UNDERSTANDING COMMON EYE DISEASES

INTRODUCTION

Diseases of the eye are very common, and if the Certified Nursing Assistant (CNA) is working with an elderly population, it is very likely that some of these clients will have one or more of these diseases. Common eye diseases that CNAs may encounter include cataracts, diabetic retinopathy, and glaucoma. These eye diseases have the potential to seriously impair someone’s vision and/or interfere with the activities of daily living, and patients who have cataracts, diabetic retinopathy or glaucoma may need help in ambulating, dressing, eating, and with other personal care activities. Because cataracts, diabetic retinopathy, and glaucoma are so common and because impaired vision is so common, as well, CNAs should be familiar with these diseases, understand how these diseases affect vision, and know how to assist someone with impaired vision.

OBJECTIVES

When the learner has completed this module, she/he will be able to

1. Identify important structures of the eye.
2. Explain the basic process of vision.
3. Identify three common diseases of the eye.
4. List three common signs and symptoms of eye disease.
5. Identify the most common cause of blindness in the US.
6. Identify risk factors for cataracts.
7. Identify risk factors for diabetic retinopathy.
8. Identify risk factors for glaucoma.
9. List two ways common eye diseases can be prevented.
10. Identify the most important cause of blindness in the US.

THE BASICS OF VISION: HOW OUR EYES WORK

Our eyes work by taking in visual information from the world and sending this information to a specific section of the brain. The process starts when we focus on an image such as a particular object, something in the environment, etc. These images we see are in the form of light rays. The light rays pass through several structures in the eye that focus them and then send them to the brain. In order to understand how the process of vision works, you will need to know what these structures are and how they work.

The first of these structures is the cornea. The cornea is a clear membrane that covers the surface of the eye, and it has five separate layers. One purpose of the cornea is to “seal” the eye and keep dirt, bacteria, and other foreign matter from entering the interior part of the eye. The other purpose of the cornea – the one related to eyesight – is to focus and control the amount of light rays that enter the eye.

The second structure that light rays must pass through is the pupil. The pupil is the dark spot in the middle of the eyeball. The pupil is not itself technically a structure. It is actually a hole/aperture in the middle of the iris, which is the colored (pigmented) part of
the eye. The iris is a thin, circular structure that has muscles that expand and contract and when they do, the pupil – the hole in the center of the iris – gets larger or smaller. The purpose of the pupil is to control the amount of light that enters the eye. The movement of the pupil can easily be seen: when you go into a dark room your pupils get bigger to allow more light in, and when you stare at a bright light your pupils get smaller to limit the amount of light coming in.

**Learning Break:** The pupil is not a structure, it is simply a hole in the iris that expands and contracts to let in or keep out light. The pupil looks dark, but what you are actually seeing is the light being absorbed by the inner eye.

After the light rays pass through the pupil they then pass through the lens. The lens is another structure – like the cornea – that controls and focuses the light rays. Once the light rays have passed through the cornea and the lens, they are focused on a structure located at the back of the eye called the retina. The retina has literally millions of light-sensing nerve cells. These cells change the light rays into electrical impulses, and the optic nerve sends these electrical impulses – and the visual information – to the brain and a special part of the brain registers these impulses as vision. In other words, we see.
The white part of the eye that surrounds the iris is called the sclera. The sclera is covered by a thin, transparent membrane called the conjunctiva. The eye also contains tear ducts. These are small openings, located in the corner of the eye near the nose. Tears are produced by the lachrymal glands (a.k.a. tear glands) when we experience strong emotions, but tears also keep the surface of the eye moist and lubricated. The eye itself is a hollow globe and it is filled with a liquid called the vitreous humor. The vitreous humor gives the eyeball shape and structure, and it also holds the retina in place at the back of the eye. The eye also contains another fluid, the aqueous humor; this is located in the anterior chamber, a space between the lens and the cornea. The aqueous humor – along with the vitreous humor – helps maintain the shape and structure of the eye. All of these parts of the eye are important to know about, but they do not contribute directly to the process of vision.

