sessions and to identify other factors that may contribute to improving eye health in remote areas. Apart from technical training, educational sessions may play an important role in promoting sustained teacher interest in school-based health intervention programmes and overall impact on community health.

Way Forward:

This research has significant implications for policy and practice, as it could help in designing effective strategies for improving eye health outcomes among school-going children in remote areas of Punjab.

School administered interventions should teach the children the importance of proper hand washing, good nutrition, and other preventive measures for their eye care.

Nongovernmental organizations and the government should increase and improve strategic interventions to enhance childhood eye health in Pakistan.

The Ministry of Health, Ministry of Education and eye care professionals should work in collaboration to organize school screening programs and ensure better provision of eye care for all children.

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ANNEXURE 1

Data Collection Tool

Questionnaire

**EFFECT OF TRAINING SESSIONS ON TEACHER’S AWARENESS
REGARDING EYE HEALTH OF STUDENTS IN REMOTE AREAS
OF PUNJAB: A QUASI EXPERIMENTAL STUDY**

I am a student of MS Public Health at Al-Shifa Trust Eye Hospital Rawalpindi. I am conducting this study as part of my curriculum requirement. I need to ask you some general questions related to this topic, which are given below. I assure you that all your information will be kept confidential and will be used for academic purpose only. You are free to respond or skip any question that you don't want to answer. This interview will take 15 to 20 minutes. I request your cooperation to complete my research requirements. Thanks!

Date: _____

ID no. _____

❖ **Please read all questions carefully and tick (✓) the most appropriate answer**

(Section A) Socio-Demographic

1. Name (Optional): _____
2. Age: _____
3. Gender:
 1. Male
 2. Female
4. School Name: _____
5. What is your employment status as a teacher?
 1. Full-time
 2. Part-time
6. What is your education?
 1. Metric
 2. Intermediate
 3. Bachelors
 4. Masters
 5. Other (Please specify) _____

7. How long you have been teaching? _____
8. How long have you been teaching at this school? _____
9. Do you have any eye disease or using spectacles? 1. Yes 2. No
10. Are there any children in your family who have an eye issue?
1. Yes 2. No 3. Unsure
11. In your teaching experience have you ever seen children or child with vision problems?
1. Yes 2. No
12. Has any of the following ever taken place at your school? Please tick all applicable answers
1. Eye screening
 2. Eye health education/ awareness
 3. Eye health material distribution
 4. No

(Section B) Awareness about eye care

13. Have you heard about these eye diseases or conditions? کیا آپ نے ان بیماریوں کی انبی ماہی وی ا
ح. تک بارے میں سنا ہے؟

	Eye Diseases	Yes	No
14.	Congenital Cataract بہی طاشی سفید ہوئی		
14.	Glaucoma ک. ا. ہوئی		
15.	Crossed Eyes/ Squint بہنگاپن		
16.	Refractive Errors نظر کی کمزوری		
17.	Night Blindness رات کا اندھاپن		
18.	Conjunctivitis(Pink Eye) آشوب چشم		

19.	Vitamin A Deficiency	وٹامن اے کی کمی ہی		
20.	Ocular Injury/ Trauma چوٹ لگنا	آنکھ میں		
21.	Amblyopia (Lazy Eye)	سست آنکھ		
22.	Nystagmus	چلنے کی بار بار جھکتا کے آنکھوں		
23.	Ptosis	کے پپیٹے کا جھکا آنکھ		
24.	Do you know any eye disease or condition which spreads from one person to another? کیا آپ آنکھوں کی کوئی بیماری یا حالت جانتے ہیں جو شخص سے دوسرے میں پھیلتی ہے؟			

(Section C) Awareness about Warning signs

25. Do you think are these the warning signs of vision problems in child?

کیا آپ کے خیال میں یہ سبچے ہیں جن کی علامتیں ہیں؟

		Yes	No	Don't Know
26.	Child holds a book too close to his/her eyes? بچہ کتاب اپنی آنکھوں کے بہت قریب رکھتا ہے۔			
26.	Child squeezes his/her eyes while looking at the black board? بچہ جبلی کبورنگ کو دیکھتا ہے تو اپنی آنکھوں سے سکھتا ہے۔			
27.	Child frequently rubs his/her eyes? بچہ اکثر اپنی آنکھوں کو رکتا ہے۔			
28.	Child tilts his/her head to see better? بچہ جب دیکھتا ہے تو سر تھکاتا ہے۔			
29.	Child closes one eye to read or see better? بچہ جب دیکھتا ہے تو ایک آنکھ بند کر لیتا ہے۔			

