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The prevalence of Visual Disturbance and Associated risk Factors among Diabetic Patients in outpatient clinic in ElmakNimer hospital

A thesis submitted in partial fulfillment of the requirement for master degree in medical surgical nursing

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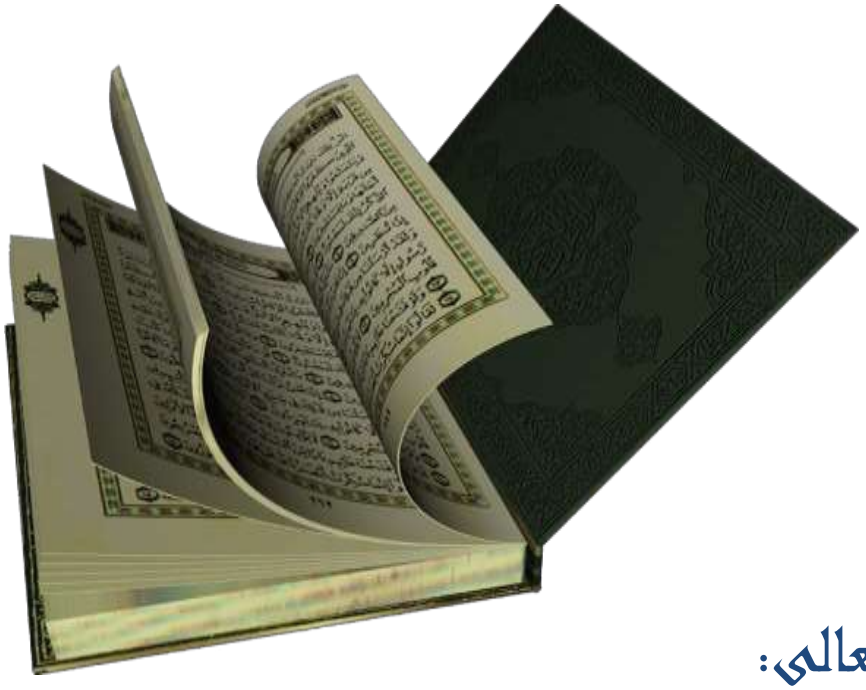

قال تعالى:

{سُبْحَانَكَ لاَ عِلْمَ لَنَا إِلاَّ مَا عَلَّمْتَنَا إِنَّكَ أَنتَ الْعَلِيمُ الْحَكِيم}

صدق الله العظيم

سورة البقرة32

Dedication

To my mother

To my father

My brothers and sisters for their help without request

To my husband for love and support

To who helped me to reach this stage

I would like to dedicate this Work to

My friends and Colleagues

Acknowledgement

First of all my deep thanks and gratitude to Allah for helping me to allow the study to come to light

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Abstract

This descriptive cross-sectional hospital based study was conducted to assess the prevalence of visual disturbance and associated risk factors among diabetic patients in outpatient clinic in Elmek Nimer university hospital, in the period from April - December 2014. In this study 90 diabetic patients were included. They were selected by use probability method of sampling (simple random sampling). Data was collected by two tools (Self-administered questionnaire, Snellen test chart).

The present study reveal that more than two third of study group (68.9%, 66.7%) were female and their age are more than 45years, respectively. More than quarters of them (28.9%) are primary school. the highly significant statistical relation had been found between the level of education and diabetes follow up (p-value 0.05). The collective evidence from this study showed that (64.4 %) of study population had Type 2 diabetes. More than two third of patients (71.1%) their duration of diabetes between 5-10 years.

The highly proportion (53.3%) of study population use Oral hypoglycemic agent. In contrast to more than quarter (26.5%) of them had hypertension. Therefore important effort should made using the media to create diabetic awareness in rural areas with less health services and emphasize the importance of dietary program .Less than two third (61.8%) of study population were performing eye examination by physician. Majority (71.1%) of study population experience of visual disturbance recently. This study explains that less than quarter (24.4%, 22.2%) of study population had developed retinopathy and cataract, respectively. It has been found from this study (25.6%) of study population had mild vision loss with eye equity 6/18 and only (13.3%) had profound vision loss.

Finally, the study recommend that, Locally educational programmes are highly needed to reduce the risk of visual impairment and blindness among diabetics and Systematic screening for diabetic retinal disease should be provided for all people with diabetes and should be screened at least annually.

مستخلص البحث

أجريت هذه الدراسة الوصفية المقطعية لتقييم مدي انتشار الاضطراب البصري وعوامل الخطورة المصاحبة له بين مرضي السكري بالعيادات الخارجية للسكري بمستشفي الملك نمر الجامعي في الفترة من فبراير 2014م إلى ديسمبر2014م . شملت هذه الدراسة (90) من مرضي السكري الذين يراجعون عيادة السكري وتم اختيارهم عن طريق استخدام أسلوب العينات الاحتمالية (العينة العشوائية البسيطة). ، وجمعت البيانات بواسطة أداتين (استبيان المعرفه ومقياس اسيلينس لقياس حدة البصر).

أظهرت الدراسة أن أكثر من ثلثي مجموعة الدراسة (68.9٪، 66.7٪) من الإناث وأعمارهم أكثر من 45 سنة ، على التوالي. أكثر من الربع منهم (28.9٪) اكملو تعليهم حتي مرحله الاساس. وقد وجدت علاقة ذات دلالة إحصائية عالية بين مستوى التعليم ومتابعة السكري (قيمة ب 0.05). أظهرت المعلومات المتراكمة من هذه الدراسة أن (64.4٪) من مجتمع الدراسة لديهم النوع 2 من مرض السكري. أكثر من ثلثي المرضى (71.1٪) فترة اصابتهم بمرض السكري بين 5-10 عاما.

نجد ان هنالك نسبة عالية (53.3٪) من مجتمع الدراسة تستخدم علاج سكر الدم عن طريق الحبوب الفموية. بالمقابل هنالك أكثر من الربع (26.5٪) منهم لديهم ارتفاع ضغط الدم. لذلك ينبغي بذل الجهد باستخدام وسائل الإعلام لخلق الوعي عن مرض السكري في المناطق الريفية ذات الخدمات الصحية الأقل والتأكيد على أهمية البرامج الغذائية لمرضي السكري. هنالك اقل من ثلثي (61.8٪) مجتمع الدراسة كانوا يؤدون فحص العين من قبل الطبيب. اغلبية مجتمع الدراسة (71.1٪) يشتكون من الاضطرابات البصرية في الآونة الأخيرة. اوضحت هذه الدراسة أن أقل من الربع (24.4٪، 22.2٪) من مجتمع الدراسة قد اصيبو باعتلال الشبكية السكري وإعتام عدسة العين،(الكتاراكت) على التوالي.

وقد وجد من هذه الدراسة (25.6٪) من مجتمع الدراسة كان لديه فقدان خفيف للرؤية بمقدار 18/6بمقياس حدة البصر وفقط (13.3٪) لديهم فقدان شديد للرؤية.

