# Study on Awareness and Knowledge Regarding Eye Diseases among Students of East West University

***A Project Report to be submitted in the Department of Pharmacy for the Partial Fulfillment of the Degree of Bachelor of Pharmacy.***

**Submitted By**
**Bijoy Karmoker**
**ID: 2012-3-70-032**

**Department of Pharmacy**
**East West University**

EAST WEST UNIVERSITY

# DECLARATION BY THE RESEARCH CANDIDATE

I, Bijoy Karmoker, ID: 2012-3-70-032, hereby declare that the dissertation entitled **"Study on Awareness and Knowledge Regarding Eye Diseases among Students of East West University''** submitted to the Department of Pharmacy, East West University, in the partial fulfillment of the requirement for the degree of Bachelor of Pharmacy (Honors) is a genuine & authentic research work carried out by me. The contents of this dissertation, in full or in parts, have not been submitted to any other institute or University for the award of any degree or Diploma of Fellowship.

**……**

**Bijoy Karmoker**

ID: 2012-3-70-032

Department of Pharmacy,

East West University

Dhaka, Bangladesh

# CERTIFICATION BY THE SUPERVISOR

This is to certify that the dissertation, entitled **"Study on Awareness and Knowledge Regarding Eye Diseases among Students of East West University"** is a bona fid research work done by Bijoy Karmoker (ID: 2012-3-70-032), in partial fulfillment of the requirement for the degree of Bachelor of Pharmacy under my supervision.

**……**

**Nishat Nasrin**

Assistant Professor

Department of Pharmacy

East West University

Dhaka, Bangladesh

# ENDORSEMENT BY THE CHAIRPERSON

This is to certify that the dissertation, entitled **"Study on Awareness and Knowledge Regarding Eye Diseases among Students of East West University"** is a bona fide research work done by Bijoy Karmoker (ID: 2012-3-70-032), under the guidance of **Nishat Nasrin**, Assistant Professor, in partial fulfillment of the requirement for the degree of Bachelor of Pharmacy.

**……**

**Dr. Shamsun Nahar Khan**

Associate Professor & Chairperson

Department of Pharmacy

East West University

Dhaka, Bangladesh

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# DEDICATION

This research paper is dedicated to my beloved parents for their unconditional support.

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## List of Abbreviation

| | |
|---|---|
| IOL | Intra Ocular Lens |
| IOP | Intra Ocular Pressure |
| NEI | National Eye Institute |

## ABSTRACT

The human eye is the organ which gives the sense of sight, allowing us to observe and learn more about surrounding world than we do other with our four senses. Eye is used for almost all activity we perform. That is why sight is sense that value more than all the rest. Because of four disease of eye which are cataract, glaucoma, night blindness and diabetic retinopathy many people lost their sight. Now a day's diabetes patients are increased worldwide as well as diabetic retinopathy risk are also increased. In Bangladesh cataract is major eye condition due to lack of awareness. The aim of the study was to access the awareness and knowledge regarding major four eye disease. Total 400 students aged between 18-29, from East West University of different departments were participated in the study. They answered to a pre-structured questionnaire in which having heard of disease represent the "Awareness" definition of the disease represent the "Knowledge". The awareness of Cataract according to the study was 88%, Glaucoma 57%, Night blindness 98%, Diabetic Retinopathy 72%. The knowledge about cataract was 46.32% and 70% knew about surgery but 55% didn't know about IOL. In case of Glaucoma only 31% knew that glaucoma causes permanent visual loss. Majority of the students didn't know who are at risk of Diabetic Retinopathy it was around 33.21%. It was also observed that students had minimum knowledge about the treatment of glaucoma and diabetic retinopathy. Analyzing the result it was seen that the awareness and knowledge regarding major four eye diseases among the students were not in satisfactory level. It is important to increase the knowledge and awareness for early detection of these four eye diseases.

# Chapter 1

# Introduction

## 1.1 Introduction

The human eye is the organ which gives us the sense of sight, allowing us to observe and learn more about surrounding world than we do other with our four senses. We use our eye for almost all activity we perform. Most people probably would agree that sight is sense they value more than all the rest. The eye is able to detect bright light or dim light, but it cannot detect objects when light is absence. The human eye belongs to a general group of eyes found in nature called "camera-type eyes." Just as a camera lens focuses light onto film, a structure in the eye called the cornea focuses light onto a light-sensitive membrane called the retina. Human eye is a sense organ that reacts to light. Our eyes are like tiny cameras that process the light reflected off surfaces to create images we see. The iris (a muscle that acts like a lens) controls the size of the pupil (similar to aperture). If the light entering our eye is too bright, our iris reduces the size of the pupil. When it's dark, the iris in the pupil is enlarged or dilated, to maximize the amount of light entering the eye. After receiving the correctly focused light, the retina's job is to analyses color, intensity and form to transmit these as electric impulses to the brain. The optic nerve connects various parts of our brain so that our emotions, experiences and visual impulses are combined together as an image that we not only see, but actually perceive. The image from the retina is actually upside down: our brains flip the image around so we don't get confused. Depending on how near or far away the object is that we're looking at, the cornea and lens work together to bring the light into focus on the retina (the back of the eye). The lens is the more dynamic of the two, especially in young people, changing in its shape (thickness and curvature) to help us shift focus. When the light from an image isn't perfectly focused, this can often be remedied with the assistance of appropriate glasses or contact lenses (Hollows.org, 2016). Avoidable conditions, which can be influenced by socioeconomic factors such as low education and poverty, account for the majority of blindness in the elderly population worldwide. With increased life expectancy in different countries, an upward trend in the prevalence of age-related eye diseases is expected in the future unless appropriate modifications are made in both eye care delivery systems and lifestyle. Studies on knowledge, attitudes and practice (KAP studies) can help health providers design better health promotion and education programs. In recent years, the level of public awareness of major causes of blindness has been reported by some researchers; the results are not encouraging, even in developed countries (Marzieh Katibeh, 2017).

## 1.2 The Anatomy of Eye

The average newborns eyeball is 18 millimeters in diameters, from front to back. The eye continues to grow, gradually about 1 inch, in adulthood. The eyeball is set in a protective cone shaped cavity called “the orbit” or “socket”. The eyeball itself consists of three main layers; the outer layer, comprised of the cornea and the sclera, the middle layer, responsible for holding the blood supply for the eye as well as the iris and the pupil, and the inner layer, or the retina. Along with the three layers, there are also three chambers of fluid which are the anterior chamber, between the cornea and iris, the posterior chamber, between the iris and lens, and the vitreous chamber, which is between the lens and the retina. The first two chambers not only provide nourishment to the interior of the eye’s structures, but also assist with inflation. The vitreous chamber contains a much thicker fluid called the vitreous humor. The vitreous humor gives the eye its shape and is the way by which light passes through before reaching the optic nerve. The optic nerve is the method of sending information and images to the brain.

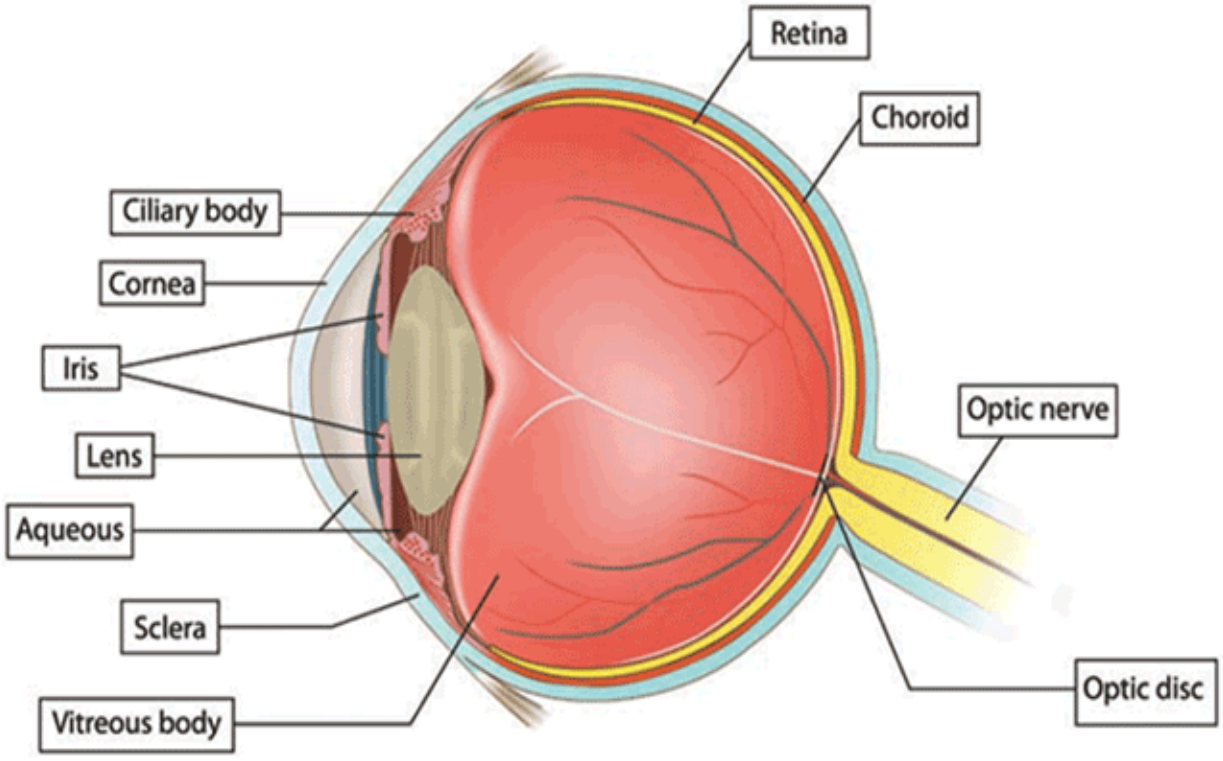


**Fig 1.1: Anatomy of Human Eye (Montgomery, 2015).**

It runs from the back of the eyeball and through the optic for a man, where it connects with the brain. This nerve transmits the signals for vision to the brain making vision possible. There are also other nerves in the eye, most of which convey pain or control motor actions. The eyelids are an external portion of the anatomy of the eye, which are mostly for protection and preservation. The eyelid carries lacrimal secretions from the tear glands across the eye as it blinks. This is to ensure moisture and provide minimal protection. The eyelid is attached to the eye by a mucous membrane called the conjunctiva. Tear glands line the upper eyelid, which secrete tears for moisture. There are seven extra ocular eye muscles attached to the outside the eyeball. Six are attached to the eyeball itself and the seventh is attached to the upper eyelid and is responsible for blinking. Blinking is a normal reflex involving the movement of the eye muscle attached to upper eyelid. The visual components of the eye are much more complicated in structure and function. The clear part of the eye is composed of the cornea, iris, and pupil. The white opaque part of the eye is the sclera, which surrounds the remaining portion of the eyeball. The sclera acts as a sheath for the optic nerve. The cornea and the sclera come together at the limbus, which contains many eye blood vessels. The iris and pupil are the most noticeable structures of the eye. The iris is the colored part of the eye composed of tissue lying underneath the cornea. The color of the eye, which is predetermined by genetics, also functions to block out unwanted light. The pupil is located in the center of the iris. This is the entrance of light into the eye and changes size to control the amount of light let in. The lens is located directly behind the iris and is used to focus light into the retina. The retina is light sensitive tissue containing photosensitive cells. These cells are known as rods and cones and use the light to convert it into electrical signals that the optic nerve carries to the brain. These cells add to the amazing nature of the human eyes. The fact that the eye uses light to form an image that makes sense to humans is miraculous (Montgomery, 2015).

### 1.3 The Basic Anatomy of Vision

The human eye develops directly from the brain and possesses two excellent lenses which are the cornea and the lens proper. When humans develop in the womb, the embryonic skin over the eye turns clear, becoming our cornea. In order to have complete clarity, this type of skin does not contain blood vessels, hair, and glands found in most other skin. It contains many nerves, causing it to be highly sensitive to touch. The cornea is mostly a protective element for the eye, but also functions as a lens. The cornea has about four times the focusing power than the actual lens itself does. The lens, much like the cornea, is made from embryonic skin and is also transparent; however it is able to change focus, which the cornea is not able to do. This function allows humans to focus on an object and any distance. A camera would focus by moving its hard lenses, but the human eye's lens is rubber like and flexes to focus quickly through changing its shape. As humans age, the lens loses flexibility which affects clarity and the ability to focus as compared to its original capabilities (Montgomery, 2015).

### 1.4 The Basic Physiology of Vision

#### 1.4.1 The Cornea

The cornea is the eye's outermost layer. It is the clear, dome shaped surface that covers the front of the eye. It plays an important role in focusing vision. Although the cornea may look clear and seem to lack substance, it is a highly organized tissue. Unlike most tissues in the body, the cornea contains no blood vessels to nourish or protect it against infection. Instead, the cornea receives its nourishment from tears and the aqueous humor (a fluid in the front part of the eye that lies behind the cornea).The tissues of the cornea are arranged in three basic layers, with two thinner layers, or membranes, between them. Each of these five layers has an important function. These layers are:

(1) Epithelium, (2) Bowman's Membrane, (3) Stroma (4) Descemet'sMembrane and (5)Endothelium. In addition, a tear film always covers the cornea of a healthy eye (McCaa, 1982).

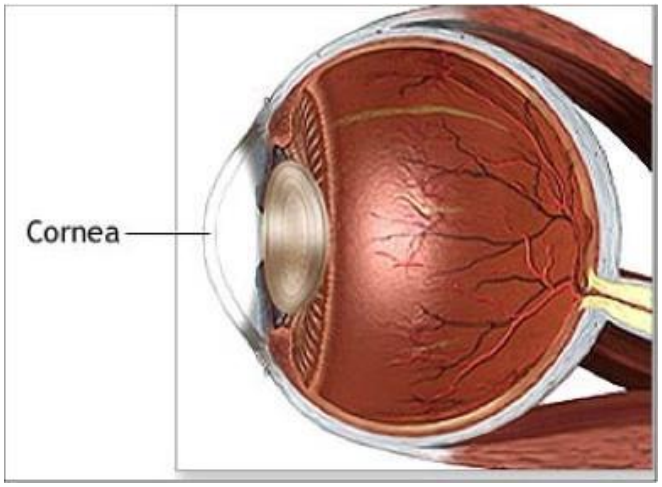


**Fig 1.2: Cornea (National Eye Institute, 2016).**

### 1.4.2 Retina

The retina is a piece of tissue that measures close to one half of a millimeter thick. This tissue lines the back of the inside of the eyeball. The tissue itself is developed from the embryonic forebrain, thus considered a part of the brain. The retina is one of the most important parts of the eye because it begins basic visual processing before the brain receives the information. There are three layers in the retina with packets of nerve cells arrayed in three rows and separated by two other layers containing synaptic connections. The retina's two most important functions are detecting and responding to light through sensory neurons and neural circuits. This begins the first stage of visual processing (Kolb2003). There is a segment of the retina called the macula, located almost directly in the center of the retina. The macula is specialized for attaining acuity in straight ahead vision. Located in the macula is the fovea. In this area, cone density is the highest within the retina and rods are absent. These foveal cones are spaced tightly, in a honeycomb fashion. Altogether, the retina contains 120 million rods and 1 million cone photoreceptors (McCaa, 1982).

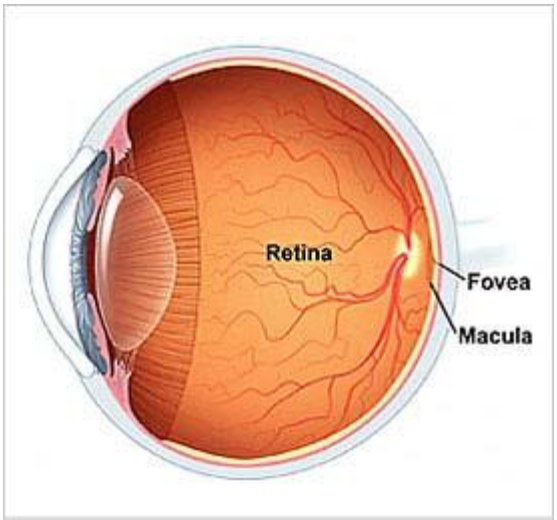


**Fig 1.3: Retina (Healthline.com, 2013).**

### 1.4.3 Lens

The lens is located in the eye. By changing its shape, the lens changes the focal distance of the eye. In other words, it focuses the light rays that pass through it (and onto the retina) in order to create clear images of objects that are positioned at various distances. It also works together with the cornea to refract, or bend, light. The lens is of ellipsoid, biconvex shape. An ellipsoid is similar to a sphere but stretched out, like an olive, and biconvex means it's rounded outward on both sides. The lens is about 10 mm across and 4 mm from front to back in adults, although its shape and size varies as it changes its focus. The lens consists of the lens capsule, the lens epithelium, and the lens fibers. The lens capsule is the smooth, transparent outermost layer of the lens, while the lens fibers are long, thin, transparent cells that form the bulk of the lens. The lens epithelium lies between these two and is responsible for the stable functioning of the lens. It also creates lens fibers for the lifelong growth of the lens**.** Common diseases of the lens include cataracts, which cause opacity, or cloudiness, in the lens. Other common ailments are presbyopia, ectopialentis, aphakia, and nuclear sclerosis (Healthline.com, 2013).