30.	Child has sensitivity to light? بچے کو آنکھ میں روشنی کا زیادہ پھینا			
31.	Excessive tearing in child's eye بچے کی آنکھ میں ضرورت سے زیادہ آنسو انا			
32.	Child avoids activities which require near vision, such as reading or homework? بچہ ٹیس یس رگر ہوں سے مگی زکرتا ہے جنکے لمیے قریب کی بھارت کی ضرورت ہوتی ہے، جیسے میٹر ٹی ای ا ہوم ورک			
33.	Child avoids activities which require distance vision, such as participating in sports or other recreational activities? بچہ ٹیس یس رگر ہوں سے مگی زکرتا ہے جنکے لمیے دو رن نظر کی ضرورت ہوتی ہے، جیسے ایک کھیل وریا ٹیگر بھارتی جی س رگر ہوں میں حصہ لینا ہوتا ہے۔			
34.	Child is complaining of headache or tired eyes? بچے کو سر درد یا آنکھوں میں تھکاوٹ کی شکایت ہے۔			
35.	Child avoids using a computer because it hurts his/ her eyes? بچہ کمپیوٹر ملتے م لکن سے مگی زکرتا ہے کیونکہ اس سے اس کی آنکھوں کو تکلیف ہوتی ہے۔			
36.	Poor academic performance than usual? تھی می کا اکرنگی معمول سے زیادہ خراب ہے۔			

(Section D) Awareness about Eye Care

		Yes	No	Don't Know
37.	Can some types of blindness be prevented? کی لکچھوں میں سے ان دھبوں کو روکا جاسکتا ہے			
38.	What do you think a child with severe visual impairment (that cannot be treated with glasses) should go to school? آپکے خیال میں بچے کی نظر میں زیادہ کمزوری (جس کا عین کس سے علاج نہیں ہو سکتا) کو لڑکھول چلا جائے			
39.	If a child comes to you with red eye, watering from eye, itching or pain in eyes, will you give him/her leave from school? اگر کوئی بچہ سرخ آنکھ، آنکھ سے پانی، خارش یا آنکھوں میں درد کے ساتھ آپکے پاس آئے تو کیا آپ لڑکھول سے چھٹی دیں گے			

40.	Does healthy diet affects eye health? کیا اصحت خوراک راکھوں کی صحت کو متاثر کرتی ہے			
41.	Do you know what is the appropriate working distance for writing or reading from the note book? کیا آپ جانتے ہیں کہ مناسب کس سے لکھنے یا پڑھنے کے لیے ایک امکا فاصلہ ہونا چاہیے			
42.	Is hygiene including hand washing essential for eye health? کیا راکھوں کی صحت تک رہنے کے ساتھ دھونے سے صحت؟ نظاں صحت ضروری ہے			
43.	Is taking any special preventive measures protect the eyes of school children? بلرکولر کیبچور کی راکھوں کی حفاظت کے لیے کیا کوئی خاص احتیاطی تدبیر اختیار کر رہی ہے			
44.	Is eye screening one of the requirements before children can be admitted? بچور کو اسکول میں داخل کرنے سے پہلے راکھوں کا چیک اپ ضروری ہے؟			
45.	Are you aware that lighting in the class room play an important part in visual? کیا آپ جانتے ہیں کہ کلاس روم میں روشنی کا منبج بچور کی راکھوں کی کارکردگی میں لمکردار ادکتی ہے			
46.	Are you aware of all problems related to eye health? کیا آپ راکھوں کی صحت سے متعلق تمام مسائل سے واقف ہیں			

(Section E) Awareness about Preventive measures

44. What preventive measures you think that reduces the risk of eye diseases in children?

آپ کے خیال میں کونسی حفاظتی تدبیر بچور میں راکھوں کی بیماریوں کے خطرے کو کم کرتی ہے؟