وفي الختام ، توصي الدراسة بأن يكون هناك برامج تعليمية للحد من مخاطر ضعف البصر والعمى بين مرضى السكري والفحص المنتظم لمرض شبكية العين السكري وينبغي أن تقدم لجميع المصابين بمرض السكري ووالتركيز علي انه يجب أجراء الفحص سنويا على الأقل.

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List of abbreviations

Abbreviation	*Meaning*
IGT:	Impaired glucose to lerance test
PDR:	Proliferator's diabetic retinopathy
OHD:	Oral hypoglycemic drug.
CDC:	Centers for disease control and prevention
DKA:	Diabetic kelo acidosis
IFG	Impair fasting glucose

Chapter one

- Introduction
- Rationale
- Objectives

1.1. Introduction

Diabetes mellitus is a group of metabolic diseases in which defects in insulin secretion or action result in high blood sugar level (hyperglycemia), approximately 20.8 million people in the United States have diabetes mellitus, and 6.2 million of those do not know it the incidence of diabetes mellitus varies by race and ethnicity Groups. Diabetes is a serious disease that can cause complications such as blindness, kidney failure, heart attacks, and strokes. It is a leading cause of lower limb amputations with good education and self-care, patients with diabetes can prevent or delay these complications and lead full, productive lives. A major role of the nurse is helping the patient learn to care for her or himself effectively **(LINDAS.Williams, paulaD.hopper:2007).**

Three complications of diabetes may lead to blindness. They are retinopathy, cataracts, and glaucoma. Diabetic retinopathy is characterized by alterations in the small blood vessels in the retina. An estimated 97% of insulin-taking and 80% of non insulin-taking persons who have had diabetes for ≥15 years have retinopathy; approximately 40% of insulin-taking and 5% of noninsulin-taking persons have the most severe stage, proliferative diabetic retinopathy**(Ronald Klein.etal.2008).**

Many risk factors affect the rate at which diabetic retinopathy progresses. These risk factors include age, race, obesity, smoking, Proteinuria, depression ,dyslipidemia ,duration of Cardiovascular diseases, uncontrolled systemic hypertension, parental history of DM, rapid glycemic control before cataract surgery, eating disorders ,and poor glycemic control Although some of these risk factors cannot be controlled, many of them can be. The rate at which vision fails can be slowed with careful management and corporation between the patient and the health care team **(Nina Tumosa, 2008).**

Diabetic retinopathy (BDR) was diagnosed by the presence of microaneurysms, blot hemorrhages or cotton wool spots. Proliferative

diabetic retinopathy (PDR) was defined as the presence of abnormal new vessels on the disc or elsewhere. Retinopathy was classified according to diabetic retinopathy study (DRS) and early treatment diabetic retinopathy study (ETDRS) . Due to limited resources and large number of patients, retinal photography was done only in patients with evidence of retinopathy **(Agrawal. R .P, etal;2003)**

Early detection and treatment of sensory injuries or diseases can reduce their impact. Any disturbance in vision disrupts a person's role performance, safety, and activities of daily living (ADLs).Nurses play an important role in recognizing symptoms of visual disorders and in assisting the individual to follow treatment, prevent recurrence, and learn new adaptive skills **(Bare, et al C.2003).**

The Ophthalmic nurse must be thoughtful in her approach to the visually impaired person. She must use a variety of interpersonal skills to their best advantage, including: touching as appropriate to indicate presence or to show concern; introducing herself; indicating when she is leaving; and never shouting. There is a great temptation to assume that a person who is visually impaired is also hard of hearing. The Ophthalmic nurse must always bear in mind that there is an individual human being behind the eyes that are being treated, and should care for each patient as a whole, unique person. Ophthalmic nurses will also care for and manage groups of patients linked to ophthalmic sub-specialties. With any of these expanded roles, the ophthalmic nurse must always be mindful of her professional accountability **(Mary E. Shaw and Agnes Lee, 2010).**

1.2.Rationale

Any disturbance in vision disrupts a person's role performance, safety, and activities of daily living (ADLs). The incidence of Diabetes mellitus continues to grow as in developing contrary. Early detection of visual disturbance excellent preventative method from blindness.

Multiple visual complications accompany diabetes mellitus (DM) of long duration. The most common complications include numerous ocular and periocular changes that characterize diabetic retinopathy. These changes are characterized by exudates, microaneurysms, hemorrhages, and, less frequently, neovascularization, all of which lead to a decrease in visual acuity and, perhaps, to blindness. Indeed, diabetic retinopathy is a leading cause of blindness in the industrialized world in people between the ages of 25 and 74 years and is the fourth leading cause of blindness in people of all ages in developing countries **(National Institutes of Health, 2014).**

This study was undertaken to explore the prevalence of visual and the influence of various factors that are thought to contribute to diabetic visual changes. Also there are many clinical signs indicative of the presence of diabetic visual disturbance in the outpatient clinic of Elmek Nimer university hospital and there is no previous study on this subject.

1.3.Objectives

1.3 .1.General objective

The prevalence of visual disturbance and associated risk factors among diabetic patients in outpatient clinic in Elmek Nimer hospital.

1.3.2 `Specific objective

- To assess the diabetic patients risk factors for development of visual disturbance.
- To identify the types of visual disturbance in diabetic patient.
- To assess the Diabetes management &control among diabetic patient.
- To determine the common visual disturbance among diabetic patient.
- To measure diabetic patients level of vision loss.

2.1. Diabetes mellitus:

Is a group of metabolic diseases in which defects in insulin secretion or action result in high blood sugar level?

According to the latest Centers for Disease Control and Prevention (CDC) data, approximately 20.8 million people in the United States have diabetes mellitus, and 6.2 million of those do not know it. The direct and indirect cost (such as lost work time) of diabetes in the United States is about $132 billion per year. The incidence of diabetes mellitus varies by race and ethnicity. In the United States, Hispanic, black, Native American, Alaska Native, and Asian American populations have a higher rate of diabetes than non-Hispanic white ethnic groups.1 Diabetes is a serious disease that can cause complications such as blindness, kidney failure, heart attacks, and strokes. It is a leading cause of lower limb amputations in the United States. With good education and self care, patients with diabetes can prevent or delay these complications and lead full, productive lives. A major role of the nurse is helping the patient learn to care for herself or himself effectively. (**Paula D. Hopper Linda S. Williams, 2003)**

2.2 type of diabetes

2.2.1 Type 1 diabetes

Type 1 diabetes is characterized by destruction of the pancreatic beta cells. It is thought that combined genetic, immunologic, and possibly environmental (eg, viral) factors contribute to beta cell destruction. Although the events that lead to beta cell destruction are not fully understood, it is generally accepted that a genetic susceptibility is a common underlying factor in the development of type 1 diabetes. People do not inherit type 1 diabetes itself; rather, they inherit a genetic predisposition, or tendency, toward developing type 1 diabetes.