### 1.4.4 Rods and Cones

The retina contains two types of photoreceptors, rods and cones. The rods are more numerous, some 120 million, and are more sensitive than the cones. However, they are not sensitive to

color. The 6 to 7 million cones provide the eye's color sensitivity and they are much more concentrated in the central yellow spot known as the macula. In the center of that region is the “fovea central is ", a 0.3 mm diameter rod-free area with very thin, densely packed cones. The experimental evidence suggests that among the cones there are three different types of color reception. Response curves for the three types of cones have been determined. Since the perception of color depends on the firing of these three types of nerve cells, it follows that visible color can be mapped in terms of three numbers called tristimulus values. Color perception has been successfully modeled in terms of tristimulus values and mapped on the CIE chromaticity diagram.

### 1.4.5 Pupil

The pupil is the black circle in the center of the eye, and its primary function is to monitor the amount of light that comes into the eye. When there is a lot of light, the pupil contracts to keep the light from overwhelming the eye. When there is very little light, the pupil expands so it can soak up as much as possible.

### 1.4.6 Iris

The iris is the colored part of the eye. Although it might seem purely cosmetic, the iris actually functions to adjust the size of the pupil. It has muscles that contract or expand depending on the amount of light the pupil needs to process images (Gauger and shon, 2012).

### 1.4.7 Sclera

The sclera is the part of the eye commonly known as the “white.” It forms the supporting wall of the eyeball, and is continuous with the clear cornea. The sclera is covered by the conjunctiva, a clear mucus membrane that helps lubricate the eye. It is thickest in the area surrounding the optic nerve. The sclera is made up of three divisions: the episclera, loose connective tissue, immediately beneath the conjunctiva; sclera proper, the dense white tissue that gives the area its color; and the lamina fusca, the innermost zone made up of elastic fibers. There are a number of abnormalities associated with the sclera. Some are genetic (Healthline.com, 2013).

### 1.4.8 Vitreous and Aqueous Humor

Gel-like fluids inside the eye help it maintain its shape, which plays an important role in overall eye health. These substances are called the vitreous humor and aqueous humor. Vitreous is a transparent substance that is around 99 percent water. The remaining one percent is collagen and hyaluronic acid, which cause vitreous to have a gelatinous consistency. Along with maintaining the shape of the eye, the vitreous helps absorb shocks to the eye and keeps the retina properly connected to the back wall of the eye. Light passes through the vitreous on its way to the retina. Vitreous in children has a consistency that resembles egg whites. As people age, it becomes more liquid. Thinning vitreous can cause the retina to separate from the back wall of the eye, often resulting in floaters — spots that appear to float in the field of vision. This separation is called posterior vitreous detachment and occurs in the majority of people by age 70. So long as no retinal tearing occurs, this condition usually resolves itself without treatment. Aqueous is a thin, watery fluid located in the anterior and posterior chambers of the eye. The anterior chamber lies between the iris (colored part of the eye) and the inner surface of the cornea (the front of the eye). The posterior chamber is located behind the iris and in front of the lens. In addition to supporting the shape of this area, aqueous supplies nutrients and nourishment to parts of the eye that lack blood supply. It also removes waste. Improper drainage of the aqueous humor can cause an increase in intraocular pressure (pressure inside the eye). This increase can result in loss of vision or contribute to the development of glaucoma. Issues with aqueous humor drainage can be treated surgically (Healthline.com, 2013).

## 1.5 Cataract

Cataract is a clouding of the eye's natural lens, which lies behind the iris and the pupil. Cataracts are the most common cause of vision loss in people over age 40 and are the principal cause of blindness in the world. In fact, there are more cases of cataracts worldwide than there are of glaucoma, macular degeneration and diabetic retinopathy combined, according to Prevent Blindness America (PBA). Today, cataracts affect more than 22 million Americans age 40 and older. And as the U.S. population ages, more than 30 million Americans are expected to have cataracts by the year 2020, PBA says (Bailey, 2016).

### 1.5.1 Causes of Cataract

The lens lies behind the iris and the pupil. It works much like a camera lens. It focuses light onto the retina at the back of the eye, where an image is recorded. The lens also adjusts the eye's focus, letting us see things clearly both up close and far away. The lens is made of mostly water and protein. The protein is arranged in a precise way that keeps the lens clear and lets light passes through it. But as we age, some of the protein may clump together and start to cloud a small area of the lens. This is a cataract. Over time, the cataract may grow larger and cloud more of the lens, making it harder to see. Researchers suspect that there are several causes of cataract, such as smoking and diabetes. Or, it may be that the protein in the lens just changes from the wear and tear it takes over the years (Jacobsen, 2008).

### 1.5.2 How Cataract affects the vision

Age-related cataracts can affect vision in two ways:

1. Clumps of protein reduce the sharpness of the image reaching the retina. The lens consists mostly of water and protein. When the protein clumps up, it clouds the lens and reduces the light that reaches the retina. The clouding may become severe enough to cause blurred vision. Most age-related cataracts develop from protein clumping. When a cataract is small, the cloudiness affects only a small part of the lens. Cataracts tend to "grow" slowly, so vision gets worse gradually. Over time, the cloudy area in the lens may get larger, and the cataract may increase in size. Seeing may become more difficult.

2. The clear lens slowly changes to a yellowish/brownish color, adding a brownish tint to vision. As the clear lens slowly colors with age, vision gradually may acquire a brownish shade. At first, the amount of tinting may be small and may not cause a vision problem. Over time, increased tinting may make it more difficult to read and perform other routine activities. This gradual change in the amount of tinting does not affect the sharpness of the image transmitted to the retina. The term "age-related" is a little misleading. In fact, people can have an age-related cataract in their 40s and 50s. But during middle age, most cataracts are small and do not affect vision. It is after age 60 that most cataracts cause problems with a person's vision (Bailey, 2016).

### 1.5.3 Symptoms

The most common symptoms of a cataract are:

1. Cloudy or blurry vision.

2. Colors seem faded.

3. Headlights, lamps, or sunlight may appear too bright.

4. Poor night vision.

5. Double vision or multiple images in one eye. (This symptom may clear as the cataract gets larger.) (National Eye Institute, 2015).

### 1.5.4 Types of Cataract

Types of cataracts include:

A **subscapular** cataract occurs at the back of the lens. People with diabetes or those taking high doses of steroid medications have a greater risk of developing a subcapsular cataract.

A **nuclear cataract** forms deep in the central zone (nucleus) of the lens. Nuclear cataracts usually are associated with aging.

A **cortical cataract** is characterized by white, wedge-like opacities that start in the periphery of the lens and work their way to the center in a spoke-like fashion. This type of cataract occurs in the lens cortex, which is the part of the lens that surrounds the central nucleus (Jacobsen, 2008).

Nuclear cataract

cortical cataract

sub capsular cataract

**Fig 1.4: Type of cataract (Jacobsen, 2008).**

### 1.5.5 Cataract Detection

Cataract is detected through a comprehensive eye exam that includes:

**Visual acuity test**: This eye chart test measures how well person see at various distances.

**Dilated eye exam:** Drops are placed in patients eyes to widen, or dilate, the pupils. Eye care professional uses a special magnifying lens to examine patient's retina and optic nerve for signs of damage and other eye problems. After the exam, patient's close-up vision may remain blurred for several hours.

**Tonometry**: An instrument measures the pressure inside the eye. Numbing drops may be applied to eye for this test (American Association for Pediatric Ophthalmology and Strabismus, 2014).

### 1.5.6 Cataract Prevention

Though there is significant controversy about whether cataracts can be prevented, a number of studies suggest certain nutrients and nutritional supplements may reduce patient risk of cataracts. One large, 10-year study of female health professionals found that higher dietary intake of vitamin E and the carotenoids lutein and zeaxanthin from food and supplements were associated with significantly decreased risks of cataract. Good food sources of vitamin E include sunflower seeds, almonds and spinach. Good sources of lutein and zeaxanthin include spinach, kale and other green, leafy vegetables.

Other studies have shown antioxidant vitamins such as vitamin C and foods containing omega-3 fatty acids may reduce cataract risk. Another step that can take to reduce the risk of cataracts is to wear protective sunglasses that block 100 percent of the sun's UV rays (Bailey, 2016).

### 1.5.7 Cataract Treatment

Cataract surgery is very successful in restoring vision. In fact, it is the most frequently performed surgery in the United States, with more than 3 million Americans undergoing cataract surgery each year.

Two approaches to cataract surgery are generally used:

Small-incision cataract surgery involves making an incision in the side of the cornea (the clear outer covering of the eye) and inserting a tiny probe into the eye. The probe emits ultrasound waves that soften and break up the lens so it can be suctioned out. This process is called phacoemulsification.

Extra capsular surgery requires a somewhat larger incision in the cornea so that the lens core can be removed in one piece. The natural lens is replaced by a clear plastic lens called an intraocular lens (IOL). When implanting an IOL is not possible because of other eye problems, contact lenses and, in some cases, eyeglasses may be an option for vision correction. During surgery, the surgeon will remove patient clouded lens and in most cases replace it with a clear, plastic intraocular lens (IOL).

New IOLs are being developed all the time to make the surgery less complicated for surgeons and the lenses more helpful to patients. Presbyopia-correcting IOLs potentially help patient to see at all distances, not just one. Another new type of IOL blocks both ultraviolet and blue light rays, which research indicates may damage the retina (Bailey, 2016).

### 1.5.8 Risk of Cataract surgery

As with any surgery, cataract surgery poses risks, such as infection and bleeding. Before cataract surgery, doctor may ask patient to temporarily stop taking certain medications that increase the risk of bleeding during surgery. After surgery, patient must keep eye clean, wash hands before

touching eye, and use the prescribed medications to help minimize the risk of infection. Serious infection can result in loss of vision (National Eye Institute, 2015).

### 1.6 Glaucoma

This family of conditions causes fluid to build up in eye. That puts pressure on optic nerve. If don't treat it, patient could lose sight. Most of the time there are no early symptoms. But a type called acute angle-closure glaucoma causes pressure inside eye to rise suddenly. Symptoms include severe eye pain, nausea and vomiting, headache, and worsening vision (Cold *et al.*, 2017).

#### 1.6.1 Causes of Glaucoma

It's the result of high fluid pressure inside eye. This happens when the liquid in the front part of the eye doesn't circulate the way it should. Normally, the fluid, called aqueous humor, flows out of eye through a mesh-like channel. If this channel gets blocked, the liquid builds up. That's what causes glaucoma. The reason for the blockage is unknown, but doctors do know it can be inherited, meaning it's passed from parents to children. Less common causes include a blunt or chemical injury to eye, severe eye infection, blocked blood vessels inside the eye, and inflammatory conditions. It's rare, but sometimes eye surgery to correct another condition can bring it on. It usually affects both eyes, but it may be worse in one than the other (Maclain and Bonny, 2006).

#### 1.6.2 Other Glaucoma Causes: Poor Blood Flow, Optic Nerve Damage

While high IOP often is associated with glaucoma, this eye disease also can occur when internal eye pressure is normal (normal-tension glaucoma). People with this condition have highly pressure-sensitive optic nerves that are susceptible to irreversible damage from what ordinarily would be considered "normal" IOP. Conversely, certain people with elevated intraocular pressure known as ocular hypertension may never develop glaucoma. Most conventional methods of screening for glaucoma involve testing eyes for the presence of high IOP. But because glaucoma can occur even without high IOP, direct examination of the optic nerve and visual field testing are essential in making (or ruling out) the diagnosis of glaucoma.

Though the exact cause of normal-tension glaucoma is unknown, many researchers believe decreased blood flow to the optic nerve may be a factor. This could be caused by narrowing of blood vessels that nourish the optic nerve or constrictions of these vessels (vasospasms).Researchers in the UK who conducted the study found that buildup of a protein known as beta-amyloid in the eye's retina and in brain tissue appears to be associated with development of both glaucoma and Alzheimer's (Bailey, 2016).

### 1.6.3 Glaucoma Symptoms

Glaucoma often is called the "silent thief of sight," because most types typically cause no pain and produce no symptoms until noticeable vision loss occurs. For this reason, glaucoma often progresses undetected until the optic nerve already has been irreversibly damaged, with varying degrees of permanent vision loss. But with acute angle-closure glaucoma, symptoms that occur suddenly can include blurry vision, halos around lights, intense eye pain, nausea and vomiting. If patient have these symptoms, make sure patient see an eye care practitioner or visit the emergency room immediately so steps can be taken to prevent permanent vision loss (Bailey, 2016).

### 1.6.4 Types of Glaucoma

There are two main kinds:

**Open-angle glaucoma**

It’s the most common type. It may also call wide-angle glaucoma. The drain structure in eye it’s called the trabecular meshwork -- looks normal, but fluid doesn’t flow out like it should.

**Angle-closure glaucoma**

It’s less common in the West than in Asia. It may also call acute or chronic angle-closure or narrow-angle glaucoma. Eye doesn’t drain right because the angle between iris and cornea is too narrow. This can cause a sudden buildup of pressure in eye. It’s also linked to farsightedness and cataracts, a clouding of the lens inside eye.

**Normal-tension glaucoma**

Like POAG, normal-tension glaucoma (also called normal-pressure glaucoma, low-tension glaucoma or low-pressure glaucoma) is a type of open-angle glaucoma that can cause visual field loss due to optic nerve damage. But in normal-tension glaucoma, the eye's IOP remains in the normal range. Also, pain is unlikely and permanent damage to the eye's optic nerve may not be noticed until symptoms such as tunnel vision occur.

**Pigmentary glaucoma**

This rare form of glaucoma is caused by clogging of the drainage angle of the eye by pigment that has broken loose from the iris, reducing the rate of aqueous outflow from the eye. Over time, an inflammatory response to the blocked angle damages the drainage system.

**Secondary glaucoma**

Symptoms of chronic glaucoma following an eye injury could indicate secondary glaucoma, which also may develop with presence of eye infection, inflammation, a tumor or enlargement of the lens due to a cataract.

**Congenital glaucoma**

This inherited form of glaucoma is present at birth; with 80 percent of cases diagnosed by age one. These children are born with narrow angles or some other defect in the drainage system of the eye (National Eye Institute, 2016).

**1.6.5 Risk factors for chronic or open-angle glaucoma include**

**Age:** Risk for developing open-angle glaucoma increases significantly after age 40 and continues to increase with each additional decade. Aging also can cause drainage channels in the trabecular meshwork to shrink or narrow, which slows the outflow of fluid from the eye.

**Certain medical problems:** Diabetes, extreme nearsightedness and previous eye surgery are risk factors for chronic open-angle glaucoma.

**Race**: Chronic glaucoma is three to four times more common in African-Americans than in whites. Also, African-Americans are more likely to develop an aggressive form of the disease at a younger age.

### 1.6.6 Narrow-Angle Glaucoma

Acute angle-closure (closed-angle or narrow-angle) glaucoma produces symptoms such as eye pain, headaches, and halos around lights, dilated pupils, vision loss, red eyes, nausea and vomiting. These signs may last for hours or until the IOP is reduced. With each narrow-angle glaucoma attack, part of peripheral vision may be lost. Acute angle-closure glaucoma is a medical emergency. If the high eye pressure is not reduced within hours, it can cause permanent vision loss. Anyone who experiences these symptoms should contact an ophthalmologist immediately or go to a hospital. Some chronic forms of narrow-angle glaucoma, however, can progress very slowly and cause eye damage without any obvious symptoms or pain in early stages (Bailey, 2016).

### 1.6.7 Glaucoma Risk Factor

It mostly affects adults over 40, but young adults, children, and even infants can have it. African-Americans tend to get it more often, when they're younger, and with greater vision loss.