		Yes	No	Don't Know
48.	Put on your sunglasses whenever you go outdoors جب بھی آپ باہر دھوپ میں جلیں تو دھوپ کا شیشہ لگائیں۔			

45.	Get your regular eye examination by your eye health professional بہن ے لکھوں کے صحت فہد رکھیں مکمل عبق اعگی سے بہن ے لکھوں کا معلن کر وٹھیں۔			
46.	Too much screen time can make it easy to fall asleep کی بہت زیادہ لڑکی نٹھیں میں نالیں ان میں اسکتا ہے۔			
47.	Eat eye-healthy foods (should include plenty of fruits and green leafy vegetables) لکھوں کے لہی صحت فہد رکھیں کے لہی زیادہ سے ار عیہل اور سب زیتوں ولای سب نیوں کا ملت عمال کرے			
48.	Rubbing your eyes is good when you feel some irritation in them. جب آپ لکھوں ہرک چھ لجن میں وس کریت و بہن ے لکھوں کو رگڑنا اچھا ہے۔			
49.	Washing your eyes with rose water helps with keeping them healthy and fresh. بہن ے لکھوں کو گلاب کے ارق ول لہی سے دھون سے لہی صحت فہد اور تازہ رکھیں لہی مدد لہتی ہے۔			
50.	Vitamins A, C, and E are essential for maintaining eye health وٹامن اے، سی اور ای لکھوں کی صحت کو بہ قرار رکھیں کے لہی ضروری ہیں			
51.	Staring at your smartphone for prolonged hours can lead to various issues such as tired, itchy, and dry eyes بہن ے سے مارٹفون کو زیادہ یرت کگھورن سے عتھک اوٹ، خارش اور خنک لکھوں میں لہی ہرطالپی داوسکتا ہے۔			

“Thank you so much for sparing your valuable time”

ANNEXURE 2

Informed Consent Form

I am Najma Shaheen, student of MSPH- Final Semester, Alshifa School of Public Health, Alshifa Eye Hospital, Rawalpindi. I am doing research on **Effect of Training Sessions on Teacher's Awareness Regarding Eye Health of Students in Remote areas of Punjab: A Quasi Experimental study**

Purpose:

Eye health education is lacking in low- and middle-income countries including Pakistan due to limited availability of eye care personnel in the school setting. In Pakistan, little is known about teachers' perspectives about eye health and its importance for students' learning. There is a significant gap among public school teachers' awareness related to students' eye health. So, Innovative strategies are needed to improve how teachers address students' eye health issues in the school.

Therefore, the current study will be conducted to improve strategies to train teachers regarding primary eye care and enable the early identification of their students with visual deficits in remote areas of Punjab.

Participation:

Data will be collected using a questionnaire that will collect demographic information along with items related to the awareness and knowledge about the Eye health. I request you to answer the questions as honestly as possible. It will take no longer than 15 minutes to complete a questionnaire. All information collected will be used only for research purpose and will be kept highly confidential. Your identity and your responses will not be identifiable; all data will be stored anonymously. As this is solely a student project no

incentive will be provided. Once study is completed, I would be happy to share the results with you if you desire.

Thank you for agreeing to participate in this study. Your feedback is important.

Contact information:

If you have questions about the study, please contact the following individual:

Najma Shaheen

Najmashaheen5506518@gmail.com

Consent

I have read and I understand the provided information and have had the opportunity to ask questions. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving a reason and without cost. I understand that I will be given a copy of this consent form. I voluntarily agree to take part in this study.

Name of Participant _____

Signature of Participant _____ **Date** _____ (DD/MM/YY)

ANNEXURE 3

IRB Letter



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

MSPH-IRB/14-09
27th Sep, 2022

TO WHOM IT MAY CONCERN

This is to certify that **Najma Shaheen** D/O **Ghulam Rabbani** 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 “**Effect of Training Sessions on Teacher’s Awareness regarding Eye Health of Students in Remote Areas of Punjab: A Quasi Experimental Study**”.