This genetic tendency has been found in people with certain HLA (human leukocyte antigen) types. HLA refers to a cluster of genes responsible for transplantation antigens and other immune processes. About

95% of Caucasians with type 1 diabetes exhibit specific HLA types (DR3 or DR4). The risk of developing type 1 diabetes is increased three to five times in people who have one of these two HLA types. The risk increases 10 to 20 times in people who have both DR3 and DR4 HLA types (as compared with the general population). Immune-mediated diabetes commonly develops during childhood and adolescence, but it can occur at any age, **2003**). There is also evidence of an autoimmune response in type 1 diabetes. This is an abnormal response in which antibodies are directed against normal tissues of the body, responding to these tissues as if they are foreign. Auto antibodies against islet cells and against endogenous (internal) insulin have been detected in people at the time of diagnosis and even several years before the development of clinical signs of type 1 diabetes. In addition to genetic and immunologic components, environmental factors, such as viruses or toxins, that may initiate destruction of the beta cell are being investigated. Regardless of the specific etiology, the destruction of the beta cells results in decreased insulin production, unchecked glucose production by the liver, and fasting hyperglycemia. In addition, glucose derived from food cannot be stored in the liver but instead remains in the bloodstream and contributes to postprandial (after meals) hyperglycemia. If the concentration of glucose in the blood exceeds the renal threshold for glucose, usually 180 to 200 mg/dL (9.9 to 11.1 mmol/L), the kidneys may not reabsorb all of the filtered glucose; the glucose then appears in the urine (glucosuria).

When excess glucose is excreted in the urine, it is accompanied by excessive loss of fluids and electrolytes. This is called osmotic diuresis. Because insulin normally inhibits glycogenolysis (breakdown of store glucose) and gluconeogenesis (production of new glucose from amino acids and other substrates), in people with insulin deficiency, these processes occur in an unrestrained fashion and contribute further to hyperglycemia. In addition, fat breakdown occurs, resulting in an increased production of ketone bodies, which are the byproducts of fat breakdown. **. (Bare etal , 2003)**

2.2.2Type 2 diabetes

The two main problems related to insulin in type 2 diabetes are insulin resistance and impaired insulin secretion. Insulin resistance refers to decreased tissue sensitivity to insulin. Normally, insulin binds to special receptors on cell surfaces and initiates a series of reactions involved in glucose metabolism. In type 2diabetes, these intracellular reactions are diminished, thus rendering insulin less effective at stimulating glucose uptake by the tissues and at regulating glucose release by the liver. The exact mechanisms that lead to insulin resistance and impaired insulin secretion in type 2 diabetes are unknown, although genetic factors are thought to play a role. To overcome insulin resistance and to prevent the buildup of glucose in the blood, increased amounts of insulin must be secreted to maintain the glucose level at a normal or slightly elevated level.

However, if the beta cells cannot keep up with the increased demand for insulin, the glucose level rises, and type 2 diabetes develops.

Despite the impaired insulin secretion that is characteristic of type 2 diabetes, there is enough insulin present to prevent the breakdown of fat and the accompanying production of ketone bodies. Therefore, DKA does not typically occur in type 2 diabetes. Uncontrolled type 2 diabetes may, however, lead to another acute problem, HHNS. **(Bare et al, 2003)**

2.3 Risk factors :-

2.3.1 Genetics. Genetic susceptibility is important for both types of diabetes. Family history of type 1 diabetes or other autoimmune diseases such as autoimmune thyroid disease is associated with a higher risk of developing type 1 diabetes in the family. Inheritance in type 2 diabetes is far more complex as there are many underlying causes. Furthermore, the risk varies according to the particular sub-type of type 2 diabetes. A family history of type 2 diabetes in a first degree relative is a strong risk factor for diabetes in that individual.

2.3.2 Obesity. Apart from family history, obesity is a very important risk factor for diabetes. For a given degree of obesity, central or 'applprogression to type 2 diabetes than those who have lower body obesity or are 'pear-shaped'. Those with a body mass index (BMI) of >25 k/m2 or high waist circumferenc 1 are at a higher risk of developing diabetes and should be encouraged to take regular exercise and eat healthily

2.3.3 Age. Beta cell function declines with age, indeed if we live long enough all of us have the potential to develop diabetes at somestage. With an aging population an increase in prevalence of diabetes can be expected.

2.3.4 Ethnicity. People of South Asian or Afro-Caribbean origin are at higher risk of developing diabetes. They are also more likely to have type 2 diabetes presenting at a young age and usually have poorer risk factor control. South Asian patients have a high risk of developing diabetic renal disease and also coronary artery disease. Afro-Caribbean patients are more likely to have strokes and havee-shaped' obesity is associated with a much higher risk ofa higher risk of gestational diabetes. South Asian and Hispanic **(Tim Holt and Sudhesh Kumar, 2010).**

2.3.5 Other risk factors:

1. Hypertension (_140/90 mm Hg)
2. Dyslipidemia (HDL _ 35 mg/dL [0.90 mmol/L]
3. Previous impaired fasting glucose (IFG) with fasting plasma glucose 100–125 mg/dL (5.6–6.9 mmol/L)
4. Previous impaired glucose tolerance (IGT) with oral glucose tolerance test (OGTT)
5. 2 hour glucose value 140–199 mg/dL (7.8–11 mmol/L)
6. Polycystic ovary syndrome **(R.S. Mazze, et al, 2006)**

2.4 Sing and symptom:

Clinical manifestations of all types of diabetes include:-

polyuria, polydipsia, and polyphagia. Polyuria (increased urination) and polydipsia (increased thirst) occur as a result -of the excess loss of

fluid associated wih osmotic diuresis. The patient also experiences polyphagia (increased appetite0) resulting from the catabolic state induced by insulin deficiency and the breakdown of proteins and fats. Other symptoms include fatigue and weakness, sudden vision changes, tingling or numbness in hands or feet, dry skin, skin lesions or wounds that are slow to heal, and recurrent infections. The onset of type 1 diabetes may also be associated with sudden weight loss or nausea, vomiting, or abdominal pains, if DKA has developed.

2.5. Diagnosis of diabetes

The diagnosis of diabetes must not be taken lightly by a clinician as the consequences for the individual are significant and life-long. For those presenting with severe symptoms, evidence of long-term complications or severe hyperglycaemia at presentation, the diagnosis is quite straightforward and can be made using only one diagnostic blood glucose measurement. In asymptomatic individuals presenting with mild hyperglycaemia, the diagnosis should only be established on the basis of at least two abnormal test results.

In future, the recently published recommendation is that HbA1c values will be used rather than plasma glucose as it has been in the diabetes, but in future this will be based on HbA1c (Box 1.1). The glucose tolerance test does not indicate the type of diabetes; this is usually determined on the basis of other presenting features and is discussed further below. Young age at presentation (especially less than 17 years), presence of other autoimmune endocrine diseases (such as hypothyroidism, pernicious anemia, Addison's disease, vitiligo) in the patient or family members, or significant weight loss are features that suggest type 1 diabetes.

2.5.1. Glucose tolerance test

A glucose tolerance test should be performed in the morning after an overnight fast. It is important that the patient should have had a normal diet for the preceding 3 days and should not restrict carbohydrate intake

drastically. The test should also not be performed during an acute illness or following prolonged bed rest. Plasma glucose concentrations are measured fasting and then 2 hours after a drink of 75 g of glucose in 250–350 ml of water (in children: 1.75 g/kg up to maximum of 75 g). Several proprietary preparations are available and these are often flavoured to make items palatable. Table 1.2 shows normal values and interpretation of abnormal values during an oral glucose tolerance test (OGTT).