Patient's more likely to get it if:

1. Are of African-American, Irish, Russian, Japanese, Hispanic, Inuit, or Scandinavian descent

2. Are over 40

3. Have a family history of glaucoma

4. Have poor vision

5. Have diabetes

6. Take certain steroid medications, like prednisone

7. Have had trauma to the eye or eyes (Cold *et al.,* 2016)

### 1.6.8 Glaucoma Treatment: Eye Drops and Other Medications

Most treatments for glaucoma are designed to lower and/or control intraocular pressure (IOP), which can damage the optic nerve that transmits visual information to the brain. Glaucoma eye drops often are the first choice over glaucoma surgery and can be very effective at controlling IOP to prevent eye damage. Depending on patient general health and other medical conditions, however, patient may be a poor candidate for glaucoma eye drops. This is because medications placed in the eye are absorbed into the conjunctiva blood vessels on the eye's surface. A certain percentage of the active ingredient of the medication, though small, will enter the bloodstream and may adversely affect functions such as heart rate and breathing. Likewise, some types of eye drops may worsen certain existing medical conditions such as asthma. Some glaucoma drugs also can interact with other common medications such as digitalis, prescribed for heart conditions.

### 1.6.9 Types of Glaucoma Eye Drops

Glaucoma eye drops are classified by the active ingredient chemical that helps make the drug work. Also, many of the glaucoma eye drops listed here are available in generic forms at pharmacy.

**Prostaglandins:** Drugs known as prostaglandins used in eye drops often have the best user compliance because they are required only once daily. Prostaglandins generally work by relaxing muscles in the eye's interior structure to allow better outflow of fluids, thus reducing buildup of eye pressure. FDA-approved prostaglandins include Xalatan (Pfizer), Lumigan (Allergan), Travatan Z (Alcon) and Rescula (Novartis). Many glaucoma specialists now report that prostaglandins have taken the lead in recent years as a first-line therapy for glaucoma.

**Beta-blockers:** Used in a variety of glaucoma eye drops, beta-blockers were at one time the drugs of first choice in treating glaucoma. These drugs work by decreasing fluid (aqueous) production in the eye and now are often prescribed as an adjunct to or in combination with prostaglandins.

**Alpha-adrenergic agonists:** These drugs work by decreasing rate of aqueous humor production and can be used alone or in combination with other anti-glaucoma eye drops.

**Carbonic anhydrase inhibitors**: These drugs work by decreasing rate of aqueous humor production. They are usually used in combination with other anti-glaucoma eye drops and not alone. This classification of drug is also used in oral form (pills). Common side effects experienced with this classification of eye drop include burning, a bitter taste, eyelid reactions and eye redness (ocular injection).

**Epinephrine**: The epinephrine class of drugs has a dual effect on the eye. These drugs work by decreasing the rate of aqueous humor production and increasing the outflow of aqueous humor from the eye (Haddrill, 2012).

### 1.6.10 Depending on the type of glaucoma, different treatment options may be considered

Glaucoma surgery creates a new opening for fluid drainage. Non-surgical options include the use of topical eye medications (glaucoma eye drops) or oral medications (pills).Most cases of glaucoma can be controlled with one or more drugs. But some people may require surgery to reduce their IOP further to a safe level by improving the outflow or drainage of fluids. Occasionally, surgery can eliminate the need for glaucoma eye drops. However, patient may need to continue with eye drops even after having glaucoma surgery. Some recent studies indicate that a laser procedure known as selective laser trabeculoplasty (SLT) may be equally as effective as glaucoma eye drops for lowering internal eye pressure. This laser surgery might be considered a primary treatment, particularly for people who find it difficult to comply with the strict, regular schedule needed for administering eye drops. Another procedure called a trabeculectomy creates an artificial drainage area. This method is used in cases of advanced glaucoma where optic nerve damage has occurred and the IOP continues to soar. A third common option is a shunt, a device that a surgeon implants in patient eye to improve fluid drainage (Haddrill, 2012).

## 1.7 Night blindness

The ability of our eyes to quickly view objects as they shift from light to dark areas and the ability to see in dim light or at night is an important part of our visual health. When we are not able to do such, the condition is referred to commonly as night blindness or medically as nyctalopia. It occurs as a result of various diseases that cause degeneration of the rods of the retina (the sensory cells responsible for vision in dim light). The problem can also appear as an

inherited deficiency in visual purple, or rhodopsin, which is the pigment of the rods of the retina. The abnormality can also result from vitamin A deficiency. Rhodopsin, maintains its photosensitivity only in the presence of vitamin A. Night blindness is a classic finding from deficiency of vitamin A. Sources of vitamin A include animal livers, milk, and yellow and green leafy vegetables which contain carotenes, chemically related substances that are converted to vitamin A in the body. Night blindness is also called day sight, nocturnal amblyopia, nyctalopia and nyctanopia (Leroy, 2011).

### 1.7.1 Causes

The causes of night blindness fall into two categories: treatable and nontreatable.

**Treatable causes**:

1. Cataracts

2. Nearsightedness

3. Use of certain drugs

4. Vitamin A deficiency

**Nontreatable causes:**

1. Birth defects

2. Retinitis pigmentosa (Leroy, 2011).

### 1.7.2 Signs and Symptoms

In night blindness a person has difficulty seeing at night or in a dimly lit root. However, in milder cases a person may not clearly identify this visual impairment. Rather there is a change in their behavior such as opting to use brighter light or avoiding night driving. Eventually a person realizes that there behavior change is due to difficulty seeing with lower light intensity. Another common feature of night blindness is the prolonged adaptation when moving from a bright to dark room. Most of us need a few seconds to adapt when moving from a very bright environment

to a dark area like a movie theater. However, in people who suffer with night blindness it can take a significant period of time to adapt, if at all and can even lead to accidents, like falling.

### 1.7.3 Prevention and Management

By treating the above conditions early it is possible to prevent night blindness. Vitamin A supplementation as a preventative measure will only be effective for night blindness due to vitamin A deficiency. It is ineffective against other causes and high doses of vitamin A can lead to toxicity. Management involves lifestyle measures that can limit the extent to which night blindness impacts on daily life and has to be considered for non-treatable causes. Use brighter light where necessary. This may involve brighter artificial lighting, allowing more sunlight into the home or office where possible or even carrying and using a small light source like a flashlight. Avoid driving at night if there is significant impairment of nighttime vision. It may be inconvenient but it can prevent serious road traffic accidents that can be fatal. Early treatment of some conditions can minimize the severity of the condition and even reverse it (Haddrill, 2012).

### 1.7.4 Treatment

Changes in vision should never be taken lightly. Because night blindness can be a symptom of a serious disease, an ophthalmologist should be consulted before a person embarks on self-treatment. Persons who experience night blindness should not drive during the evening or at night. Additional safety precautions should be taken. Alternative remedies may be effective at reducing night blindness, particularly when caused by a vitamin A deficiency (Leroy, 2011).

## 1.8 Diabetic retinopathy

Diabetic retinopathy is a diabetes complication that affects eyes. It's caused by damage to the blood vessels of the light-sensitive tissue at the back of the eye (retina). At first, diabetic retinopathy may cause no symptoms or only mild vision problems. Eventually, it can cause blindness. The condition can develop in anyone who has type 1 or type 2 diabetes. The longer patient have diabetes and the less controlled your blood sugar is, the more likely patient are to develop this eye complication (American Optometric Association, 2016).

### 1.8.1 Symptoms

Patient might not have symptoms in the early stages of diabetic retinopathy. As the condition progresses, diabetic retinopathy symptoms may include:

1. Spots or dark strings floating in vision (floaters)

2. Blurred vision

3. Fluctuating vision

4. Impaired color vision

5. Dark or empty areas in vision

6. Vision loss

7. Diabetic retinopathy usually affects both eyes (American Optometric Association, 2016).

### 1.8.2 Causes

Over time, too much sugar in blood can lead to the blockage of the tiny blood vessels that nourish the retina, cutting off its blood supply. As a result, the eye attempts to grow new blood vessels. But these new blood vessels don't develop properly and can leak easily.

### 1.8.3 Type

There are two types of diabetic retinopathy:

**Early diabetic retinopathy**

In this more common form called nonproliferative diabetic retinopathy (NPDR) — new blood vessels aren't growing (proliferating). When patient have NPDR, the walls of the blood vessels in retina weaken. Tiny bulges (microaneurysms) protrude from the vessel walls of the smaller vessels, sometimes leaking fluid and

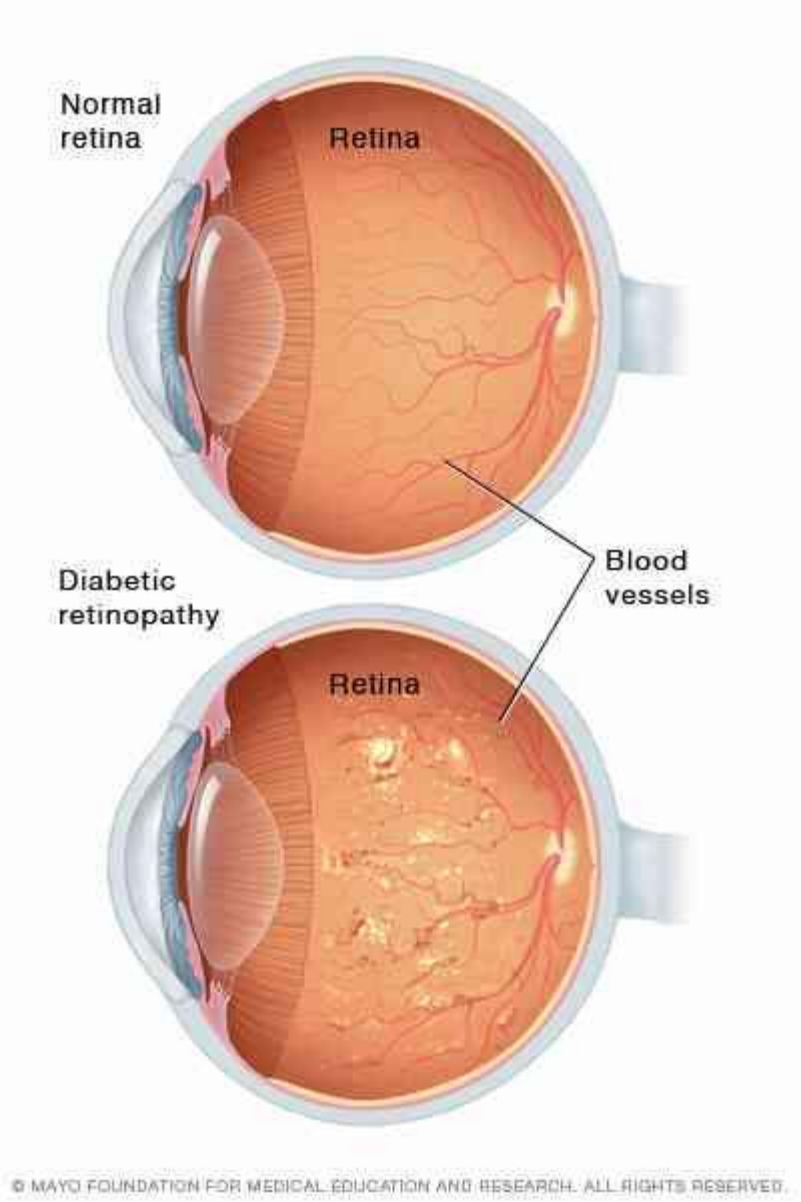


**Fig 1.5: Diabetic Retinopathy state (Congdon, 2001).**

blood into the retina. Larger retinal vessels can begin to dilate and become irregular in diameter, as well. NPDR can progress from mild to severe, as more blood vessels become blocked. Nerve fibers in the retina may begin to swell. Sometimes the central part of the retina (macula) begins to swell (macular edema), a condition that requires treatment.

**Advanced diabetic retinopathy**

Diabetic retinopathy can progress to this more severe type, known as proliferative diabetic retinopathy. In this type, damaged blood vessels close off, causing the growth of new, abnormal blood vessels in the retina, and can leak into the clear, jelly-like substance that fills the center of eye (vitreous). Eventually, scar tissue stimulated by the growth of new blood vessels may cause the retina to detach from the back of eye. If the new blood vessels interfere with the normal flow of fluid out of the eye, pressure may build up in the eyeball. This can damage the nerve that carries images from eye to brain (optic nerve), resulting in glaucoma (Congdon, 2001).

### 1.8.4 Risk factors

Anyone who has diabetes can develop diabetic retinopathy. Risk of developing the eye condition can increase as a result of:

1. Duration of diabetes the longer patient have diabetes, the greater risk of developing diabetic retinopathy

2. Poor control of blood sugar level

3. High blood pressure

4. High cholesterol

5. Pregnancy

6. Tobacco use

7. Being black, Hispanic or Native American (Congdon, 2001).

### 1.8.5 Complications

Diabetic retinopathy involves the abnormal growth of blood vessels in the retina. Complications can lead to serious vision problems:

**Vitreous hemorrhage**

The new blood vessels may bleed into the clear, jelly-like substance that fills the center of eye. If the amount of bleeding is small, patient might see only a few dark spots (floaters). In more-severe cases, blood can fill the vitreous cavity and completely block vision. Vitreous hemorrhage by itself usually doesn't cause permanent vision loss. The blood often clears from the eye within a few weeks or months

**Retinal detachment**

The abnormal blood vessels associated with diabetic retinopathy stimulate the growth of scar tissue, which can pull the retina away from the back of the eye. This may cause spots floating in vision, flashes of light or severe vision loss.

**Glaucoma**

New blood vessels may grow in the front part of patient eye and interfere with the normal flow of fluid out of the eye, causing pressure in the eye to build up (glaucoma). This pressure can damage the nerve that carries images from your eye to your brain (optic nerve).

**Blindness**

Eventually, diabetic retinopathy, glaucoma or both can lead to complete vision loss.

**1.8.6 Tests and diagnosis**

**Fluorescein angiography**

With patient eyes dilated, doctor takes pictures of the inside of eyes. Then doctor will inject a special dye into patient arm and take more pictures as the dye circulates through eyes. Doctor can use the images to pinpoint blood vessels that are closed, broken down or leaking fluid**.**

**Optical coherence tomography**

Eye doctor may request an optical coherence tomography (OCT) exam. This imaging test provides cross-sectional images of the retina that show the thickness of the retina, which will

help determine whether fluid has leaked into retinal tissue. Later, OCT exams can be used to monitor how treatment is working.

### 1.8.7 Treatments and drugs

Treatment, which depends largely on the type of diabetic retinopathy patient have and how severe it is, geared to slowing or stopping progression of the condition**.**

**Early diabetic retinopathy**

If patient have mild or moderate nonproliferative diabetic retinopathy, it may not need treatment right away. However, eye doctor will closely monitor patient eyes to determine when patient might need treatment. Work with diabetes doctor (endocrinologist) to determine if there are ways to improve patient diabetes management. When diabetic retinopathy is mild or moderate, good blood sugar control can usually slow the progression**.**

**Advanced diabetic retinopathy**

If patient have proliferative diabetic retinopathy or macular edema, it'll need prompt surgical treatment. Depending on the specific problems with patient retina, options may include:

**Focal laser treatment**

This laser treatment, also known as photocoagulation, can stop or slow the leakage of blood and fluid in the eye. During the procedure, leaks from abnormal blood vessels are treated with laser burns. Focal laser treatment is usually done in doctor's office or eye clinic in a single session. If patient had blurred vision from macular edema before surgery, the treatment might not return vision to normal, but it's likely to reduce the chance the macular edema may worsen. Scatter laser treatment. This laser treatment, also known as photocoagulation, can shrink the abnormal blood vessels. During the procedure, the areas of the retina away from the macula are treated with scattered laser burns. The burns cause the abnormal new blood vessels to shrink and scar. It's usually done in doctor's office or eye clinic in two or more sessions. Patient vision will be blurry for about a day after the procedure. Some loss of peripheral vision or night vision after the procedure is possible**.**

**Vitrectomy**

This procedure uses a tiny incision in eye to remove blood from the middle of the eye (vitreous) as well as scar tissue that's tugging on the retina. It's done in a surgery center or hospital using local or general anesthesia. Surgery often slows or stops the progression of diabetic retinopathy, but it's not a cure. Because diabetes is a lifelong condition, future retinal damage and vision loss are still possible. Even after treatment for diabetic retinopathy, patient will need regular eye exams. At some point, additional treatment may be recommended. Researchers are studying new treatments for diabetic retinopathy, including medications that may help prevent abnormal blood vessels from forming in the eye. Some of these medications are injected directly into the eye to treat swelling or abnormal blood vessels. These treatments appear promising, but more study is needed.

### 1.7.8 Alternative medicine

Several alternative therapies have suggested some benefits for people with diabetic retinopathy, but more research is needed to understand whether these treatments are effective and safe. Be sure to let doctor know if patient are taking any herbs or supplements. They have the potential to interact with other medications, or cause complications in surgery, such as excessive bleeding. It's vital not to delay standard treatments to try unproven therapies. Early treatment is the best way to prevent vision loss (American Optometric Association, 2016).