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

ANNEXURE 4

Gantt Chart

Tasks	Aug 2022- Jan 2023																											
	Aug				Sep				Oct				Nov				Dec				Jan							
	Week																											
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4				
Approval, Permission and Participant Selection	█	█	█	█																								
Questionnaire development					█	█	█																					
Pilot testing									█	█	█																	
Data Collection									█	█	█	█	█	█														
Data analysis																			█	█	█	█						
Thesis write up																			█	█	█	█	█	█				
Presentation and approvals																							█	█	█	█		

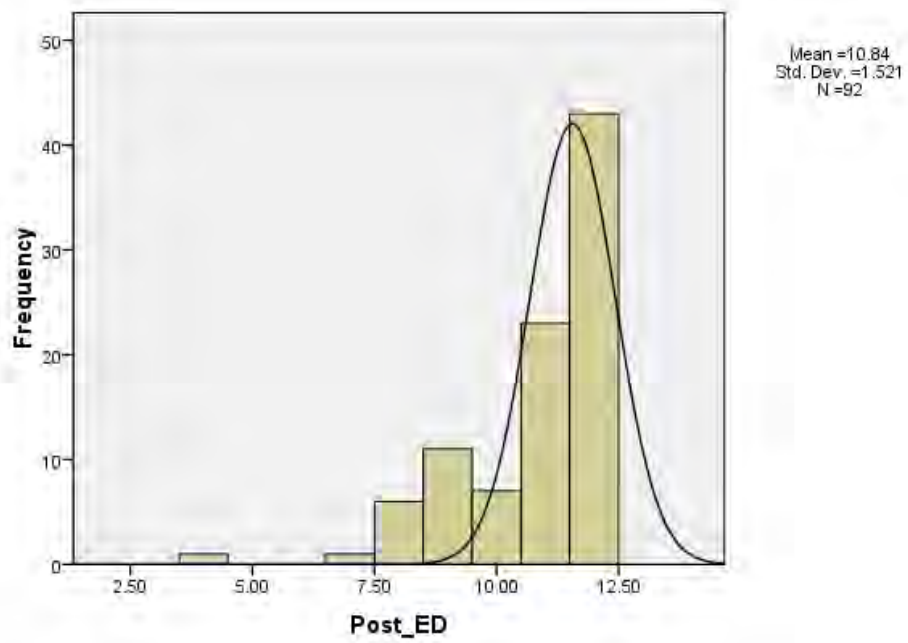
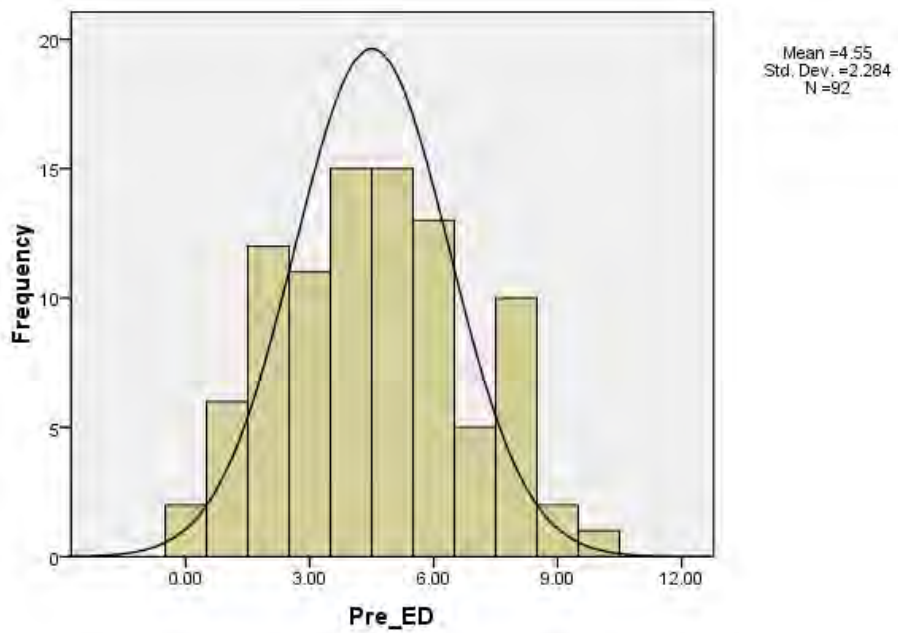
ANNEXURE 5