The role of oral glucose tolerance tests is set to change given the recent recommendations over the use of HbA1c as a preferred means of diagnosing diabetes.

2.5.2. Interpretation of the oral glucose tolerance test results:

Impaired fasting glycaemia (IGF):

Fasting glucose between 6.1 and 6.9 mmol/l in the absence of abnormal values after the glucose load is defined as impaired fasting glycaemia. Conversion to diabetes is not invariable but it is important to reassess once a year, and in future this is likely to be through HbA1c measurement Individuals with IFG should be advised about a healthy life-style and to avoid obesity.

2.5.3. Impaired glucose tolerance (IGT):

Once again conversion to diabetes is not invariable and patients may either persist with impaired glucose tolerance, revert to normal glucose tolerance or progress to type 2 diabetes. Obese individuals should be advised to try and lose weight through diet and exercise.

The implications of this diagnosis for pregnancy are different and this is considered further in Chapter [17].

IGF and IGT are collectively known as impaired glucose regulation but these terms may become outdated as HbA1c becomes the recommended means of diagnosing diabetes and identifying those at risk **(Tim Holt and Sudhesh Kumar, 2010).**

2.6 Treatment:

2.6.1 Dietary treatment:

Diet is a basic part of management in every case. Treatment cannot be effective unless adequate attention is given to ensuring appropriate nutrition.

— ensuring weight control

— providing nutritional requirements

— allowing good glycemic control with blood glucose levels as close to normal as possible

— correcting any associated blood lipid abnormalities

— ensuring consistency and compatibility with other forms of treatment if used, for example oral agents or insulin.

The Ancient Greeks were the first to advocate diet and lifestyle management for people with diabetes. Until the discovery and use of insulin in the 1920s and suphonylureas in the 1940s, diet and lifestyle intervention were the only treatment options available. For people with Type 1 diabetes this was woefully ineffective and consisted of near starvation

Diet imposed on already severely malnourished individuals. While such diets may have prolonged life by a few months, an inevitable early death from ketoacidosis was all too often replaced with death from infections due to the severe malnutrition and other comorbidities.The introduction of insulin radically reduced the death rates from ketoacidosis and problems associated with malnutrition, however, survival brought other lethal problems in the form of micro vascular and macro vascular disease. **(John and Sons canda ,2003)**

The goals of dietary advice are to achieve and maintain good health and quality of life, with avoidance and management of short-term symptoms, including hypoglycaemia and freedom from the long-term complications of the disease, for as long as possible. Evidence available from America from the Diabetes Control and Complications Trial in Type 1

diabetes and also from the United Kingdom Prospective Diabetes Study in Type 2 diabetes suggests that normalization of metabolic markers like blood glucose levels and management of blood pressure constitute key aims.

There needs to be a balance between the attainment of objectives of care and impose on the individual person with diabetes **(Frost, A. Dornhorst and R. Moses: 2003).**

2.5.2 Drug treatment:

Oral hypoglycaemic drugs (OHD):

Are considered only after a regimen of dietary treatment combined with exercise has failed to achieve the therapy targets set.There are two major groups of OHD: sulphonylureas (SUs) and biguanides (BGs). SUact by stimula ting insulin release from the beta cells and also by promoting its action through extra pancreatic mechanisms. BG exert their action by decreasing gluconeogenesis and by increasing the peripheral utilization of glucose.Several SU preparations are marketed in countries of the Eastern Mediterranean Region. Selection of a specific SU preparation will depend on factors such as availability,cost, and the physician's experience.

However, this group of drugs may be represented byglibenclamide or tolbutamide.SUs can cause hypoglycaemia and their use should therefore be closely monitored in the elderly and in those with nephropathy.

Tolbutamide is a short-acting SU and may beselected in patients with renal impairment.Glibenclamidmay be given in an initial dose of *1.25-2.5* mg which can be increasedup to a maximum daily dose of 15 mg. For tolbutamide, the initial daily dose is *0.5* gwhich can be increased, if necessary, to *1.5* g in divided doses.Metformin is the only BG preparation now marketed in most Eastern MediterraneanRegion countries. Metformin is primarily used in the obese not responding to dietary therapy. The starting dose is 500-850 mg with or after food, once daily, which can be increased to 500 mg tds or *850* mg bd. Because of the risk of lactic acidosis.

Insulin Therapy:

Because the body loses the ability to produce insulin in type 1 diabetes ,exogenous insulin must be administered for life.

In type 2 diabetes, insulin may be necessary on a long-term basis to control glucose levels if diet and oral agents fail. In many cases, insulin injections are administered two or more times daily to control the blood glucose level. Because the insulin dose required by the individual patient is determined by the level of glucose in the blood Insulins may be grouped into several categories based on the onset, peak, and duration of action short duration insulin. These insulins have an onset of 5 to 15 minutes, a peak action of 1 hour after injection, and a duration of 2 to 4 hours. Because of their rapid onset, patients should be instructed to eat no more than 5 to 15 minutes after injection. Because of the short duration of action of these insulin analogs, patients with type 1 diabetes and some patients with type 2 or gestational diabetes also require a long-acting insulin to maintain glucose control. Basal insulin is necessary to maintain blood glucose levels irrespective of meals. A constant level of insulin is required at all times.

Intermediate-acting insulins function as basal insulins but may have to be split into two injections to achieve 24-hour coverage. Short-acting insulins, called regular insulin have an onset of 30 minutes to 1 hour; peak, 2 to 3 hours; and duration, 4 to 6 hours. Regular insulin is a clear solution and is usually administered 20 to 30 minutes before a meal, either alone or in combination with a longer-acting insulin. Humulin R, Iletin Regular, and Novolin R are examples of regular insulin.

Intermediate-acting insulins, called NPH insulin (neutral protamine Hagedorn) or Lente insulin, have an onset of 3 to 4 hours; peak, 4 to 12 hours; and duration, 16 to 20 hours. Intermediate acting Brunner and Suddarth insulins, which are similar in their time course of action, appear white and cloudy. If NPH or Lente insulin is taken alone, it is not crucial that it be taken 30 minutes before the meal. It is important,Long-acting

insulins, called Ultralente insulin, are sometimes referred to as peakless insulins because they tend to have a long, slow, sustained action rather than sharp, definite peaks in action.

The onset of long-acting human insulin is 6 to 8 hours; peak, 12 to 16 hours; and duration, 20 to 30 hours."Peakless" basal insulin, insulin glargine (Lantus), is approved for use as a basal insulin—that is, the insulin is absorbed very slowly over 24 hours and can be given once a day.