### 1.7.9 Prevention

It can't always prevent diabetic retinopathy. However, regular eye exams, good control of patient blood sugar and blood pressure, and early intervention for vision problems can help prevent severe vision loss.

If patient have diabetes, reduce risk of getting diabetic retinopathy by doing the following:

**Manage diabetes**

Make healthy eating and physical activity part of daily routine. Try to get at least 150 minutes of moderate aerobic activity, such as walking, each week.

**Monitor blood sugar level**

It may need to check and record blood sugar level several times a day — more-frequent measurements may be required.

**Ask doctor about a glycosylated hemoglobin test**

The glycosylated hemoglobin test, or hemoglobin A1C test, reflects average blood sugar level for the two- to three-month period before the test. For most people, the A1C goal is to be under 7 percent.

**Keep blood pressure and cholesterol under control**

Eating healthy foods, exercising regularly and losing excess weight can help. Sometimes medication is needed, too.

**Pay attention to vision changes**

Patient should Contact with eye doctor right away if experience sudden vision changes or vision becomes blurry, spotty or hazy (American Optometric Association, 2016).

# Chapter 2

# Literature

# Review

## 2.1 Awareness and Knowledge of Poor Vision among Students in Taif University

Alghadmdi in 2011 conducted a study to assess the level of awareness and knowledge of problem of poor vision in Taif city among the Taif University students. A total of 1132 students were randomly chosen from all colleges of the university to participate in the study. They were 686 males and 446 females, 41.2% of them were students in colleges for medical and non-medical sciences and the rest were students in the rest of colleges of Taif University. The participants were good representatives of the whole university students. They responded to a structured questionnaire on poor vision to trained field investigators (fifth year medical students). Having heard of the eye disease in question was defined as "awareness' and having some understanding of the eye disease was defined as "knowledge". Awareness of poor vision (~90%) was good. Knowledge of all the eye diseases assessed was ~70%. Students in colleges of sciences were significantly more aware of the poor vision problem than students from the other colleges. ~35% of female students and 30% of male students answered don't know when they asked about knowing about poor vision. There is a little difference in knowledge about poor vision among students in different academic years, being more in the last years than in the early years of academic years. The major source of awareness of poor vision was a family member, of the eye diseases was a family member/friend/relative suffering from that eye disease. These data indicate that knowledge of poor vision and its cause and possible prevention is unsatisfactory, and the available data suggest that there is a need for health education in this population to increase their level of awareness and knowledge of common eye diseases. Such awareness and knowledge could lead to better understanding and acceptance of the importance of routine eye examinations for the early detection and treatment of eye diseases, thereby reducing visual impairment in this population (Alghadmdi, 2011).

## 2.2 Awareness of eye diseases in an urban population in southern India

Dandona el al. in 1993 were conducted this study is to assess the level of awareness of eye diseases in the urban population of Hyderabad in southern India. A total of 2522 subjects of all ages, who were representative of the Hyderabad population, participated in the population-based Andhra Pradesh Eye Disease Study. Of these subjects, 1859 aged >15 years responded to a

structured questionnaire on cataract, glaucoma, night blindness and diabetic retinopathy to trained field investigators. Having heard of the eye disease in question was defined as ‘‘awareness’’ and having some understanding of the eye disease was defined as ‘‘knowledge’’. Findings Awareness of cataract (69.8%) and night blindness (60.0%) was moderate but that of diabetic retinopathy (27.0%) was low, while that of glaucoma (2.3%) was very poor. Knowledge of all the eye diseases assessed was poor. Subjects aged 530 years were significantly more aware of all eye diseases assessed except night blindness. Multivariate analysis revealed that women were significantly less aware of night blindness. Education played a significant role in awareness of these eye diseases. Study subjects of upper socioeconomic status were significantly more aware of night blindness and those belonging to upper and middle socioeconomic strata were significantly more aware of diabetic retinopathy. Muslims were significantly more aware of cataract and less aware of night blindness. The major source of awareness of the eye diseases was a family member/friend/relative suffering from that eye disease. Conclusion these data suggest that there was a need for health education in this Indian population to increase their level of awareness and knowledge of common eye diseases. Such awareness and knowledge could lead to better understanding and acceptance of the importance of routine eye examinations for the early detection and treatment of eye diseases, thereby reducing visual impairment in this population (Dandona *et al*., 1993).

### 2.3 Parents’ awareness and perception of children's eye diseases in Nigeria

Most causes of childhood blindness are treatable or preventable. Knowledge of parents’ awareness and perception of eye problems is important in helping to understand parents’ eye care seeking behavior. This understanding becomes necessary as early detection and intervention can be effective when done at an early age. Ebeigbe and Emedike in 2016 were conducted this Study carried out in Benin City, Nigeria. Thirty-five parents aged 38–54 years with a mean age of 43(±2) years were recruited. Twenty six were females and nine males. Ten eye care practitioners aged 30–45 years with a mean age of 40 (±2) were included. Seven were males and three were females. Data was analyzed qualitatively and in percentages. Majority of parents were aware of common eye problems: Blurry vision (85.7%), measles in eye (48.5%), cataract (74.3%), conjunctivitis (48.5%), itching and redness (74.3%), crossed eyes (34.3%), strabismus (57.1%),

short sightedness (48.5%). Too much carbohydrate, night reading and too much TV were some of the reasons given for bad eyesight. Self-medication and use of local remedies for treatment of conjunctivitis was common practice (94.3%). Chloramphenicol eye drop was the most common drug used for any eye problem before visiting a doctor (80.0%).Parents were aware of common eye diseases in children but have wrong perception of their causes. Programs to increase public awareness of causes of eye problems and harmful effects of self-medication are advocated for to expose inherent dangers (Ebeigbe and Emedike, 2016).

### 2.4 Assessment of Awareness, Knowledge, Attitudes and Practices Associated with Eye Diseases in the Population of Aljouf and Hail Province of Saudi Arabia

Al Zarea in 2016 was conducted this study to assess the awareness, knowledge, attitudes and practices associated with eye diseases in the population of AlJouf and Hail province of Saudi Arabia. A total of 763 patients attending the Ministry of Health hospitals with various complaints were incorporated in this study. Data were collected from participants using a structured questionnaire. The questionnaire collected information regarding demographics, awareness, knowledge, attitude and practice regarding eye diseases. In this study 59.23% of males and 40.76% of females were participated. Majority of the participants (88.99%) were aware of blurring or refractive error, 83.87% were aware of night blindness. Graduates and higher qualified, male subjects and those belonging to higher economic class were much aware about the various eye diseases and exhibited positive attitudes and practices towards eye care. Most of the participants (60.55%) replied that they went for eye examination whenever they had a complaint, 73.65% were not aware that any treatment is available for eye disease and 26.6% replied that they obtained information about eye diseases from relatives/friends/family members. The results suggested that still there is a need for health education in the population of this region of Saudi Arabia to increase their level of awareness and knowledge of common eye diseases especially in females, lower economy class and illiterates (Al Zarea, 2016).

## 2.5 The knowledge, perception, and attitude of patients living with glaucoma and attending the eye clinic of a secondary health care facility in South-East, Nigeria

In the developing countries, most patients present with advanced disease or glaucoma blindness. This has been attributed to lack of awareness and poor knowledge as major contributing factors. The outcome of glaucoma management, however, depends largely on the understanding and perception of the illness by the patients. Achigbu, Achigbu and Chuka-Okosa in 2015 were conducted this study to determine the knowledge, perception, and attitude of patients living with glaucoma and attending the Eye Clinic of the Imo State Specialist Hospital Owerri Imo State, Nigeria. The information obtained can be utilized by the health authorities in planning eye health education programs. This was a cross-sectional study involving all previously diagnosed glaucoma patients attending the eye clinic of the hospital during the study period. Data were collected on knowledge, perception, and social disclosure attitude of the subjects using a structured questionnaire. Twenty-nine males and 25 females participated in this study. The majority (42.6%) had only primary school education with petty trading accounting for 38.9% of the different occupations. The mean age at presentation was 60.9 years. The majority (88.8%) identified their eye problem as glaucoma, 46.3% knew it caused a progressive, irreversible loss of vision, and most (68.5%) did not know glaucoma to be familial. Approximately 67% of the subjects rated their management as satisfactory, 37% considered the drugs expensive, 70% and 13%, respectively had no, and negative perception of glaucoma surgery while 87.0% had a poor disclosure attitude. Conclusion: The subjects had a good knowledge of their diagnosis but a poor knowledge of the disease process. There was also an appreciable poor disclosure attitude and a negative perception of glaucoma surgery. Education and interaction with eye care personnel and other glaucoma patients using focal groups may bring about the desired change (Achigbu, Achigbu and Chuka-Okosa, 2015). .

## 2.6 Determinants of glaucoma awareness and knowledge in urban Chennai

(Ronnie et al., 2009) conducted this study to assess the awareness and knowledge levels about glaucoma and its determinants in an urban population of Chennai in south India. Chennai glaucoma study (CGS) was a population based prevalence study to estimate the prevalence of

glaucoma in a rural and urban south Indian population. A total of 3850 subjects aged 40 years or above participated in the urban arm of CGS. A systematic random sample of 1926 (50.0%) subjects completed a questionnaire that assesses their awareness and knowledge level of glaucoma. Respondents "having heard of glaucoma" even before they were contacted/recruited for the study were defined as "aware" and respondents having some understanding of the eye disease were defined as "knowledgeable". Overall 13.5% were aware of glaucoma, the age-gender adjusted rate for awareness was 13.3%. Two clinicians graded knowledge on glaucoma, based on the subject's knowledge of risk factors, definitions and treatment aspects of glaucoma. Overall 8.7% had some knowledge about glaucoma. Among those who had knowledge 0.5% had good knowledge about glaucoma, 4% had fair knowledge and 4.2% had poor knowledge. We observed a very good agreement between the clinicians in grading knowledge. Determinants of glaucoma awareness and knowledge were higher levels of education, females, age, religion and family history of glaucoma. Awareness and knowledge about glaucoma was very low among the urban population of Chennai. Study had found that younger subjects and men were less aware of glaucoma. Subjects with lower levels of education were less aware and knew less about glaucoma than their counterparts. The study findings stress the need for health education for effective prevention of blindness due to glaucoma (Ronnie *et al.,* 2009).

## 2.7 Knowledge and attitude for eye diseases and satisfaction for services among urban citizens of Oman: A pilot study

The eye health care program, Ministry of Health of Oman conducted a pilot survey of Omani people that visited the eye health stall. It was organized on the World Health Day on 7th April 2005 in Muscat, Oman. Khandekar and Al-Harby in 2005conducted the survey aimed at identifying the level of knowledge of blinding eye diseases and the satisfaction among community for the eye services at government hospitals. This was a descriptive study. 156 Omani citizens of more than 12 years of age were given a close ended questionnaire. Their self-reported responses were collected. Six questions related to cataract, diabetic retinopathy, refractive error, blindness, home treatment, rehabilitation of visually impaired and perception of eye services at Ministry of Health hospitals were asked with three grades of responses to choose from. The knowledge about cataract and diabetic retinopathy was found to be good in more than

70% of respondents. 35% of participants agreed for home treatment of minor eye ailments. The importance of using visual aids and the need to give special facilities for the visually impaired was positive in 85%. Two thirds of the respondents were satisfied with type of eye services. Association of knowledge and satisfaction to the gender and age group was not conclusive. Knowledge regarding cataract surgery and blindness due to diabetes, attitude towards use of spectacles, perceived need for visual rehabilitation and satisfaction with eye care services was positive in more than 60% of the interviewed people in this pilot study. A larger study representing Omani population is recommended (Khandekar and Al-Harby, 2005).

### 2.8 Knowledge, attitudes, and self-care practices associated with age related eye disease in Australia

Livingston, McCarty and Taylor in 1998 were conducted this study To determine the level of correct knowledge about common eye disease and attitudes towards blindness prevention and treatment, and how these factors influence self-care practices in a population based sample. A cluster random sample of the Victorian population was interviewed. The study population comprised residents aged 40 years of age or older living in five randomly selected Melbourne metropolitan suburbs and four randomly selected rural areas of Victoria. Questions were asked to ascertain each person's knowledge of common age related eye disease—that was, cataract, age related macular degeneration (AMD), and glaucoma. A subsample of the population was also asked questions to determine their attitudes to blindness prevention and treatment. All respondents were asked the year of their last visit to an eye practitioner. A total of 3184 (89%) eligible residents were assessed. Sex (females), age (younger people), higher levels of education (secondary, trade, or tertiary education), recent visit to an eye practitioner (within the past 2 years) and English spoken at home appeared to be significant predictors of knowledge of common age related eye conditions. Younger people believed blindness prevention and blindness treatment were the highest priorities compared with other diseases; people who spoke English at home and people with knowledge of common age related eye disease also considered blindness treatment to be the highest priority compared with other diseases. People with a previous diagnosis of age related eye disease, older people, females, people with correct knowledge of common eye diseases, and those who spoke English at home were significantly more likely to be

under eye care. No interaction was found between knowledge and positive attitudes to self-care practices. These data show that there was a large gap in the public's knowledge and understanding of eye disease that will need to be understood for eye health promotion activities (Livingston, McCarty and Taylor, 1998).

## 2.9 Glaucoma awareness, knowledge, perception of risk and eye screening behaviour among residents of Abokobi, Ghana

Although glaucoma is the lead cause of irreversible blindness globally, the condition shows no signs or symptoms until later stages. Knowledge about the disease is known to influence utilization of eye screening services. De-Gaulle and Dako-Gyeke in 2016 were conducted this study aimed at understanding knowledge and perception of risk for glaucoma, as well as eye screening behavior among residents of Abokobi, a peri-urban community. This was a cross-sectional study that employed quantitative data collection methods, with the use of a questionnaire. Descriptive statistics were used to describe the socio-demographic characteristics, knowledge about glaucoma and eye screening behavior. Also, associations between socio demographic factors and awareness as well as perception of risk were analyzed using Chi-square test or Univar ate Fisher's exact test. Out of a total of 300 respondents, 60.3 % were females and 39.3 % were aware of glaucoma. Majority (99.1 %) of respondents aware of glaucoma also agreed the disease can result in blindness with only (28 %) affirming that blindness from glaucoma is irreversible. Nearly half (49.7 %) of the respondents perceived themselves to be at risk of developing glaucoma. The results showed that age and education were statistically significant with glaucoma awareness. Approximately, 20.7 % of the respondents have had their eye screened with just a few (4.3 %) screening for glaucoma. Although glaucoma awareness was high, the findings display inadequate knowledge about glaucoma. There was a need to effectively inform and educate people about the disease (De-Gaulle and Dako-Gyeke, 2016).

## 2.10 Prevalence of visual impairment, cataract surgery and awareness of cataract and glaucoma in Bhaktapur district of Nepal: the Bhaktapur Glaucoma Study

Cataract and glaucoma are the major causes of blindness in Nepal. Bhaktapur is one of the three districts of Kathmandu valley which represents a metropolitan city with a predominantly agrarian rural periphery. (Thapa et al., 2011) conducted this study was undertaken to determine the prevalence of visual impairment, cataract surgery and awareness of cataract and glaucoma among subjects residing in this district of Nepal. Subjects aged 40 years and above was selected using a cluster sampling methodology and a door to door enumeration was conducted for a population based cross sectional study. During the community field work, 11499 subjects underwent a structured interview regarding awareness (heard of) and knowledge (understanding of the disease) of cataract and glaucoma. At the base hospital 4003 out of 4800 (83.39%) subjects underwent a detailed ocular examination including log MAR visual acuity, refraction, application tonometry, cataract grading (LOCSII), retinal examination and SITA standard perimeter when indicated. The age-sex adjusted prevalence of blindness and low vision was 0.43% and 3.97% respectively. Cataract (53.3%) was the principal cause of blindness. The leading causes of low vision were cataract (60.8%) followed by refractive error (12%). The cataract surgical coverage was 90.36% and was higher in the younger age group, females and illiterate subjects. Pseudophakia was seen in 94%. Awareness of cataract (6.7%) and glaucoma (2.4%) was very low. Among subjects who were aware, 70.4% had knowledge of cataract and 45.5% of glaucoma. Cataract was commonly known to be a 'pearl like dot' white opacity in the eye while glaucoma was known to cause blindness. Awareness remained unchanged in different age groups for cataract while for glaucoma there was an increase in awareness with age. Women were significantly less aware, confidence interval for cataract and for glaucoma. Literacy was also correlated with awareness. The low prevalence of visual impairment and the high cataract surgical coverage suggested that cataract intervention programs had been successful in Bhaktapur. Awareness and knowledge of cataract and glaucoma was very poor among this population. Eye care programs needed to be directed towards preventing visual impairment from refractive errors, screening for incurable chronic eye diseases and promoting health education in order to raise awareness on cataract and glaucoma among this population (Thapa *et al.*, 2011).