CATARACTS

A cataract is an abnormality of the lens. Cataracts cause the lens to become thick, rigid and much less transparent. Cataracts can form in one or both eyes, and they can also form in different parts of the lens. In some people, a cataract can be very obvious; when you look directly at the eye you will notice that the eye has a cloudy or “milky” appearance. Cataracts are very common. There are approximately 22 million Americans over the age of 40 who have a cataract and approximately 3 million Americans have cataract surgery every year. Cataracts become much more common as we age, and women seem to be affected more than men. No one knows exactly why cataracts form. Normal aging causes the lens to become rigid and less transparent, but cataracts probably result from a combination of the aging process and other factors. Risk factors that increase the chances of developing cataracts include:

- Alcohol abuse
- Diabetes
- Excessive exposure to sunlight
- Family history of cataracts
- High blood pressures
- Smoking

The signs and symptoms of cataracts that people experience differ from person to person, but most people with cataracts will say that their vision is cloudy or blurred, they cannot see well at night, and/or their eyes are very sensitive to bright lights. The lens is responsible for controlling and focusing the light rays as they enter the eye. If the lens cannot control the amount of light that enters, poor night vision and sensitivity to light occur. And if the lens cannot focus the light directly on to the retina, any images that we look at will be blurred and indistinct. Cataracts slowly worsen and as they do, the person’s visual ability worsens, as well. There is no effective medical care for cataracts, and the preferred treatment is surgery. Cataract surgery is not an emergency procedure – it’s done if the cataracts are affecting the quality of life and/or the activities of daily living, and it is an outpatient procedure.
that takes an hour or less. If the patient has cataracts in both eyes, the surgeon will usually schedule the operations one month apart.

The operation is fairly simple. The physician injects a local anesthesia, a small incision is made in the eye, the affected lens is removed, and an artificial lens is inserted. (Note: Sometimes the physician will decide not to place an artificial lens). The lens can be a) physically removed with surgical tools or b) removed by inserting a tiny probe through the incision: ultrasound waves break up the lens and the pieces are suctioned out. The second type of procedure is more common. Cataract surgery is very safe and very effective – in fact, it is considered one of the safest and most effective surgeries. Many people have a significant improvement in their vision after the operation.

GLAUCOMA

Glaucoma is a very common eye disease; it is the second leading cause of blindness. There are actually several different types of glaucoma but most cases of glaucoma are caused by increased pressure inside the eye, and the increased pressure is caused by a slow, gradual buildup of the aqueous humor. Normally, aqueous humor is continuously circulated through the eye and it is drained out of eye through small openings. But when someone has glaucoma, the aqueous humor is not drained or it drains too slowly, the aqueous humor accumulates, and the increased pressure in the eye damages the optic nerve.

It is not clear why glaucoma happens. Some people are born with a predisposition to the disease – the drainage channels in the eye may be abnormally small or the optic nerve may be unusually sensitive – but there are risk factors that increase someone’s chances of developing glaucoma. Those risk factors include:

- **Age:** Everyone over the age of 60 has an increased risk for developing glaucoma.
- **Ethnicity:** African-Americans, Hispanic-Americans, and Asian-Americans are more likely to develop glaucoma than Caucasians.
- **Medical conditions:** Diabetes, hypertension and hypothyroidism are risk factors for glaucoma.
- **Eye injuries and eye infections.**
- **Nearsightedness.**
- **Family history of glaucoma**
- **Chronic use of corticosteroids.** Corticosteroids are medications such as prednisone that are used to treat conditions such as asthma and arthritis.

**Learning Break:** Age, ethnicity, and family history of glaucoma are strong risk factors for the development of glaucoma.

Unfortunately, many people can have glaucoma for years but they will not have any signs and symptoms until significant damage has been done. Current recommendations are that everyone over the age of 40 should have a comprehensive eye exam every 3 to 5 years, and everyone over the age of 60 should have a comprehensive exam every year. If glaucoma is left untreated, it can cause serious, permanent damage to the vision or blindness.
There is no cure for glaucoma. However, the progression of glaucoma can be slowed and eye damage can be prevented. Medications – eye drops and oral medications – are used to lower the pressure in the eye, and these are often successful. If medications alone do not work, there are surgical procedures available that increase the drainage of aqueous humor and reduce the pressure in the eye.

**DIABETIC RETINOPATHY**

Diabetes is one of the most widespread diseases in the United States, and diabetic retinopathy is a very common complication of both type I (insulin-dependent) and type II (non-insulin dependent) diabetes. Approximately 95% of people with type I diabetes and 60% of people with type II diabetes will have evidence of diabetic retinopathy within 15 years of when they develop diabetes, and *diabetes is the most frequent cause of blindness in adults in the US.*

The exact cause of diabetic retinopathy is not known, but it is probably a direct result of a high blood sugar level that persists for years. The elevated blood sugar damages the blood vessels that supply oxygen and nutrients to the retina. These blood vessels in the retina become weakened and scarred and once this happens, the blood vessels “leak,” and pressure builds up in the eye. If this continues, the retina is damaged and the vision is permanently affected. Unfortunately, diabetic retinopathy is similar to glaucoma; people with diabetic retinopathy usually do not have any problems with their vision until the retina has been seriously affected. Once the condition has progressed, people may have some of these signs and symptoms:

- Poor night vision
- Blurred vision
- Difficulty reading
- Spots in the visual field (these are known as floaters)

People with type I diabetes and people with type II diabetes can both develop diabetic retinopathy, and the longer someone has diabetes the more likely it is that she/he will develop the disease. High blood pressure also increases the risk for diabetic retinopathy and many people with diabetes have hypertension, as well.