Budget

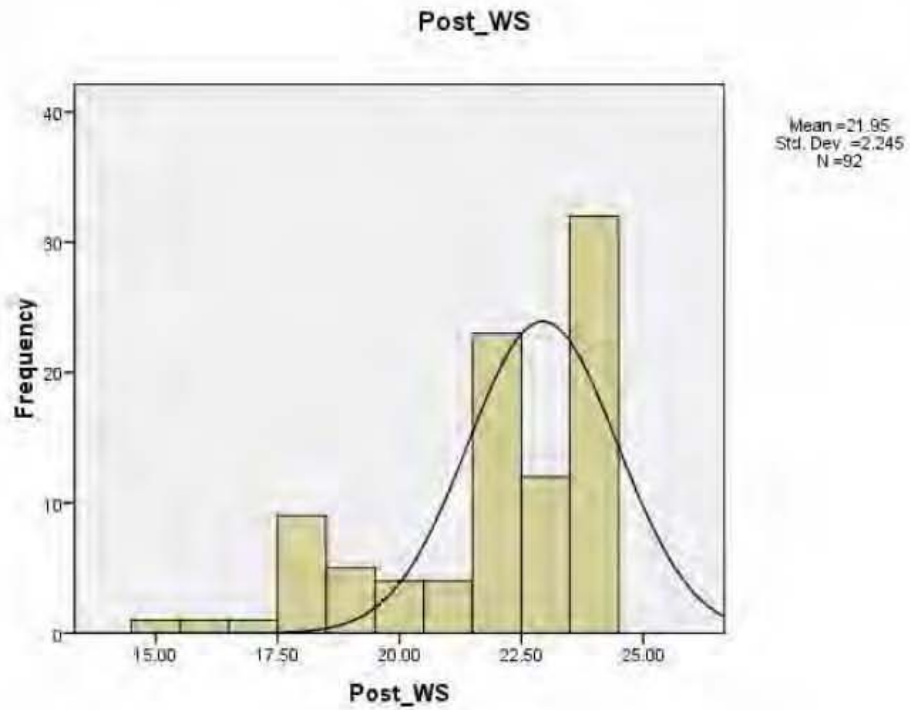
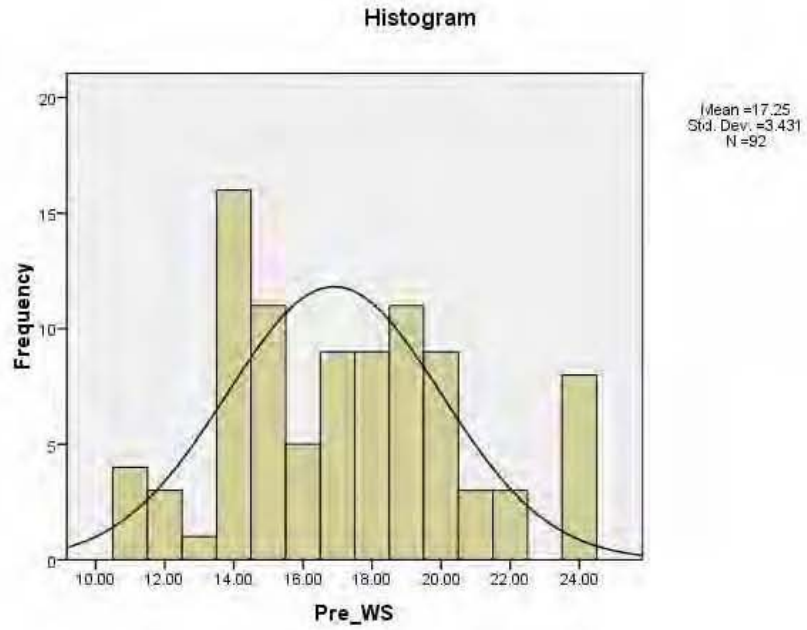
	Transport	Printing	Stationary and internet	Publishing
Survey tool	-	15,000 Rs/-	-	-
Data collection	10,000 Rs/-	-	5,000 Rs/-	-
Data analysis	-	5,000 Rs/-	-	-
Write up	-	5,000 Rs/-	5,000 Rs/-	8,000 Rs/-
Total	10,000 Rs/-	25,000 Rs/-	10,000 Rs/-	8,000 Rs/-
Grand Total	53,000 Rs/-			