**Significance of the study**

Bangladesh is one of the mostly populated countries. Over half a million people in Bangladesh are blind from cataract and the country has one of the highest reported rates of untreated cataract in the world. Due to extreme poverty and a lack of awareness that cataract blindness is preventable and treatable, many people unnecessarily become and remain blind. Diabetes is also an emerging public health problem. It can lead to diabetic retinopathy, an eye disease which causes blindness if left untreated. Currently 1.54 million people in Bangladesh are at risk of diabetes-related blindness. Another significant problem is that most eye care services in Bangladesh are based in major cities. This creates a large gap in available help when more than three quarters of the country's population live in rural areas. There's also a lack of trained professionals to provide screening and treatment, a shortage of appropriate equipment, and minimal facilities to meet demand (Hollows.org, 2016). Glaucoma blindness affects over 6.7 million people, ranking only second to cataract (19.3 million) as a cause of blindness worldwide. Being medically and surgically irremediable, visual impairment from glaucoma presents a significant challenge to those concerned with prevention of blindness, both on an international and local scale. Glaucoma prevalence is relatively high in Bangladesh, although it accounts for only a small proportion of blindness in the community. It is estimated that there are approximately 586 000 people 40 years and older with definite or probable glaucoma in Bangladesh. Vitamin-A deficiency is a major cause of preventable blindness in children in Bangladesh. It also impairs growth, lowers resistance to infections and increases the risk of dying. In pregnant and postpartum women, Vitamin-A deficiency can have serious consequences for the health and survival of women and for the Vitamin-A status of their children. The project aims to maintain the high coverage of Vitamin-A supplementation in children aged 1–5 and to increase the coverage among children under one and postpartum mothers (WHO, 2016).

There are several studies conducting on awareness and knowledge assessment in different countries like India, Nigeria, Saudi Arab, and Australia etc. But there is very few studies regarding this topic in Bangladesh. So this study may provide information about the knowledge and awareness regarding eye disease among university students. It may also be informative to the health sector of Bangladesh. This study is expected to deliver the important information about knowledge and awareness regarding eye disease.

**Aims and object of the study**

The major objectives of this study were to -

1. To investigate knowledge and perception towards eye disease among the university students.

2. To know the kind of perception about glaucoma, cataract, night blindness and diabetic retinopathy and their thinking towards risk factors those promote eye disease.

# Chapter 3

# Methodology

### 3.1 Type of the Study

It was a survey based study.

### 3.2 Study Area

The survey was conducted in East West University in different departments. The departments were

1. PHARMACY, 2. BBA, 3. ECONOMICS, 4. CSE,5. EEE,6. ECE

### 3.3 Study Population

A total number of 400 students of different departments were surveyed with questionnaire in order to assess the awareness and knowledge regarding eye disease.

### 3.4 Data collection paper

A data collection paper was made and complied all the information and data of the student in an organized manner.

### 3.5 Study Period

The duration of the study was about six months starting from July to December in 2016.

### 3.6 Data Analysis

All the data were collected properly and then checked. After that the collected data were entered into Microsoft Excel and the result was shown in pie chart and column and calculated the percentage of the awareness on eye disease

# Chapter 4

# RESULT

### 4.1 Departmental Distribution of Student

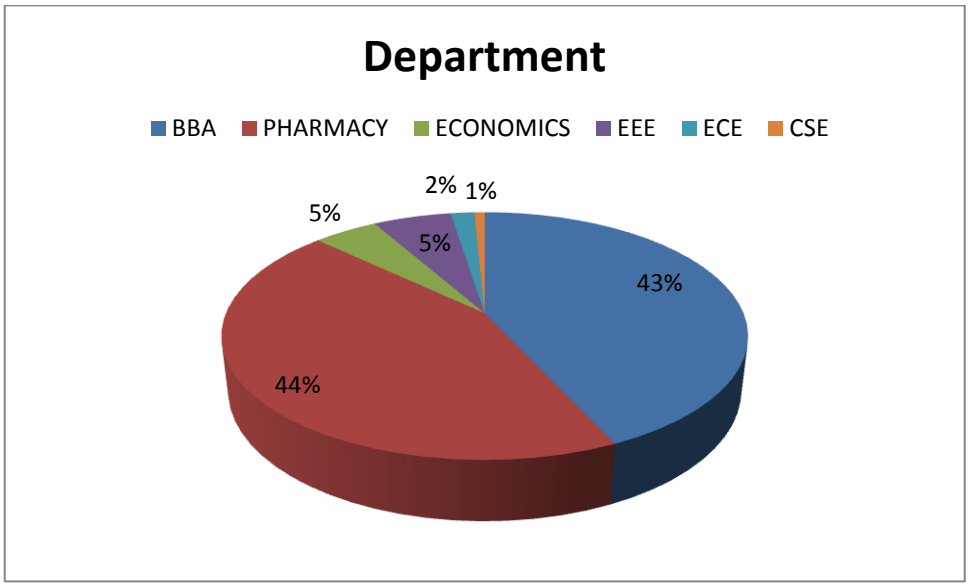


**Fig 4.1: Departmental distribution of Student**

The research was conducted on East West University students. Among them 44% were from pharmacy department and 43% students belonged to Business Administration department. Only 8% were from department of Engineering.

## 4.2 Gender Distribution of Student

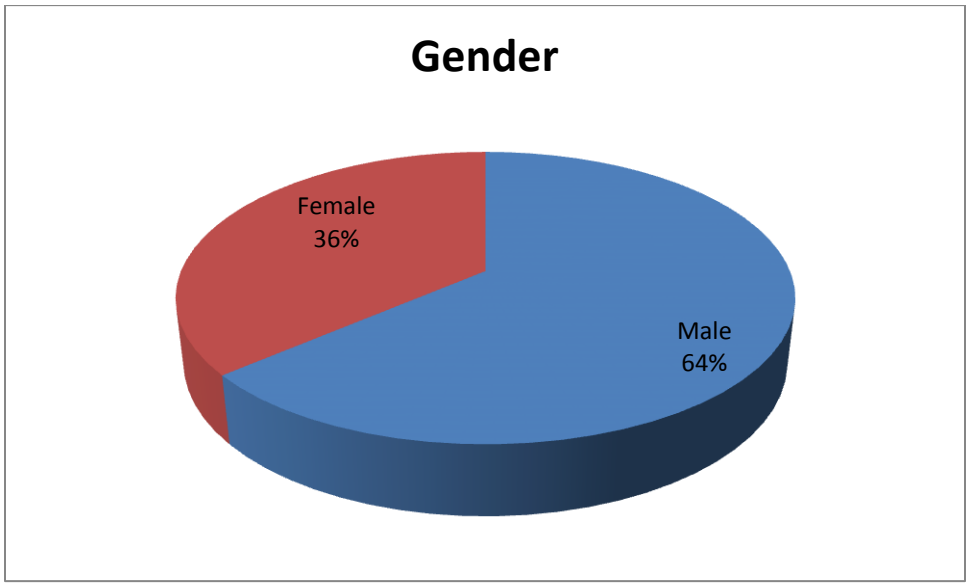


**Fig 4.2: Gender Distribution of students**

Among the students, majority was male which represent 64% and only 36% students were female.

### 4.3 Socio-Economic Condition of the Students

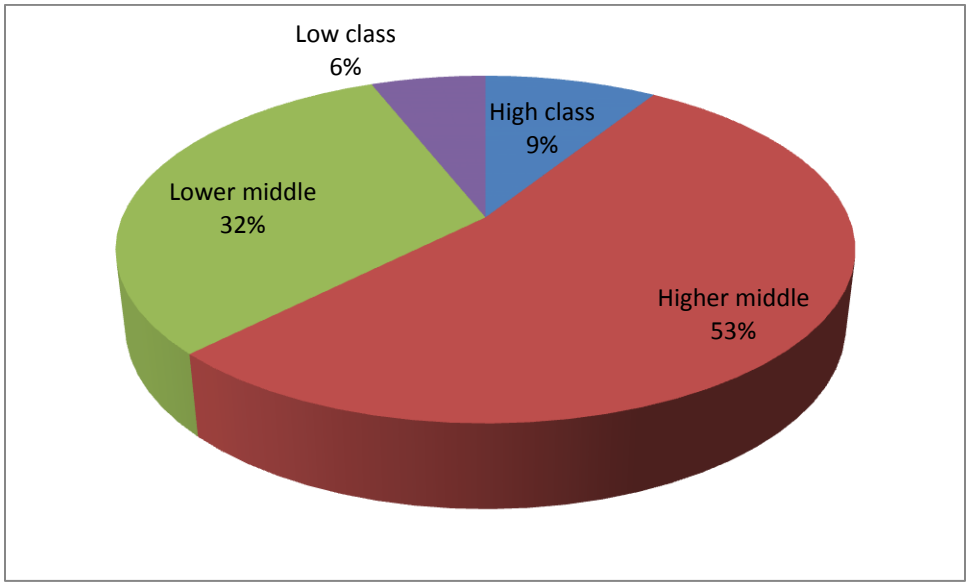


**Fig 4.3: Socio economic condition**

It was observed that most of the students belonged to higher middle class family. Around 53% of the students were from higher middle class. Only 9% students were from high class and 6% were from low class.

### 4.4 Cataract

#### 4.4.1 Knowledge about Cataract

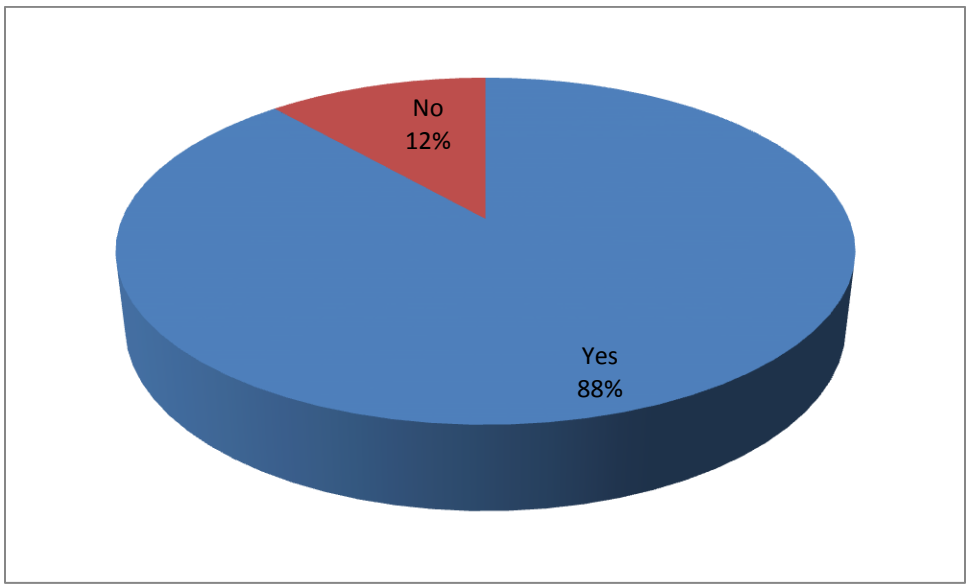


**Fig 4.4: Knowledge about Cataract**

Among the students majority of them, (88%) have heard about cataract and only 12% students answered in negative.

### 4.4.2 Knowledge about Definition

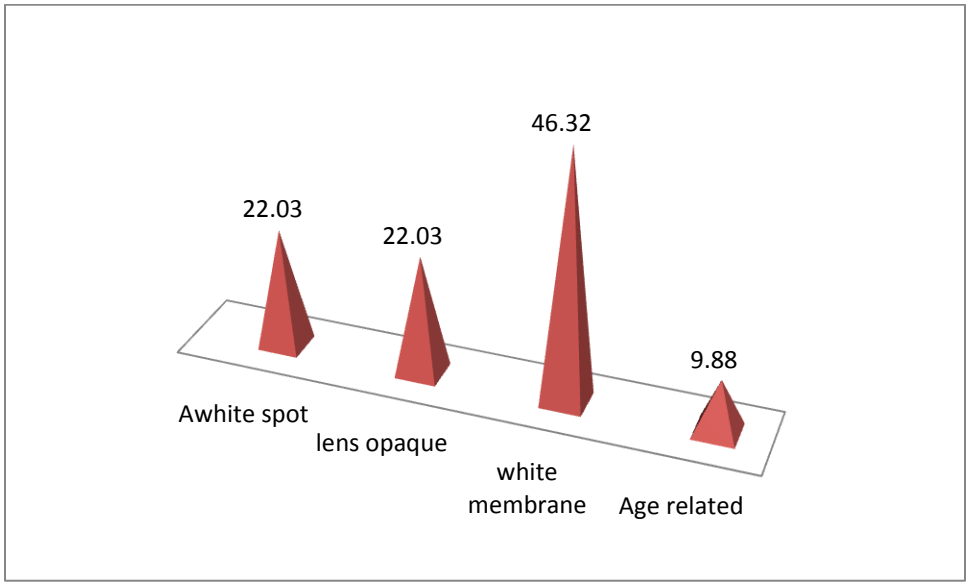


**Fig 4.5: knowledge about definition**

About the definition of Cataract around 46%students answered that cataract is a white membrane growing over the eye. On the other hand 22% of students answered that cataract is a white spot in the eye. Only 9% students answered cataract as an age related process.

### 4.4.3 Source of Knowledge

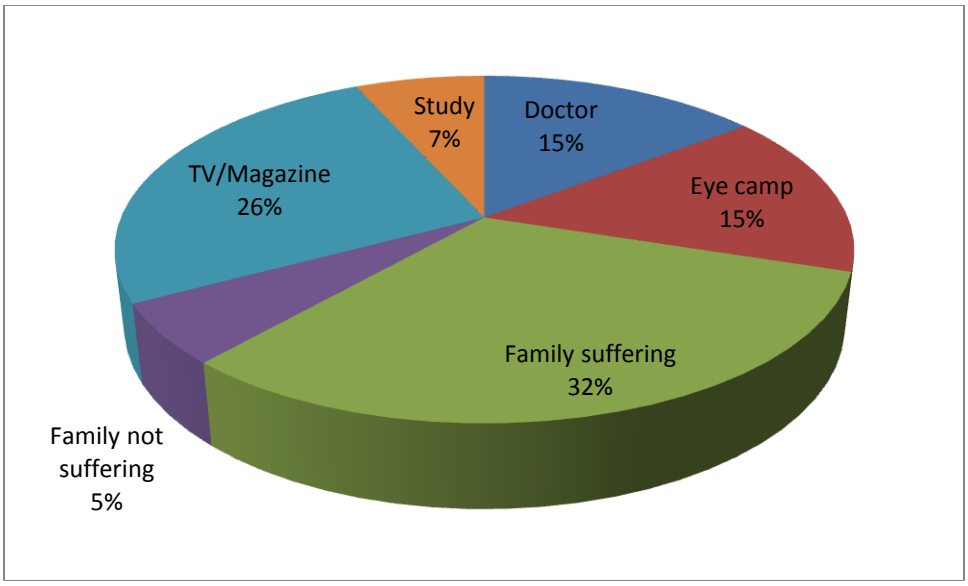


**Fig 4.6: Source of Knowledge**

Most of the students (32%) knew about cataract from family/friends suffering from it. Around 26% students knew from TV/Magazine and only 7% study knew it from study.