Fortunately, diabetic retinopathy can be prevented. People with diabetes should have regular eye exams, and if they can keep their blood sugar within normal limits and control their blood pressure these steps can very effective ways to prevent the diabetic retinopathy. If the blood sugar and blood pressure cannot be controlled and if diabetic retinopathy has already begun to develop, it can be treated with medications, surgery or a procedure called laser photocoagulation; laser photocoagulation heals the damaged vessels and decreases pressure in the eye.

**Learning Break:** Medications, surgery, and laser photocoagulation can treat the symptoms of diabetic retinopathy and help prevent further damage. However, diabetic retinopathy is a complication of diabetes, there is no cure for diabetes so diabetic retinopathy can reoccur. Controlling blood sugar and controlling hypertension are lifelong processes.
ASSISTING THE CLIENT WHO HAS IMPAIRED VISION

When you are working with a client who has impaired vision your focus should be on a) helping the client maintain independence, and b) on client safety. The client can often tell you exactly what his/her limitations are and what she/he is capable of doing. However, as a health care professional you have a responsibility to make sure that the clients you are caring for are free from harm, and you want to help the clients do as much self-care as they can – within their limits – so you must determine what the client can/can’t do, make sure the environment is safe, and assist them when they need help with activities of daily living.

- Determining the client’s ability: The CNA does not have to perform a complicated assessment of someone’s vision. It is easy to quickly determine whether or not someone has the visual ability she/he needs to be independent. Can the client recognize you when you enter a room or only after you are standing right in front of her? If the client is reading printed material, does he complain that the print is too small or does he always ask someone to read for him? Does she have to sit very close to the television set, or is she only comfortable if a room is very well lit? Although many older adults can see well, many do have vision problems and the risk of developing cataracts, diabetic retinopathy, or glaucoma definitely increases with age, so when you are working with older clients you must keep in mind that their visual ability may be lacking. When you are working with someone who may have impaired vision, ask yourself: How well can this person see to perform the activities of daily living, and is her/his visual loss a safety issue?

Learning Break: The loss of visual ability is often very gradual. People slowly become adjusted to their decreased ability to see, and they do not notice the changes. Someone may be surprised to know that his/her vision is not what it used to be, and that person may also deny that the changes have happened: after all, losing visual ability is naturally upsetting and it represents a possible loss of independence. Clients may know they cannot see as well as they once did, they may not know, or they may know their vision is poor and deny the fact, but the CNA should have a clear idea about how well the client can see.

- Making a safe environment: Making the environment safe for someone who has impaired vision is simple. Make sure it is organized in a predictable way, make sure it is well lit, and make sure that any obvious hazards are removed. Predictable organization of the environment (e.g., always having objects in the same place) has obvious benefits. For example, many patients depend on having their medications and personal care products stored in a certain order, and this can be helpful. They also depend on having furniture kept in order, having their house keys always kept in the same place, etc. Keeping the environment well lit is important because people with impaired vision can see better if there are no shadows and there is adequate light. Obvious hazards –
loose rugs, electrical cords, furniture that sticks out into the room, walkways/aisles with objects in them – need to be corrected.

- Assisting the visually impaired: There are some simple rules you can use to help you help the person who has less than optimal vision. First, don’t assume that every older adult cannot see well. Second, always ask before offering help. And third, when you are helping someone whose vision is impaired you must communicate: Ask them what they need and tell them what you are going to do. For example, if you are working with an older adult who may have impaired vision and who is getting dressed, ask that person if he/she needs help finding their clothes and dressing. If the answer is yes, be clear about what you are going to do and when, e.g., “I’m going to place you arm through the sleeve of your sweater now.” Give the clients the help they need, not what you assume they need. The simplest way to do this is to ask a client what specific activities/tasks she/he needs help with. However, you must also be observant and trust your professional judgment: if a situation is clearly unsafe you need to intervene and speak up.