Appendix 1

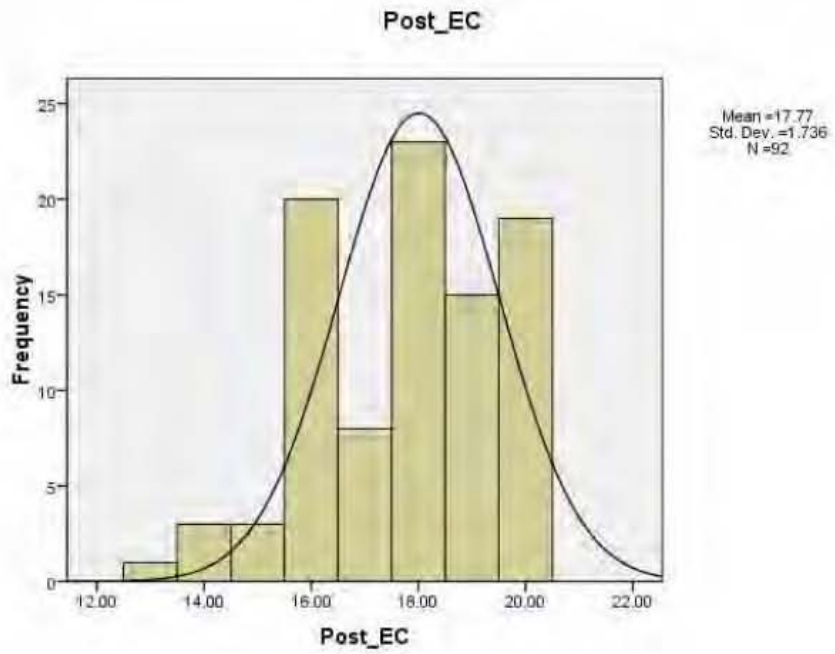
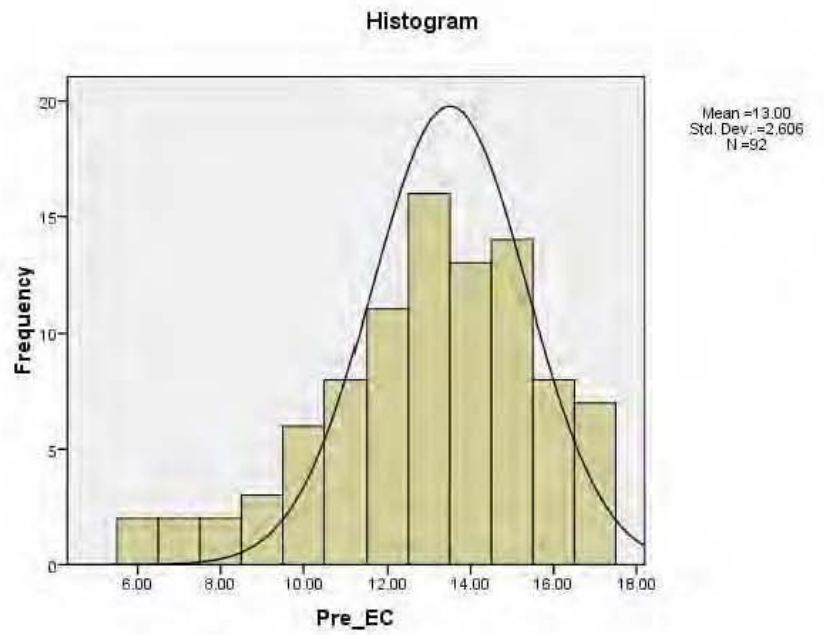
Normality Test for awareness regarding Eye diseases Pre & Post intervention