### 4.4.4 Knowledge about Treatability

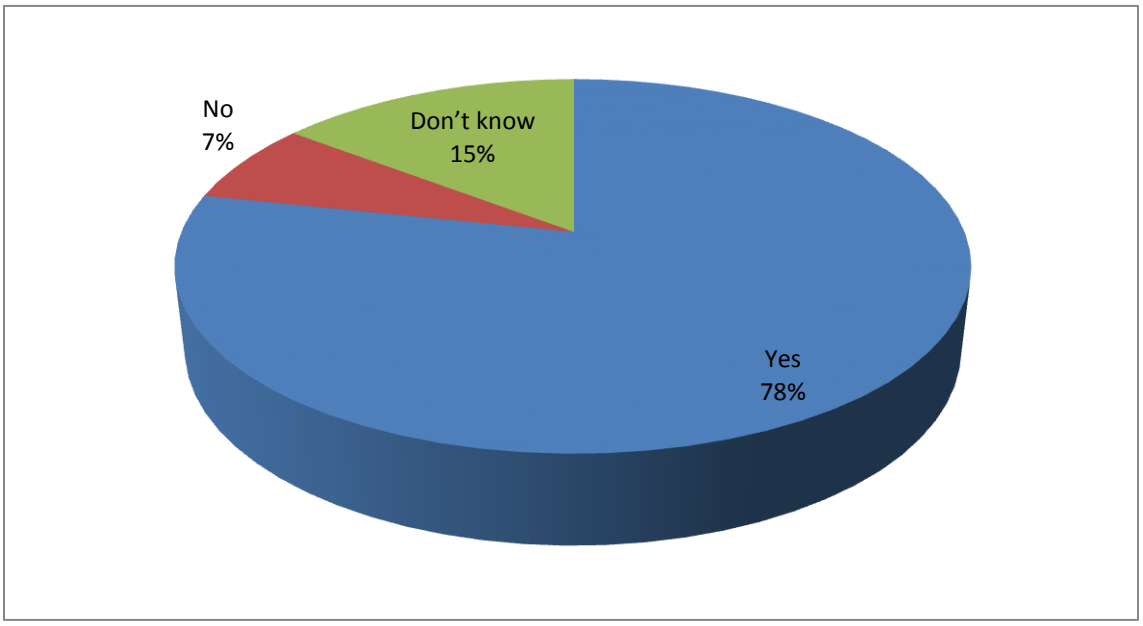


**Fig 4.7: knowledge about treatability**

Majority of the students (around 78%) answered in yes about the question of Cataract treatability and 7% students answered in no.

### 4.4.5 Knowledge about Cataract Treatment

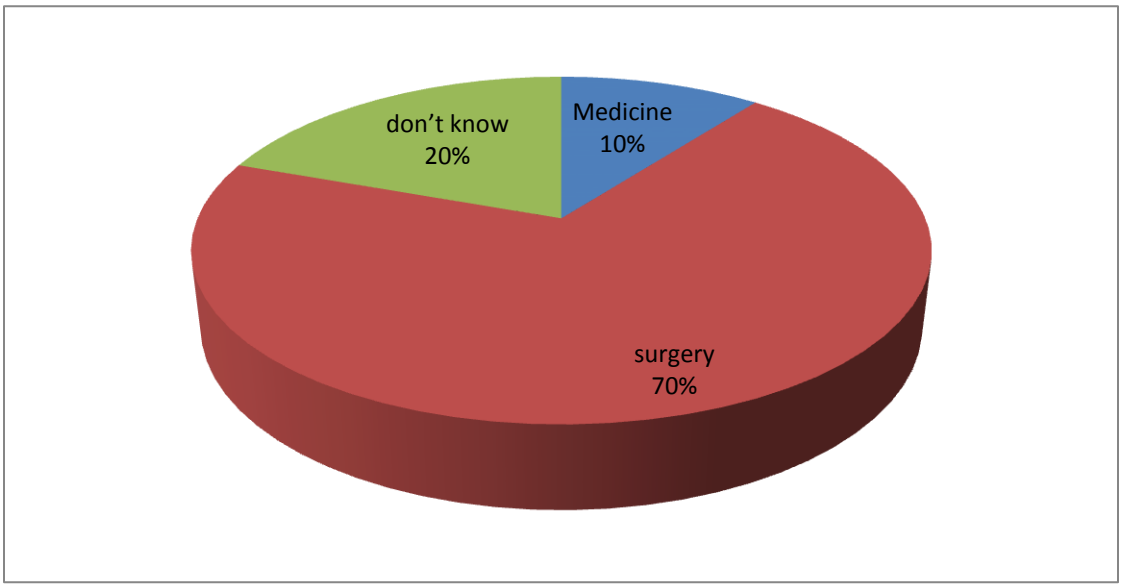


**Fig 4.8: knowledge about treatability**

Majority of the students around 70% answered surgery as the treatment for cataract and 20% of students didn't know the answer. Lastly, 10% said that medication is the treatment of cataract.

### 4.4.6 Knowledge about Possibility of Getting Vision Back

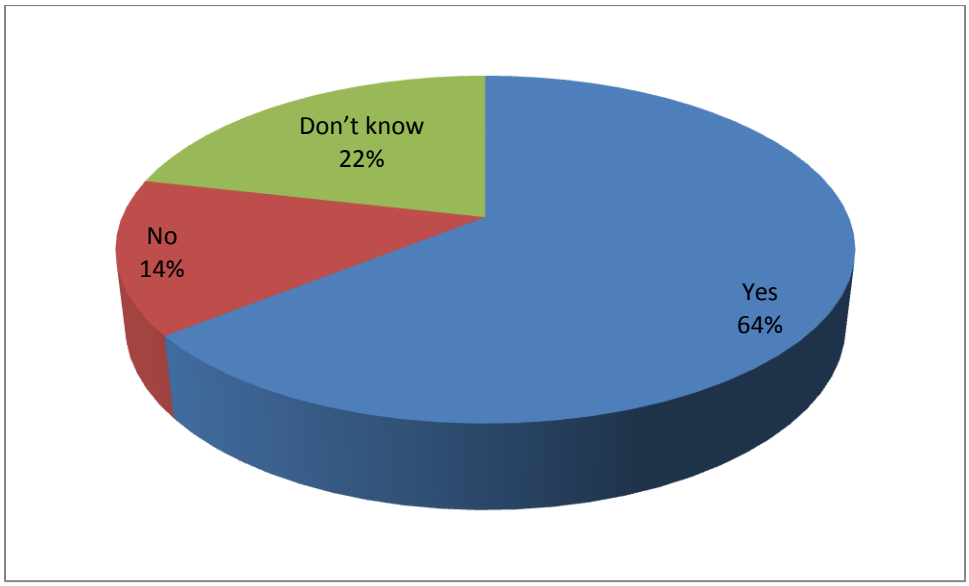


**Fig 4.9: Knowledge about Possibility of Getting Vision Back**

Around 64% students answered that it is possible to get vision back and 22% don't know the answer. Only 14% students didn't think it was possible to get vision back.

### 4.4.7 Knowledge about Intraocular Lens Implantation (IOL)

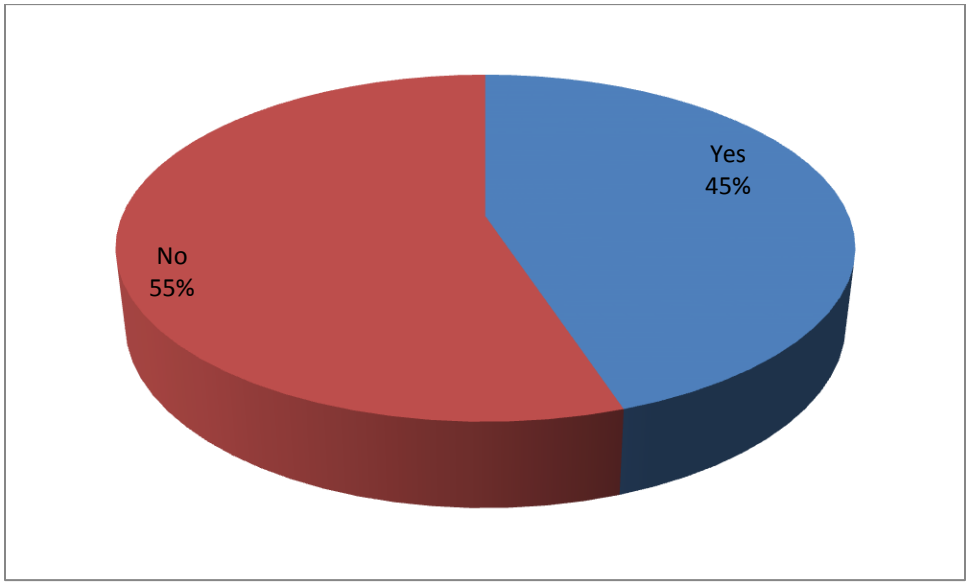


**Fig 4.10: Knowledge about Intraocular Lens Implantation (IOL)**

Only (45%) of the students knew about Intraocular Lens Implantation and the other (55%) students didn't know about it.

### 4.5 Night Blindness

### 4.5.1 Knowledge about Night Blindness

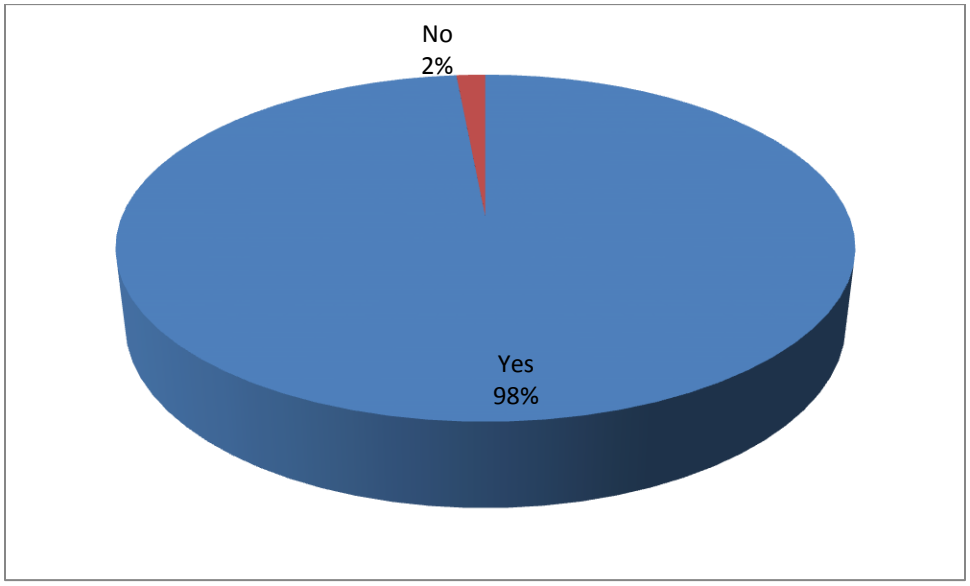


**Fig 4.11: Knowledge about Night Blindness**

Among the study population 98% had heard about night blindness and only 2% had not heard about it.

### 4.5.2 Source of Knowledge

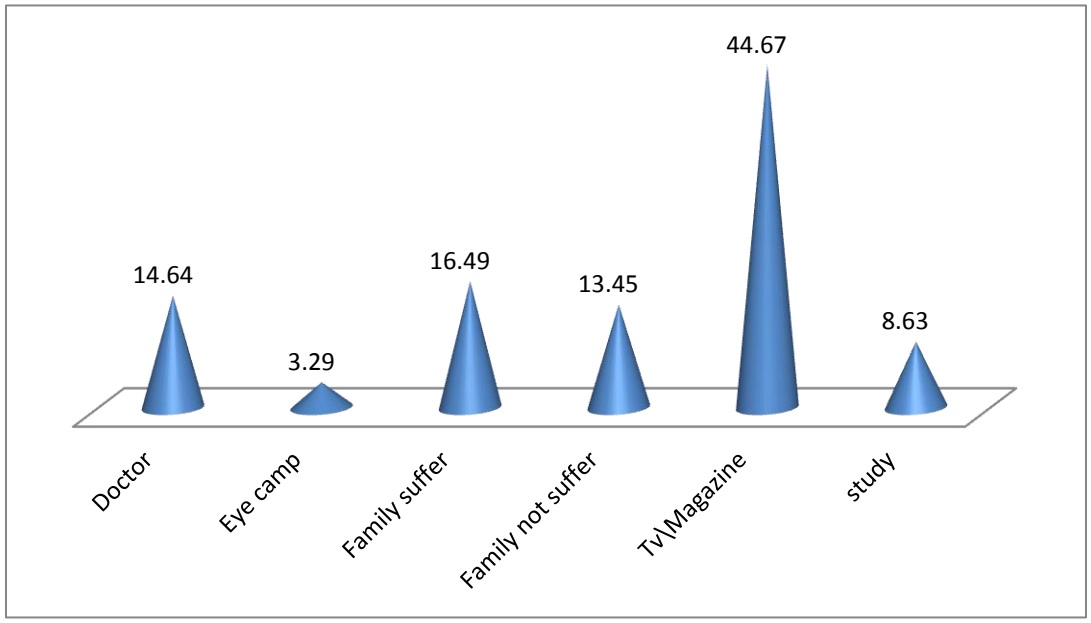


**Fig 4.12: Source of Knowledge**

Among the study population most of them (44.67%) answered that they knew about it from TV/Magazine/Other media and (8.63%) students knew it from study. Only (3.29%) knew it from eye camp.

### 4.5.3 Common Cause of Night Blindness

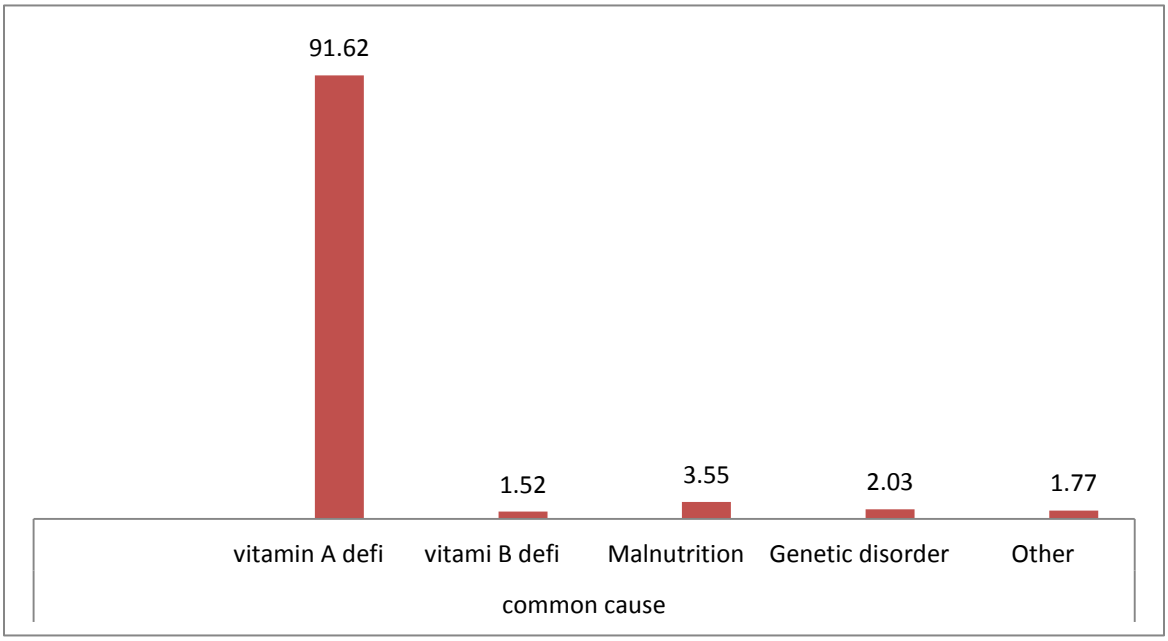


**Fig 4.13: Common Cause of Night Blindness**

Majority of the students answered (91.62%) that Vitamin A is the main cause of Night blindness. On the other hand, only 1.52% answered Vitamin B deficiency and 3.55% thought Malnutrition is the main reason behind it.

### 4.5.4 Possibility of Prevention at Childhood

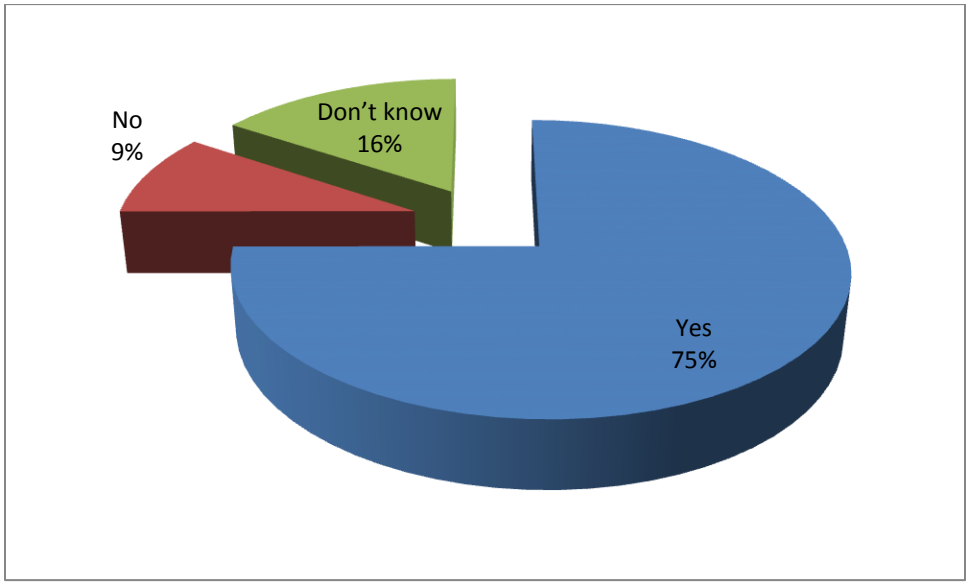


**Fig 4.14: Possibility of Prevention at Childhood**

Around 75% students thought that it can be prevented at childhood and only 9% answered in no. Among them 16% didn't know the answer.