2.7 Complication:-

2.7.1 Acute complications:

These include diabetic keto acidoses (DKA) and non-ketotic hyper-osmolar state (NKHS). While the first is seen primarily in individuals with type 1 DM, the latter is prevalent in individuals with type 2 DM. Both disorders are associated with absolute or relative insulin deficiency, volume depletion, and altered mental state. In DKA, insulin deficiency is combined with counter-regulatory hormone excess (glucagon, catecholamine's deficiency leads to hyperglycemia, which induces an osmotic diuresis leading to profound intravascular volume depletion

2.7.2 Chronic complications:

The chronic complications of diabetes mellitus affect many organ systems and are responsible for the majority of morbidity and mortality. Chronic complications can be divided into vascular and nonvascular complications. The vascular complications are further subdivided into micro vascular (retinopathy, neuropathy, and nephropathy) and macro vascular complication (coronary artery disease, peripheral vascular disease, and cerebro vascular disease). Nonvascular complications include problems such as gastroporesis, sexual dysfunction, and skin changes. As a consequence of its chronic complications, DM is the most common cause of adult blindness, a variety of debilitating neuropathies, and cardiac and cerebral disorders. Treating the complications of diabetes costs more than controlling the disease**.(Brajendra and Arvind 2006).**

2.8 Vision Complications:

2.8.1. Blindness – to be used only for total vision loss and for conditions where individuals have to rely predominantly on vision substitution skills.

2.8.2. Low Vision – to be used for lesser degrees of vision loss, where individuals can be helped significantly by vision enhancement aids and devices.

2.8.3. Visual Impairment – to be used when the condition of vision loss is characterized by a loss of visual functions (such as visual acuity, visual field, etc.) at the organ level. Many of these functions can be measured quantitatively.

2.8.4. Functional Vision – to be used to describe a person's ability to use vision in Activities of Daily Living (ADL). Presently, many of these activities can be described only qualitatively.

2.8.5. Vision Loss – to be used as a general term, including both total loss (Blindness) and partial loss (Low Vision), characterized either on the basis of visual impairment or by a loss of functional vision.

(B) For reporting the prevalence of vision loss in population studies and clinical research, reconfirms its earlier recommendation (Kyoto, 1978) to describe vision loss in more detail by classifying it into

multiple Ranges of Vision Loss (based on visual acuity):

Normal vision >= 0.8

Mild vision loss < 0.8 and >= 0.3

Moderate vision loss < 0.3 and >= 0.125

Severe vision loss < 0.125 and >= 0.05

Profound vision loss < 0.05 and >= 0.02

Near-total vision loss (near blindness) < 0.02 and >= NLP

Total vision loss (total blindness NLP

Recommends that, where such detailed reporting is not feasible, the categories defined in ICD-9 and

ICD-10 of the World Health Organization be used as a minimum:

- Low Vision < 0.3 and >= 0.05
- Blindness < 0.05 including NLP with additional detail where feasible.

(C) Recommends with reference to its “Visual Acuity Measurement Standard” (Kos, 1984), That the ETDRS protocol of the National Eye Institute, National Institutes of Health, USA, be adopted as the "‘gold standard" for visual acuity measurement in population studies and clinical research.

The ETDRS charts are characterized by a proportional layout and a geometric) progression of letter sizes. Those deviations from that protocol be spelled out if adherence to the complete protocol is not feasible. That the geometric progression be maintained to assure equal accuracy at all levels of vision loss, even if the full proportional layout is not feasible (as in projector charts).

It is recognized that the use of the full ETDRS charts is often not practical in present clinical practice.

That measurement conditions be specified, including (but not limited to) whether best-corrected acuity, presenting acuity, pinhole acuity, distance and/or near acuity are reported.

The functional importance of near acuity is emphasized **(International Council of Ophthalmology, 2002)**.

2.8.6. Cataract:

A cataract is a condition of the eye that makes it difficult to see. The lens, the part of the eye that we use to focus, becomes clouded. The eye is like a camera with a lens system at the front and a photosensitive area at the back. The normal function of the lens is to focus light so that you can see sharp clear images. If the lens of the eye becomes cloudy, it restricts the amount of light that is able to enter the eye, reducing the eyesight.cataract usually develops gradually, eventually making it difficult to carry out your daily activities. If the cataract is not removed, your vision usually

Glaucoma:

Glaucoma is a group of conditions that can cause permanent sight loss. There is damage to the optic nerve head that may or may not be the result of a rise in the intra-ocular pressure. It is the damage to the optic nerve head that results in a visual field loss (**Mary etal 2010**) becomes worse over time. One or both eyes can be affected, but a cataract cannot spread from one eye to the other.

2.9. Recording visual acuity

Visual acuity is the measurement of acuteness of central vision only. An accurate assessment of visual acuity is one of the most important parts of any ophthalmic examination. Visual acuity is a test of the visual system from the occipital cortex to the cornea. Accurate visual acuity testing requires:

- Patient co-operation and comprehension of the test;
- Ability to recognize the forms displayed;
- Clear ocular media and correct focusing;
- Ability of the eyes to converge simultaneously;
- Good retinal function;
- Intact visual pathways and occipital cortex.

When all these criteria are present, it is a good test of macula function

2.9.1. General considerations when performing visual acuity:

When performing visual acuity, a number of general considerations need to be taken into account, including adequate illumination, recording of contact lens wear and the use of methods to avoid patient 'cheating'. Good communication skills (including accurate instructions) and patience are particularly important with patients with any learning disabilities and language difficulties, and also with children.

- In order to assess accurately a patient's visual acuity (both distance andnear), it is extremely important that the test type or reading material is correctly illuminated, i.e. if using a Snellen box or LogMAR, that all the bulbs are in working order. When testing a patient's near vision, ensure that there is an adequate light source.
- It is also important to record if a patient uses contact lenses and if these were worn at time of testing.
- Since each eye is tested separately, it is a good idea to occlude the other eye with his outpatient card or occluder to avoid patient 'cheating' by looking through the gaps between his fingers. Similarly, it is a good idea to rotate thechart round for frequent attendees to the eye outpatient unit to minimize patients memorising the letters on the chart. (As LogMAR has a different chart for testing each eye, this reduces opportunity for remembering all of the letters **(Mary E. Shaw, Agnes Lee 2010)**

Diabetic retinopathy:

Diabetic retinopathy is a complication of diabetes mellitus. Diabetes mellitus is a condition in which the blood sugar level is elevated because the body is unable to use and store sugar. This high sugar content damages blood vessels in the body over time and can affect a variety of body organs such as the eyes, heart, and kidneys. Diabetes affects the eyes by causing deterioration of blood vessels in the retina. Breakdown of retinal blood vessels may result in fluid leaking into the center of the retina (macular edema)or abnormal blood vessels that grow on the surface of the retina (neovascularization) which can bleed and scar. This can lead to loss of central and possibly peripheral vision. **(WILLS 2010)**

Retinopathy is one of the small-vessel diseases. Microangiopathy involves the small blood vessels (capillaries) all over the body, but the clinical manifestations of microangiopathy occur for certain in only two organs: the kidney and the eye. Another condition, called Cardiomyopathy,

as, a too common problem in the person who has diabetes, may also be due to micro vascular disease. Cardiomyopathy, as a disease of the heart, involves diffuse loss of heart muscle (myocardium) Resulting in ineffective pumping and congestive heart failure. The diffuse loss of myocardium may be caused by disease in the myocardial blood supply, owing to disease and obstruction of the small blood vessels **(Diana W. Guthrie, etal.2009).**

2.10.1. Causes and risk factors:

The longer someone has diabetes mellitus, the more likely they will develop diabetic retinopathy. After 25 years, nearly all people with diabetes mellitus will show some signs of diabetic retinopathy. The severity of diabetic retinopathy is also related to blood glucose (sugar) control .Keeping blood glucose levels down to as normal as possible reduces the degree and rate of progression of diabetic retinopathy and other diabetic complications in the body. The hemoglobin A1C level reflects how well blood sugar control has been achieved over the past several months. The goal in managing diabetes is to keep the hemoglobin A1C level less than seven.