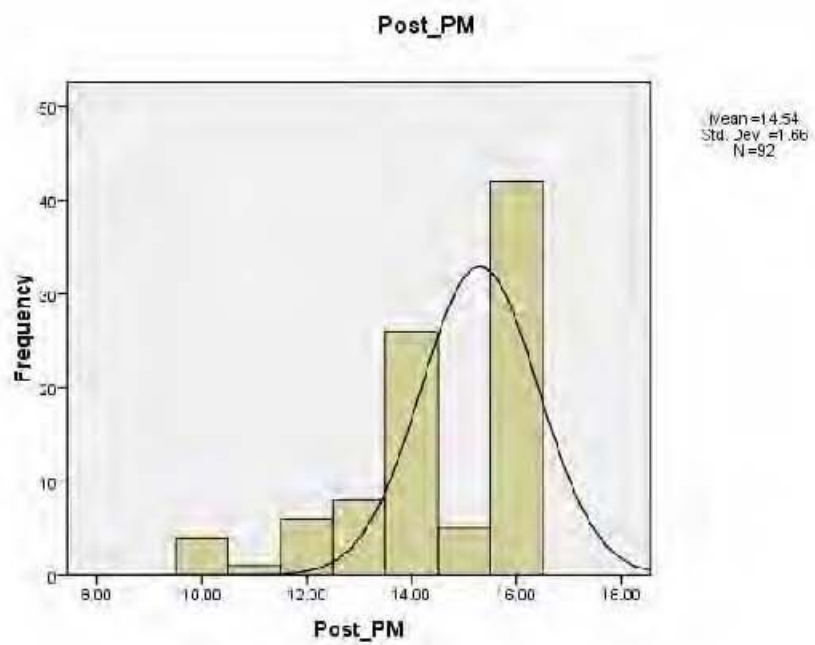
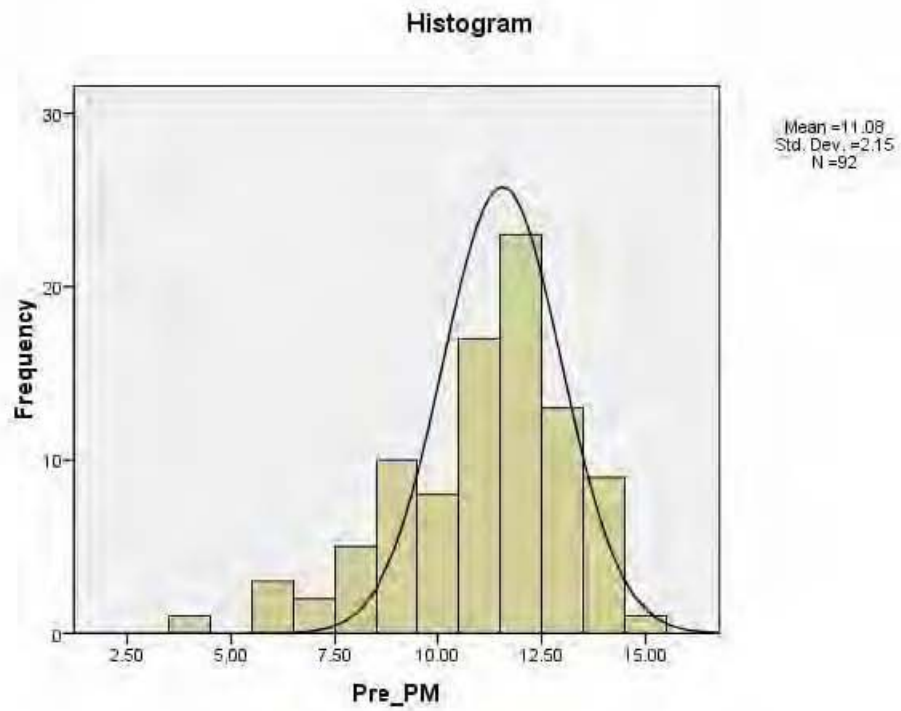
Normality Test for awareness regarding Warning signs Pre & Post intervention



Normality Test for awareness regarding Eye Care Pre & Post intervention



Normality Test for awareness regarding Preventive Measures Pre & Post intervention