### 4.5.5 Knowledge of Preventive Methods

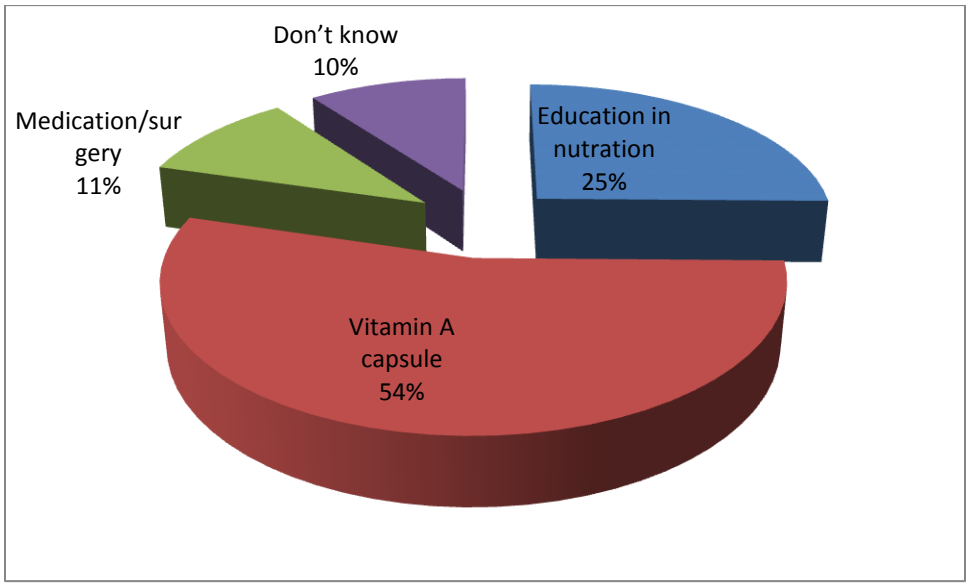


**Fig 4.15: Knowledge of Preventive Methods**

Around 54% students answered Vitamin A capsules as a prominent preventive measure. Education about nutrition as preventive measure was answered by 25%. Only 10% answered didn't know.

### 4.5.6 Possibility of Getting Vision Back from Night Blindness

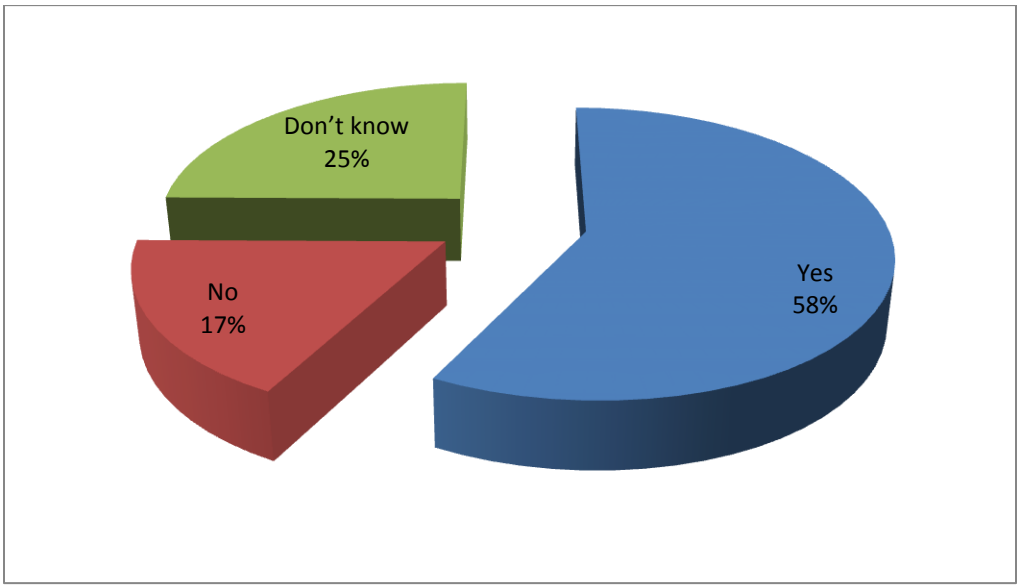


**Fig 4.16: Possibility of Getting Vision Back from Night Blindness**

Around 58% of the students answered that it was possible to get vision back from night blindness. But 25% answered that they didn't know about it.

### 4.6 Diabetic Retinopathy

#### 4.6.1 Knowledge about Diabetic Retinopathy

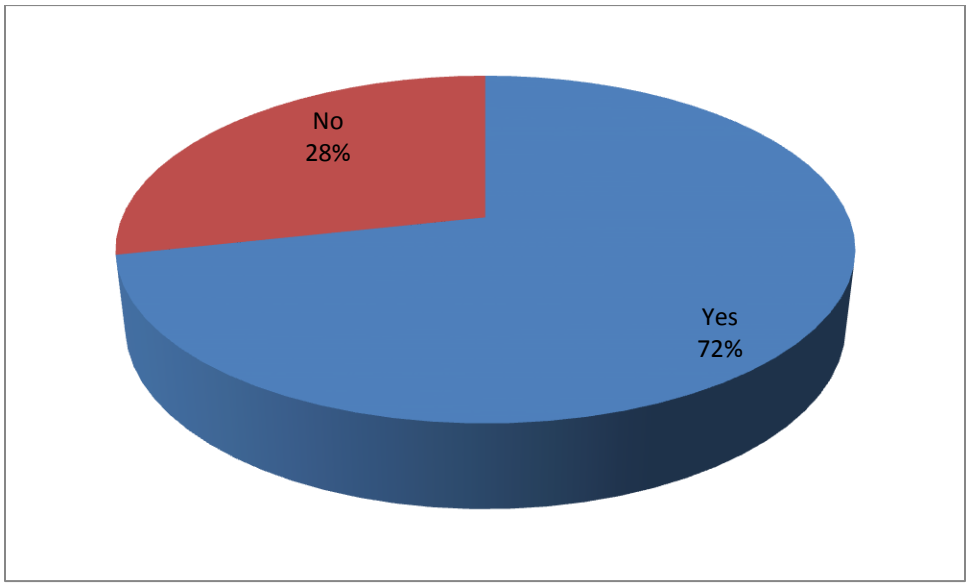


**Fig 4.17: Knowledge about Diabetic Retinopathy**

Among 400 students, most of them around 72% answered that they have heard about Diabetic Retinopathy and the remaining 28% students said that they didn't hear about Diabetic Retinopathy.

### 4.6.2 Source of Knowledge

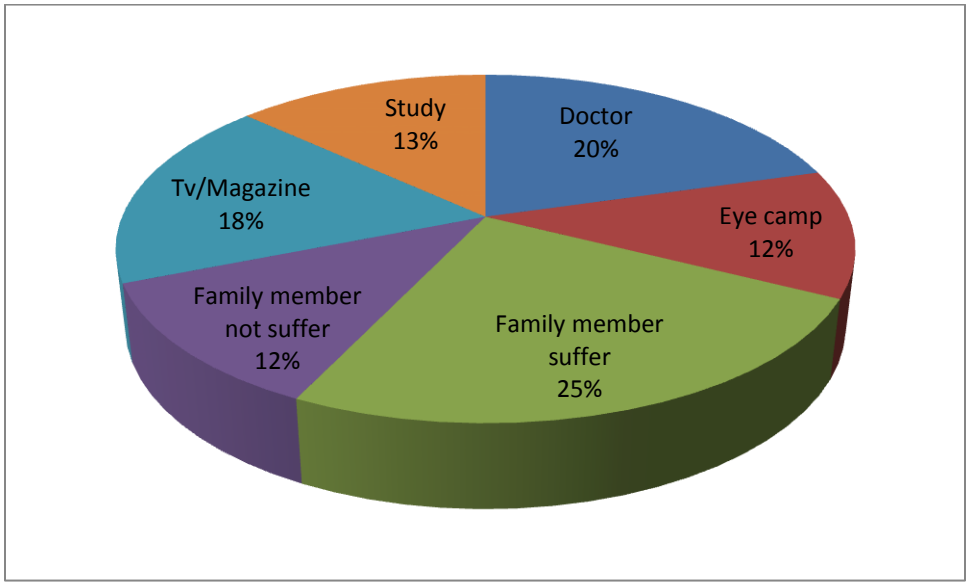


**Fig 4.18: Source of Knowledge**

Around 25% knew it from their affected family/relative/friends. Then 20% marked as Doctor and 18% of them knew about it from TV/magazine/other media.

### 4.6.3 Knowledge about Treatability Due to Loss of Vision Level

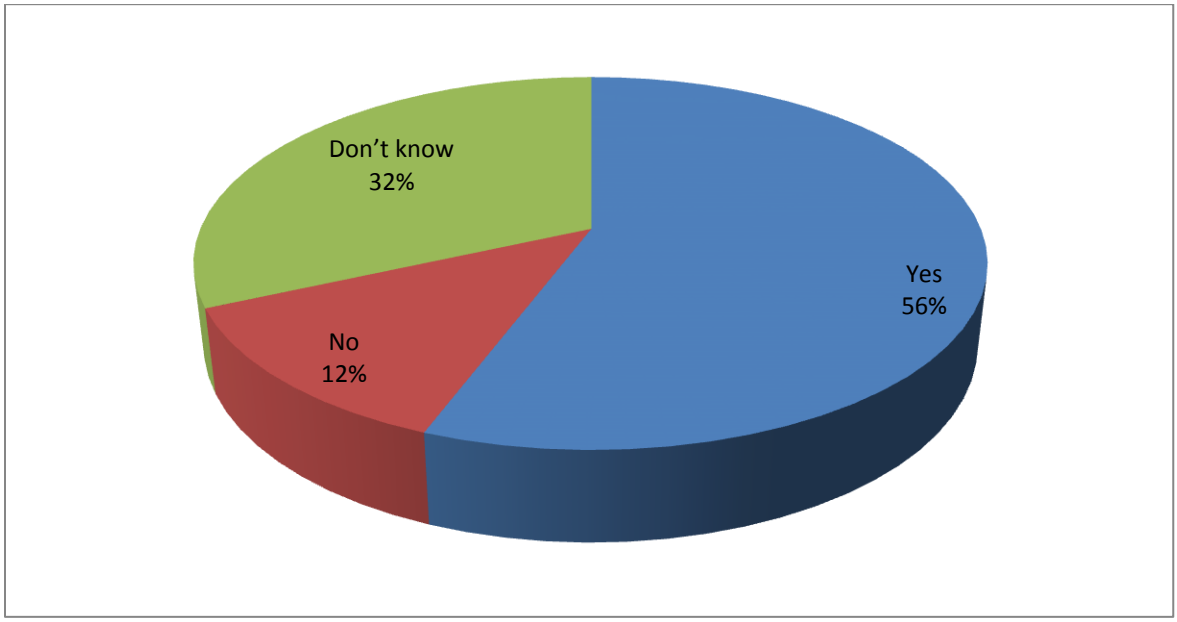


**Fig 4.19: Knowledge about Treatability Due to Loss of Vision Level**

Around 56% of students answered that decrease in vision due to Diabetic Retinopathy is treatable. But large percentage of students 32% didn't know the answer.

### 4.6.4 Knowledge about Frequency of Eye Checkup

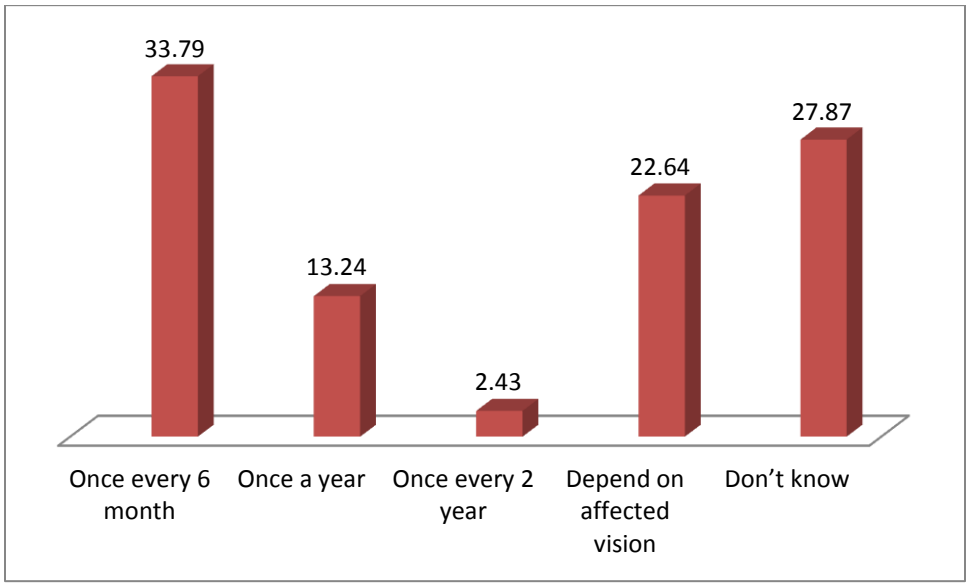


**Fig 4.20: Knowledge about Frequency of Eye Checkup**

Among the students, 33.79% answered that once every 6 months the patient should go for checkup. 22.64% of students thought that it depends on how much vision has been affected it. Only, 2.43% thought that once every 2 years the patient should attend eye checkup. Around 27.87% students didn't know it.

### 4.6.5 Knowledge of People Who Are At Risk at Diabetic Retinopathy

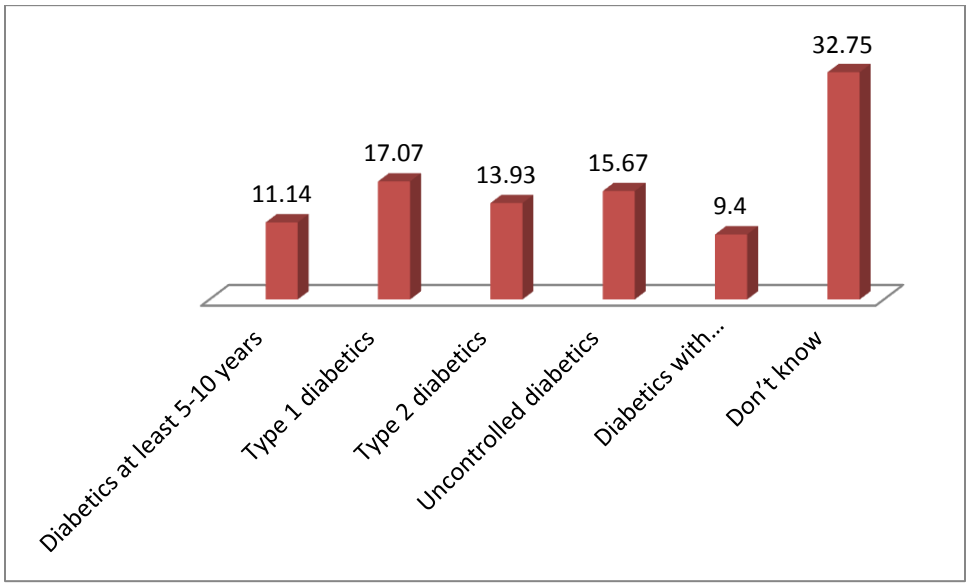


**Fig 4.21: Knowledge of People Who Are at Risk for Diabetic Retinopathy**

Around 32.75% didn't have any knowledge about who are at risk of Diabetic Retinopathy. Only 15.67% answered uncontrolled patient were at more risk for Diabetic Retinopathy. Type 1 diabetics were answered by 17.07%.