2.10.2Classification:

Diabetic retinopathy falls into two main classes: non proliferative and proliferative. The word "proliferative "refers to whether or not there is neovascularization (abnormal blood vessel growth) in the retina Early disease without neovascularization is called non proliferative diabetic retinopathy (NPDR). As the disease progresses, it may evolve into proliferative diabetic retinopathy (PDR), which is defined by the presence of neovascularization and has a greater potential for serious visual consequences**. (Jesse and Thomas, 2010).**

2.10.3. Risk factors for the development of retinopathy:

The primary risk factors for the development of diabetic retinopathy are:

- Duration of the disease
- Poor metabolic control (hyperglycemia)

- -Arterial Hypertension
- Hyper lipidemia including cholesterol and triglyceride levels.
- Patient unaware of having the disease
- Other risk factors are micro albuminuria, anemia, smoking, or pregnancy **(Ferando and Francisco 2010).**

2.10.4. Symptoms:-

Symptoms of diabetic retinopathy include gradual, progressive blurring of vision, sudden, severe vision loss ,floaters or fluctuating vision. It is important to recognize that people with diabetic retinopathy may not necessarily have visual changes even in more advanced stages. It is important and mandatory that people with diabetes mellitus have their eyes examined at least annually **(Wills Eye institute, 2010)**

2.10. 5. BTreatment of diabetic retinopathy:

The treatments currently used for diabetic retinopathy are:

1. Laser photocoagulation
2. Intravitreal medical therapy
3. Surgical treatments using vitrectomy

- **Laser treatment**

The conventional treatment for diabetic retinopathy to date has been peripheral scatter laser treatment. To be effective, this must be given at the optimal stage of the disease process. Laser treatment can stabilise the retinal changes but is rarely able to restore vision that has been lost. However, studies have shown that in imminent or early proliferative

Retinopathy, it will prevent severe sight loss in over 90% of cases (Diabetic Retinopathy Study Research Group, 1981). In most cases it is possible to preserve reading and driving vision. Laser treatment is given at an outpatient clinic and may involve a single visit or more than one visit before the eye changes are controlled. Treatment for retinopathy, specifically, is to apply a large number of laser spots (1500–3000 in total) to the peripheral retina. The recently introduced Patterned SCAnning Laser

(PASCAL) system allows semi-automated application of arrays of gentle laser burns, reducing the treatment time and increasing patient comfort. Most people do notice a problem with night vision after laser treatment but few notice a change in their field of vision.

Early treatment for retinopathy included hypophysectomy, or removal of the pituitary gland, which resulted in improvement in the retinopathy but severe side effects due to loss of all pituitary hormones. The treatment worked because the hypophysectomy destroyed the ability of the pituitary gland to produce growth hormone that was responsible for the growth of new blood vessels in the eye to replace the occluded vessels in order to nourish the retina. These new vessels (neovascularization) are very fragile and break easily, causing retinal hemorrhage.

This treatment is now obsolete. Newer treatment for retinopathy being performed throughout the country includes photocoagulation (panlasering), individual vessel lasering, the scleral buckling procedure, vitrectomy, and lens replacement. Treatment should also include control of hypertension and dyslipidemia as one or both of these are frequent comorbidities that may exacerbate diabetic retinopathy **(Diana W. Guthrie, etal.2009).**

- **Pharmacological approaches**

A number of important studies have shown that injections of steroid drugs, such as triamcinolone and fluocinolone, directly into the eye, are effective at treating diabetic maculopathy (Rudnisky et al, 2009). However, the effect wears off and injections need to be repeated every 6 months. Important potential side effects of this treatment are the development of glaucoma and cataract. There is a development rate for glaucoma of 25–40%, with a peak at 2 months. In most cases, intraocular pressure returns to normal at 4–6 months; however, around 2% will need glaucoma surgery (for a review of this topic see **Razeghinejad and Katz [2012]).**

Anti-vascular endothelial growth factor (anti- VEGF) agents have been investigated for some time as an alternative to conventional laser Treatment, particularly for diabetic maculapathy. Oral PKC inhibitors have been studied and shown to have an effect in certain groups of people (Aiello et al, 2006), but the main focus is now on the intravitreal injection of anti-VEGF agents (ranibizumab, bevacizumab and aflibercept).

Results are temporary, requiring repeated injections at monthly intervals, but these agents have been shown to be superior to laser treatment when the vision has been affected **(Elman et al, 2010; 2012; Mitchell et al, 2011).**

- **Surgical vitrectomy:**

Surgical vitrectomy has been the treatment of choice for people with advanced retinopathy (vitreous hemorrhage and traction retinal detachment). It has also been shown to have good results in tractional diabetic maculopathy (Haller et al, 2010). An area of increasing interest lies in the possibility of giving an injection into the eye to produce achemical vitrectomy, particularly for maculopathy, and this is being actively researched.

2.11. Snellen chart:

The researcher using a Snellen box or LogMAR that all the bulbs are in working order. When testing a patient's near vision, ensure that there is an adequate light source. It is a good idea to rotate the chart round for frequent attendees to the eye outpatient unit to minimize patients memorizing the letters on the chart. (As LogMAR has a different chart for testing each eye, this reduces opportunity for remembering all of the letters.)

2.11.1. Snellen's test type:

Snellen's test had heavy block letters, numbers or symbols printed in black on a white background, are arranged on a chart in nine rows of graded size, diminishing from the top downwards. The top letter can be read by the

normal eye at a distance of 60 m, and the following rows should be read at 36, 24, 18, 12, 9, 6, 5 and 4 m, respectively.

For vision less than 6/60, the distance between the patient and the chart is reduced by a meter at a time and the vision is recorded accordingly as, for example, 5/60, 4/60, 3/60, 2/60, 1/60.

The patient is seated 6m from the chart, which must be adequately lit, and is asked to read down to the smallest letter he can distinguish, using one eye at a time.

Visual acuity is expressed as a fraction and abbreviated as VA. The numerator is the distance in meters at which a person can read a given line of letters.

The denominator is the distance at which a person with normal average vision can read the same line, e.g. if the seventh line is read at a distance of 6 m, this is VA 6/6. If some letters in the line are read but not all, it is expressed as, for example, VA 6/6 −2, or VA 6/9 + 2.

If the patient cannot read the top letter at a distance of 1 m, the examiner's hand is held at 0.9 m, 0.6m or 0.3m away against a dark background and the patient is asked to count the number of fingers held up. If he answers correctly, record VA = CF (count fingers). For less vision, the hand is moved in front of the eye at 0.3 m, record VA = HM (hand movement).