Appendix 2

Selected Government primary schools of South Punjab

South Punjab Government Primary Schools List		
District	Teshil	Nos of Primary School
Rajjan Pur	Jam Pur	327
	Rajan Pur	308
	Rojan	150
D.G Khan	D.G. Khan	342
	Koh-e-Suleman	310
	Kot Chutta	321
	Tunsa	27
Muzafar Garh	AliPur	163
	Jatoi	193
	Kot Adu	580
	Muzaffargarh	443
Multan	Jalalpur	184
	Multan City	174
	Multan Sadar	323
	ShujaAbad	205
BahawalNagar	BahawalNagar	321
	Chishtian	312
	FortAbbas	279
	Haroonabad	327
	Minchinabad	317
RahimYar Khan	RahimYar Khan	569
	Khanpur	460
	Liaqatpur	596
	Sadiqabad	508
Bahawalpur	Yazman	224
	Ahmadpur	3771
	Bahawalpur city	112
	Bahawalpur Sadar	174
	Hasilpur	204
	Khairpur	101
Vehari	Burewala	279
	Mailsi	377
	Vehari	280

Appendix 3

Teachers Training Session in different Government Primary Schools of South Punjab



Appendix 4

Eye health literature distributed during teaching training session

Precautionary measures

HOW CAN YOU TAKE CARE FOR YOURSELF

Wear Sunglasses. Sun exposure can damage your eyes and raise your risk of cataracts and age-related macular degeneration.

Wear Protective Eye Wear. To prevent eye injuries, you need eye protection while playing certain sports, working in jobs such as factory work or doing repairs in your home.

Avoid Smoking. Smoking increases the risk of developing age-related eye diseases and can damage the optic nerve.

Know your Family Medical History. Some eye diseases are inherited, so it is important to find out whether anyone in your family has had them.

If you wear contacts, take steps to prevent eye infections. Wash your hands well before you put in or take out your contact lenses.

Give your eyes a rest. Try the 20-20-20 Rule: Every 20 minutes, look away about 20 feet in front of you for 20 seconds. This can help reduce eyestrain.

Eye Massage: Put a warm, moist cloth on your eyelids every morning for about 5 minutes. Then massage your eyelids to increase the natural wetness of your eyes.

Eat a Healthy, Balanced Diet. Your diet should include fruits and vegetables, especially deep yellow and green leafy vegetables.

Maintain a Healthy Weight. Being overweight increases your risk of developing diabetes that puts you at higher risk of getting diabetic retinopathy or glaucoma.



Nutritional Benefits

BEST FOODS FOR HEALTHY EYES

Nuts & Seeds

Filled with vitamin E which slows macular degeneration.



EAT RIGHT

FOR YOUR SIGHT

Green Vegetables

Contains carotenoids i.e. lutein & zeaxanthin which promote the health of retina.



Whole Grains

It can protect cataract & macular degeneration



Carrots

Contain Beta Carotene Aids in the smooth functioning of Retina



Bell Pepper

Great source of vitamin C It maintains the eye's blood vessels Reduce risk of cataracts



Lean Beef

Great source of Zinc Helps bring vitamin A to your retina



Fish

Fish are rich in Omega-3 fatty acids Helps protect against dry eyes, & Cataract



Oranges

Oranges are rich in Vitamin C Helps for healthy blood vessels including in eyes



Information regarding Squint

EXERCISE FOR SQUINT

- A standard type of exercise for convergence insufficiency and exotropia (Outward Deviation) is pencil pushups.
- To do pencil Pushups, follow these steps:
- Hold a pencil at arm's length, around midway between the eyes.
- Look at the pencil while moving it toward the nose, and try to maintain a single image of it.
- Keep moving the pencil towards the nose until you can no longer see it as a single image or a clear image.
- Hold the pencil at the closest point where a single image is possible.
- If you cannot regain a single image, start again
- Repeat it 03 times a day with 20 repetition each time.



Information regarding Glaucoma

Early detection, through regular and complete eye exams, is the key to protect your vision from damage caused by glaucoma.



It is important to have your eyes examined regularly. Your eyes should be tested:

- Before age 40, every two to four years
 - From age 40 to age 54, every one to three years
 - From age 55 to 64, every one to two years
 - After age 65, every six to 12 months
- Anyone with high risk factors should be tested every year or two after age 35.



GLAUCOMA

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Information regarding Conjunctivitis

Symptoms of Conjunctivitis

- A gritty feeling in one or both eyes.
- Itching or burning sensation in one or both eyes.
- Excessive Tearing.
- Discharge from one or both eyes.
- Swollen Eyelids
- Pink discoloration to the whites of one or both eyes
- Increased sensitivity to light.



CONJUNCTIVITIS

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Let Us be the light