### 4.6.6 Knowledge of Diabetic Retinopathy Treatment

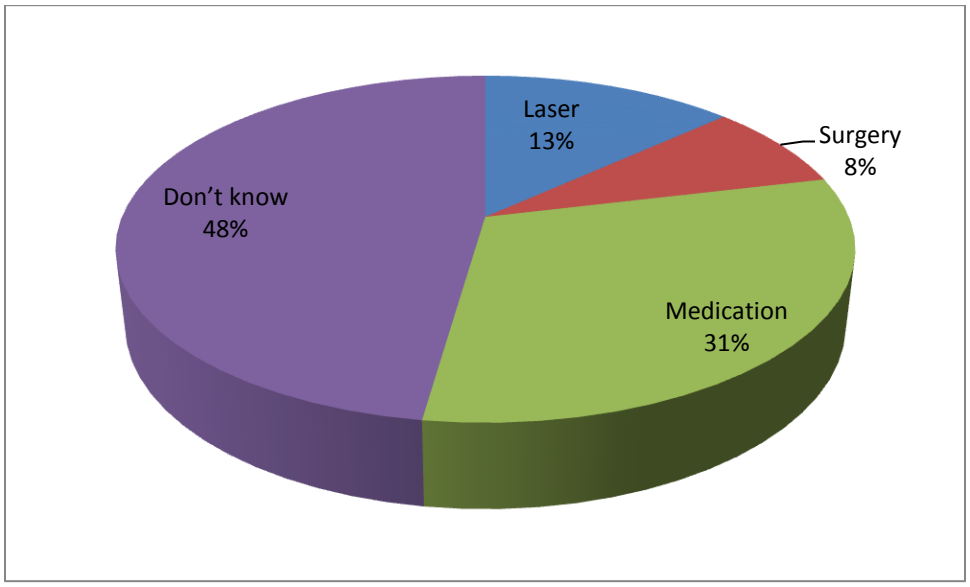


**Fig 4.22: Knowledge of Diabetic Retinopathy Treatment**

Most of the students (31%) marked that medication was the treatment for the disease and only 13% thought that Laser treatment was the treatment for Diabetic Retinopathy 48% student answered they didn't know about it.

## 4.7 Glaucoma

### 4.7.1 Knowledge about Glaucoma

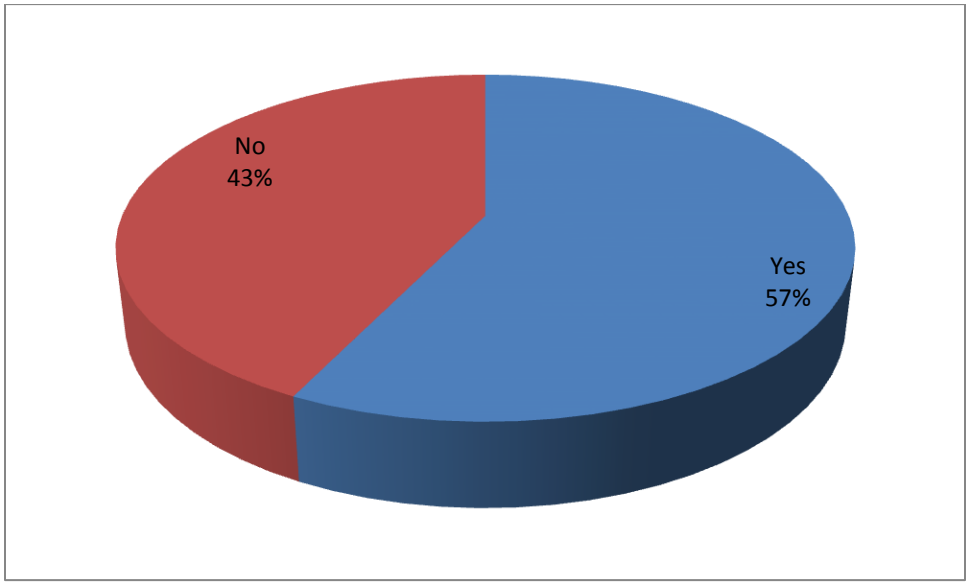


**Fig 4.23: Knowledge about Glaucoma**

Among the 400 students, majority of them 57% answered that they heard about glaucoma and the other 43% answered in no.

### 4.7.2 Knowledge about the Definition

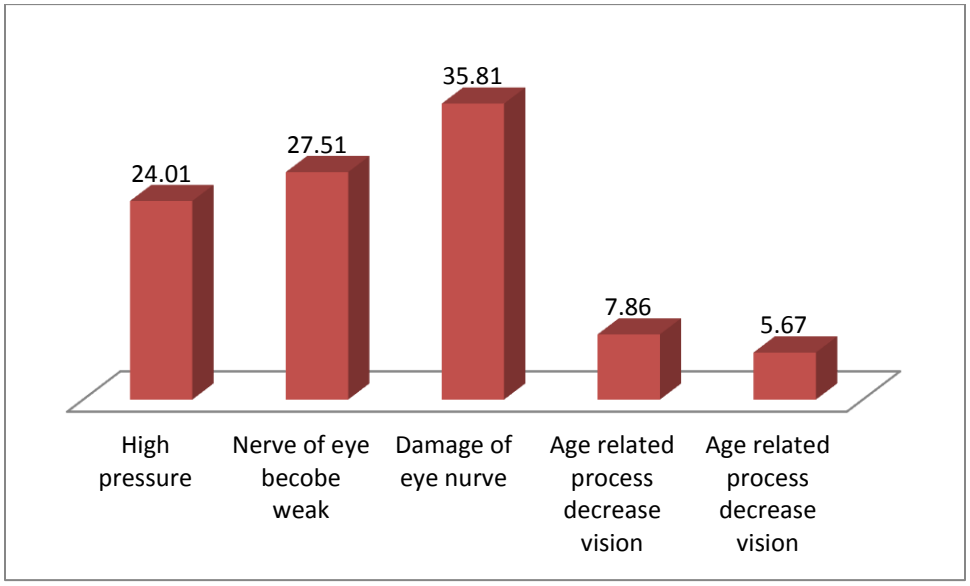


**Fig 4.24: Knowledge about the Definition**

Majority of the students 35.81% answered that Glaucoma is damage of eye nerve. On the other hand 27.51% answered that nerve of eye become weak. Only 5.67% thought that age related process decrease vision

### 4.7.3 Source of Knowledge

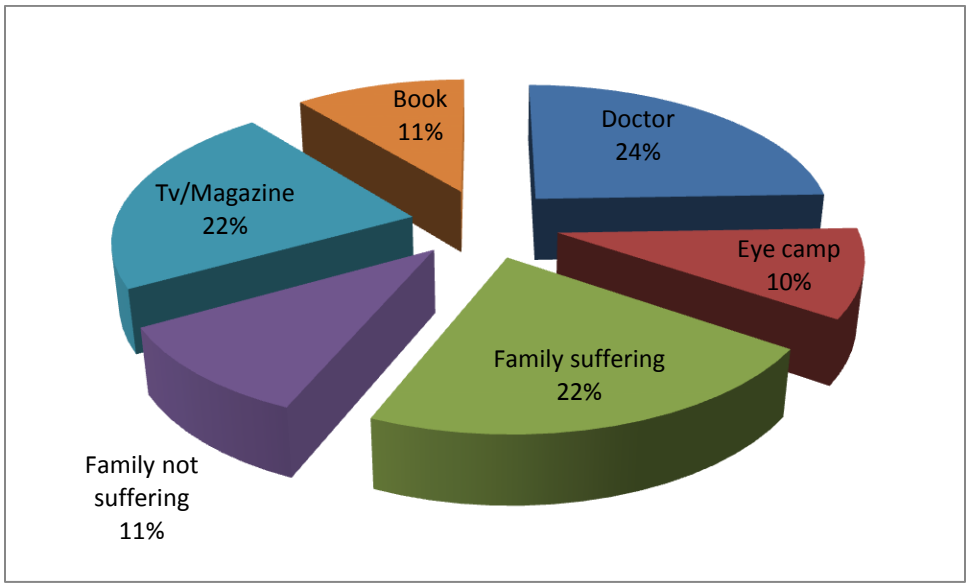


**Fig 4.25: Source of Knowledge**

Majority of the students 24% knew about glaucoma from doctor. Another, 22% answered TV /magazine or other magazine. Only 10% answered Eye camp as their source of knowledge.

### 4.7.4 Knowledge about Visual Loss being Permanent/Reversible

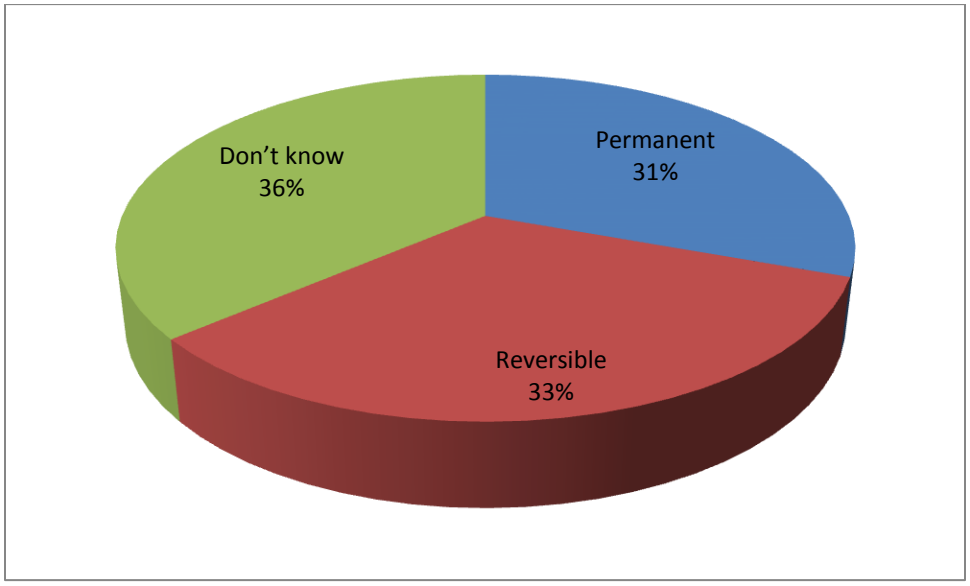


**Fig 4.26: Knowledge about Visual Loss being Permanent/Reversible**

Majority of the students 36% had no knowledge regarding visual loss. Only 31% answered that permanent visual loss happened.

### 4.7.5 Knowledge about Glaucoma Treatment

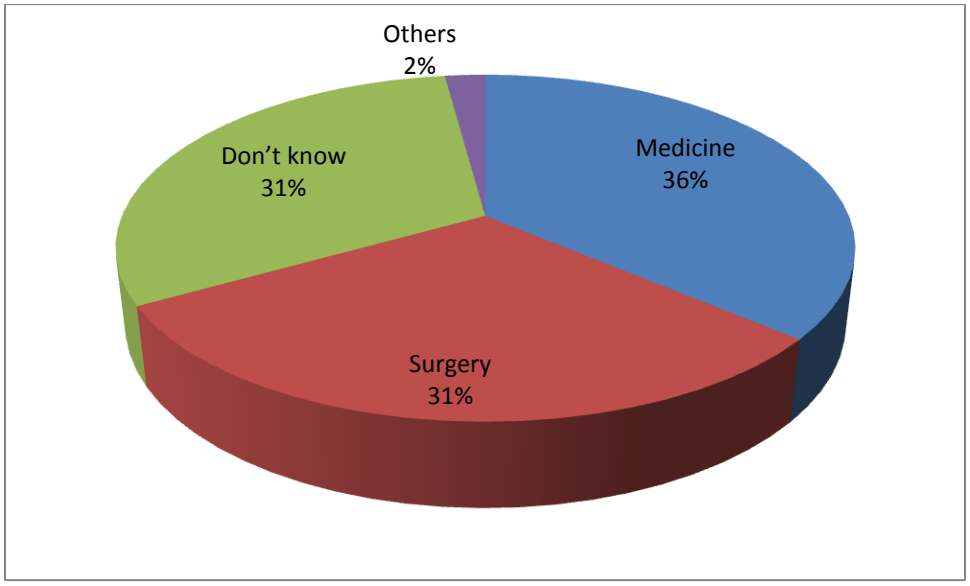


**Fig 4.27: Knowledge of Glaucoma Treatment**

Around 31% answered that surgery is the treatment for Glaucoma and 36% answered medication. On the other hand, 31% didn't know anything regarding this topic.

### 4.7.6 Possibility of Getting Vision Back From Glaucoma Blindness

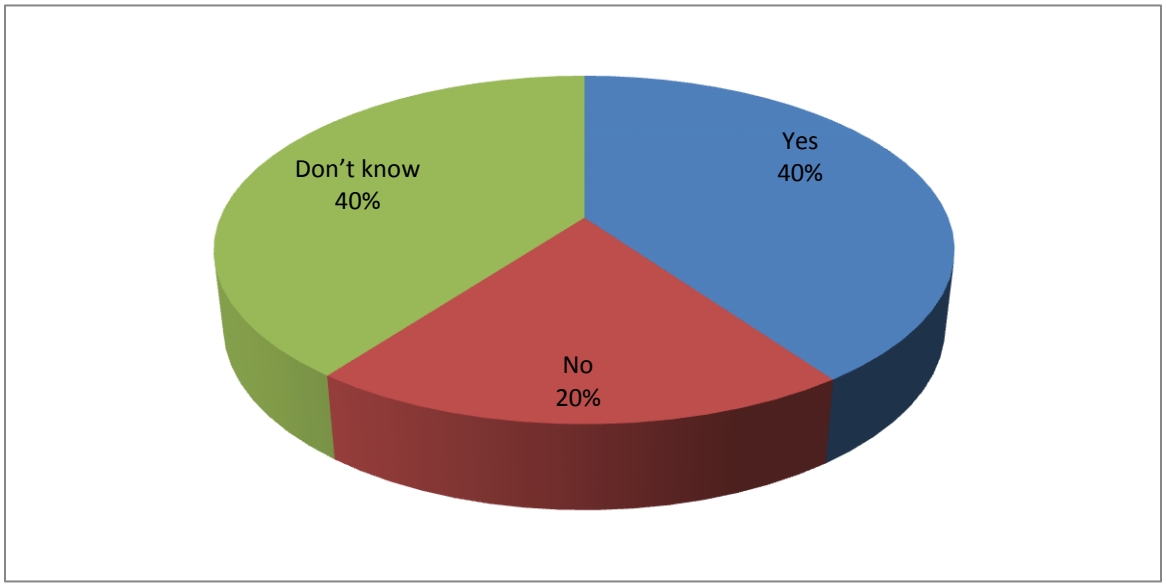


**Fig 4.28: Possibility of Getting Vision Back From Glaucoma Blindness**

Around 40% of the students answered that it is possible to get vision back from Glaucoma and 40% didn’t have any knowledge regarding it.

# Chapter 5

# Discussion &Conclusion

## Discussion

Blindness because of eye disease is tragic wherever it strikes. For many in the developing world, it condemns them to a life of poverty with little chance to live independently. As much as 90 percent of the global burden of eye disease is shouldered by developing countries, where treatable diseases often go undiagnosed. About 39 million people around the world are blind and a further 246 million are unable to see properly (National Eye Institute, 2012).

The study was conducted on 400 university students. They belong to different departments. Most of the students were from Pharmacy department (44%) and Business department (43%).Only 8% were from engineering department. Among these students, 64% were male and 36% were female.

More than 50% belong to higher middle class and only 6% belong to low class. All of them were young in age.

The question having heard of the disease indicated the awareness among the students and rest of the questions indicated the knowledge level of students about that disease.

This study found that 88% students were aware about the term cataract. The study of Dandona et al., (1993) and study of Ebeigbe and Emedike (2016) found observation which is nearly similar. The knowledge of Cataract was found to be 69.8% and 74.3% respectively.

Although a high percentage of students were aware about cataract only 46.32% students had good knowledge which is white membrane growing over the eye. A good percentage of students answered a white spot which is not right. So a large number of students did not have a good knowledge about cataract.

Students mainly knew about it from family/friends/relative who were not suffering the disease (31.63%) and from TV/Media/Newspaper (25.14%) were known about cataract.

Although 70% students knew about the surgery but majority of them had no knowledge about intraocular lens implantation. Only 45% students knew about it.

In case of glaucoma the awareness among the students were average (57%).The study of Ronnie et al., (2009) found 13.5% awareness of Glaucoma. On the other hand De-Gaulle and Dako-Gyeke (2016) found that 39.3 % respondents were aware about Glaucoma.

Among the student 35.81% had good knowledge about glaucoma as well as 21%of students had basic knowledge about glaucoma. The main source of knowledge was doctor around (24%).

Majority of the students had no idea about getting vision back. Lower percentage of students knew that glaucoma causes permanent vision loss.

Awareness and Knowledge regarding night blindness was very good among the study population. About 92% students know the reason of night blindness which is vitamin A deficiency. In this case the major source of knowledge was TV/Magazine which is 44.67%.

The awareness of Diabetic Retinopathy was 72%.Dandona et al., in 1993 found that 27% respondents heard about Diabetic Retinopathy .Good number of students had treatable knowledge due to loss of vision. Around 33.21% students had no idea about the risk factor of the disease.

## Conclusion

Throughout the world as well as in our country there is increasing eye disease in an alarming rate. There are several risk factors for eye disease. In our country people are not so educated as well as life style is not standard. Based on the result it can be said that awareness regarding eye diseases are not good. Even the educated population has lack of knowledge regarding common eye disease. It is necessary to create necessary awareness regarding eye disease through health awareness program.

# Chapter 6

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