In the case of less vision, test for projection of light by shining a torch into the eye from different directions to see if the patient can tell from which direction it comes. If he sees the light but not the direction, it is noted as VA = PL (perception of light). This test is performed in a dark room. If no light is seen, record no PL, which is total blindness **(Mary E. Shaw, Agnes Lee 2010).**

2.12. Prevention of visual impairment:

The majority of people with diabetes do not have any retinopathy. However, a minority have macular edema or proliferative retinopathy that,

untreated, may lead to visual impairment (Sight-threatening retinopathy). Screening aims to refer to ophthalmology those people whose retinal images suggest they may be at increased risk of having, or at some point developing, sight-threatening retinopathy (referable retinopathy). When examined in ophthalmology, some of those referred will have sight-threatening retinopathy but many will just require regular ophthalmology review until they do develop sight-threatening retinopathy.

The diabetic retinopathy screening service was established to detect signs of diabetic retinopathy only. Patients should be aware of this and ensure that they continue to attend routinely to a community optometrist for all other eye care needs.

2.12.1. Risk identification and prevention:

The following risk factors have been shown to determine the development and progression of diabetic retinal disease:

- ƒPoor glycemic control
- ƒRaised blood pressure
- ƒDuration of diabetes
- ƒMicro albuminuria and proteinuria
- ƒ Raised triglycerides and lowered haematocrit pregnancy.
- ƒ Serum cholesterol for macular exudates and oedema.**(Hipwell JH,etal 200)**

2.12.2. Risk factor modifications:

The evidence that modifying risk factors has a beneficial outcome in diabetic retinal disease exists for only some of the risk factors identified above. Tight control of blood glucose reduces the risk of onset and progression of diabetic eye disease in type 1 and 2 diabetes.

Reducing HbA1c by 1.5% (16.4 mmol/mol) and, if possible, to 7% (53 mmol/mol) in type 1 and 2 diabetes522, 604 and reducing blood pressure to 144/82 mm Hg in type 2 diabetes reduces the incidence and progression of sight-threatening diabetic eye disease606 and this is likely also to be the case for type 1 diabetes.

2.12.3. Screening:

The primary aim of screening is the detection of referable (potentially sight-threatening) retinopathy in asymptomatic people with diabetes so that treatment, where required, can be performed before visual impairment occurs. Screening is usually performed in the community using digital retinal photography.

In this section screening is defined as the ongoing assessment of funds with no diabetic retinopathy or non-sight-threatening diabetic retinopathy. Once sight threatening eye disease develops treatment is usually required. This would normally be carried out in an ophthalmology clinic. Diabetic retinopathy screening does not obviate the need for a regular**(Scottish Intercollegiate Guidelines 2011)**.

2.12.4. Grading and quality assurance:

When grading retinal appearances, digital imaging is more sensitive than Polaroid prints and probably similar to 35 mm film.644 Initial data indicate that high-resolution automated techniques can identify the absence of microaneurysms on digital images with a sensitivity of 85%, although further research is required in this area to validate the technique.

An observational study suggested that an increase in the total number and area of hemorrhages and hard exudates temporal to the fovea is associated with the development of macular oedema. All screening modalities should undergo quality assurance checks. For retinal photography this should happen in 500 sets of images per grader per year.**(Hipwell JH,etal 200)**

2.12.5. Referral intervals for diagnosis and treatment:

Delay in treatment of more than two years from diagnosis of proliferative diabetic retinopathy is associated with poor outcome and severe visual loss. When vitrectomy is required, a delay of over one year is associated with poorer visual outcome.

2.13. The nurse in the outpatient department:

The outpatient department is the portal into the hospital or unit for the majority of patients attending with eye conditions and may be the only department they visit. It is therefore important that the nurse working there should be a good advertisement for the whole hospital or unit.

Standards exist to ensure that patients do not have to wait longer than 18 weeks from referral to commencement of treatment. Has suggested that ophthalmic outpatient facilities fail to meet the needs of the patient with low vision and, whilst much has been done to improve on this situation, some work is still required. Nurses have a major role to play in ensuring that the environment and systems work for this category of patients and that they come up to a good standard. Low vision awareness training is one way to redress the situation, as is the introduction of initiatives such as 'The productive department' or 'the productive ward' **(Mary E. Shaw, Agnes Lee 2010).**

3. Methods and materials

The methods and material of this study used to assess the prevalence of visual disturbance and associated risk factors among diabetic patient in outpatient clinic in Elmek Nimer hospital, methods and materials of this study are presented in three main designs as follows:

1- Technical design.

2- Operational design.

3- Statistical design.

3.1 Technical Design:

Technical design of the study included study design, study area, setting, study population, sampling, data collection tools and pilot study.

3.1.1 Study design:

Descriptive cross-sectional hospital based study conducted to assess the prevalence of visual disturbance and associated risk factors diabetic patient in outpatient clinic in Elmek Nimer hospital.

3.1.2 Study area:

The study area is Elmek Nimer university hospital at Shendi city, River Nile State, Sudan, Shendi town is located north of Khartoum, about 176 km. and 110 km south to Elddamer, the capital of River Nile State, and Shendi town is lies on the eastern bank of the River Nile with a total area about 14596 Km2. The total population of Shendi locality is estimated at about 197589 of whom 116713 live in rural areas and 80876 in urban centers, most of them are farmers. Shendi University was established in the early 1990s and stands as a landmark institution in Higher Education.

Many governmental and private health services were established, to provide health care to the community. There are many hospitals (10), health centers (38), basic health units (17), and others health programs in the locality, (MCH and expanded program of immunization (EPI)). Moreover, environmental Health and Sanitary activities are carried out by the Environmental Health staff. The major constraints facing the heath facilities in the locality are the small number of qualified staff, lack of training courses, and the shortage of equipments.

3.1.3 Study Setting:

This study was carried out at Elmek nimer university hospital. This hospital was established since 2002. It is the second university hospital in Sudan. The hospital provides most types of medical services (medicine, surgery, Obstetric and Gynecological, pediatric and outpatient clinics complex). Beside these there are cardiac, renal and oncology centers). In this hospital there is a big theater complex in which most type of general operations are done. In addition to these, some of special surgery (Ophthalmic and laparoscopic surgery) are also performed in this theater complex. the outpatient provide patients follow up and medical consultation for many department including(medicine, surgery, Obstetric and Gynecological, pediatric and recent ophthalmology outpatient clinics.

3.1.4 Study population:

The population of this study was constituted all diabetic patients available in the above setting in the time of the study and mach the criteria of the sample. The estimated number of diabetic patients about (1680) patient. Whom coming to outpatient in Elmek Nimer university hospital for follow up. Adult diabetic patient of both sexes according to the following:

✓ Inclusion criteria:

- Age more than 30 years from both sexes.
- Diagnose since five years or more.
- The diabetic patient coming to outpatient clinic only.

✓ Exclusion criteria:

- Patients admitted to inpatient in the hospital.
- Newly diagnosed diabetic with less than five year.

3.1.5 Sample Size and Sampling technique:

▪ Sample Size:

The sample size was calculated using software Known as the survey system available at http:/www.surveystem.com.sscalc.htm. The system inertly relies on this equation:

$$\text{Sample size (n)} = \frac{Z2 / pq}{d2}$$

(n) = the sample size

Z = the standard normal deviate, usually set at 1.96, which corresponds to the level of the 95% confidence level

P = the proportion of target population

d = absolute precision required on either side of the proportion

q = 1.0-P

The sample size was calculated to be (90) patient. The sample was distributed proportionally to the study population follow up days and according to total population.

- **Sampling techniques:**

The sample was taken from all diabetic patient, they are selected by use probability method of sampling (simple random sampling).

3.1.6 Data collection tools:

For this study two tools are used to collect data to achieve the objectives of the study, under supervision of the researcher himself. Data collected by the following means:-

1. Structured questionnaire.
2. Structural snellen test chart.

1- Structured questionnaire:

The questionnaire was developed by researcher based on reviewing of literature, to assess the prevalence and associated risk factors of visual disturbance among diabetic patient in outpatient clinic in Elmek nimer hospital. The questionnaire consisting of parts:

The first part: was designed to collect demographic data of study participants. e.g. age, sex, level of education, job, type and duration of diabetes) this part included four eight closed ended questions from (1-8).

The second part: was developed to collect data about the participants associate risk factors. (Such as hyperglycemia attack, risk factors, diabetes follow up). This part included ten four closed questions from (9-12).

The third part: was designed to collect data about the participants visual disturbances. This part included six closed questions to measure visual impairment, eye examination and type of visual disturbance.

2-Snellen chart:

The researcher using a Snellen box or LogMAR that all the bulbs are in working order. When testing a patient's near vision, ensure that there is

an adequate light source. It is a good idea to rotate the chart round for frequent attendees to the eye outpatient unit to minimize patients memorizing the letters on the chart. (As LogMAR has a different chart for testing each eye, this reduces opportunity for remembering all of the letters.)

Smeller's test type had heavy block letters, numbers or symbols printed in black on a white background, are arranged on a chart in nine rows of graded size, diminishing from the top downwards. The top letter can be read by the normal eye at a distance of 60 m, and the following rows should be read at 36, 24, 18, 12, 9, 6, 5 and 4 m, respectively.

For vision less than 6/60, the distance between the patient and the chart is reduced by a meter at a time and the vision is recorded accordingly as, for example, 5/60, 4/60, 3/60, 2/60, 1/60. Patients have eye examination, which includes using a Snellen projection chart. We used the WHO recommended definitions of visual impairment and blindness when testing vision equity will be as following:

- 6/9-6/6-6/4= Normal vision.
- 6/18 = Mild vision loss.
- 6/24 = Moderate vision loss.
- 6/36 = Sever vision loss.
- 6/60 = Profound vision loss. **(Mary E. Shaw, Agnes Lee 2010).**

3.2 Operational Design:

Operational design included a pilot study, data collection technique, ethical consideration and the program

3.2.1 Pilot Study:

A pilot study carried out after the development of the study and before embarking on the actual study (data collection). It was conduct during May2014 in order to test applicability of the tools of data collection, and to estimate the time required for filling the required forms , It was

carried out on (10 patient) to evaluate the contents of the tools so as to find out if the items were understood by the patient.

Pilot study applicability under the pleaded for questionnaire. The results of this pilot study were as follows:

- The patients understand the method used to fulfill each tool. They indicated that some items needed to be modified, rephrasing, omission, whether these items stay as it is or by adding some words.
- Based on this pilot results modification were made, at the final the researcher assure that each tool is most likely going to achieved the aim of the study.
- The sample of pilot study (10patients) was excluded from the total subject of the research work.

3.2.2 Data collection technique:

In this study the data was collected in two phases, the first phase the questionnaire was dispensed for participants and each one of them is allowed sufficient time to fill it, all participants return questionnaire back.

The second phase regarding the visual equity the researcher was assigned a code for each one of participants to facilitate the check vision equity measurement.

3.2.3 Ethical considerations:

To conduct the study the permission and the approval of the directors of the hospital was taken through the Dean of the Faculty of post graduate studies. Permission was taken from hospital general manager and from the nursing headquarters (matron) and the manger of outpatient clinic. The purpose of study was explained to each one of participants. And the researcher assured them that the data collected from the questionnaire will be remaining confidential and it’s not allowed for any person to identify it.

Responders were informed that they could refuse to participate in the study, and withdraw from it at any time. .

3.4 Statistical Design:

The collected data was organized, and analyzed statistically using percentage, chi- square test and one way a nova test to find out the relation between variables. Using a computerized statistical package for social science

s (SPSS version 16). The results were demonstrated as tables and figures showing numbers and percentages. Significant level considered if p value <0.05 o

Results

Table: (1)The distribution of the study population according to Socio-Demographic Characteristics (age, sex, level of education, patient's job) (n=90).

age	Frequency	Percent
30-35 years	3	3.3 %
36-40 years	6	6.7 %
41-45 years	19	21.1 %
More than 45 year	62	68.9 %
Total	**90**	**100%**
sex		
Male	30	33.3 %
Female	60	66.7 %
Total	**90**	**100 %**
level of education		
Illiterate	49	54.4 %
Primary	26	28.9 %
High school	14	15.6 %
University graduate	1	1.1 %
Total	**90**	**100 %**
job		
Employed	25	27.8 %
Unemployed retired	42	46.7 %
Unable to work	23	25.6 %
Total	**90**	**100** %

Table (1) shows that more than two third of study group (68.9%, 66.7%) were female and their age was between 45years, respectively. With only 21.1 % of study population their age rang 41-45 years.

About the educational level of study group the table revealed that less than half (54.4%) are Illiterate. More than quarters of them (28.9%) are primary school. on the other hand less than half of the patients are Unemployed retired. The employed are (27.8%).

Table (2). The distribution of the study population according to type of diabetes and Duration of diabetes. (n=90).

Type of diabetes	Frequency	Percent
Type 1	32	35.6 %
Type 2	58	64.4 %
Total	**90**	**100 %**
Duration of diabetes		
5-10 years	64	71.1 %
11-15 years	12	13.3 %
16-20 years	7	7.8 %
More than 20 year	7	7.8 %
Total	**90**	**100 %**

Table (2) shows that (64.4 %) of study population had Type 2 of diabetes. More than third of them (35.6 %) had Type 1 of diabetes. More than two third of patients (71.1%) their duration of diabetes between 5-10 years. While same percentage (7.8%) of them their duration of diabetes range between 16-20 years and more than 20 years.

Table (3). The distribution of the study population according to type of diabetes medication used. (n=90).

Diet program	Frequency	Percent
Yes	64	71.1 %
No	26	28.9 %
Total	**90**	**100 %**

This table shows more than half (53.3%) of study population use Oral hypoglycemic agent. While more than two fifth (42.2%) of the study population use insulin. With 4.4% of study population depend on diet only.

Table (4). The distribution of the study population according to Diet program for diabetes. (n=90).

Type of medication	Frequency	Percent
Oral hypoglycemic agent	48	53.3 %
Insulin	38	42.2 %
Diet only	4	4.4 %
Total	**90**	**100%**

This table illustrates that more than two third (71.1%) study group are in diabetes dietary program.

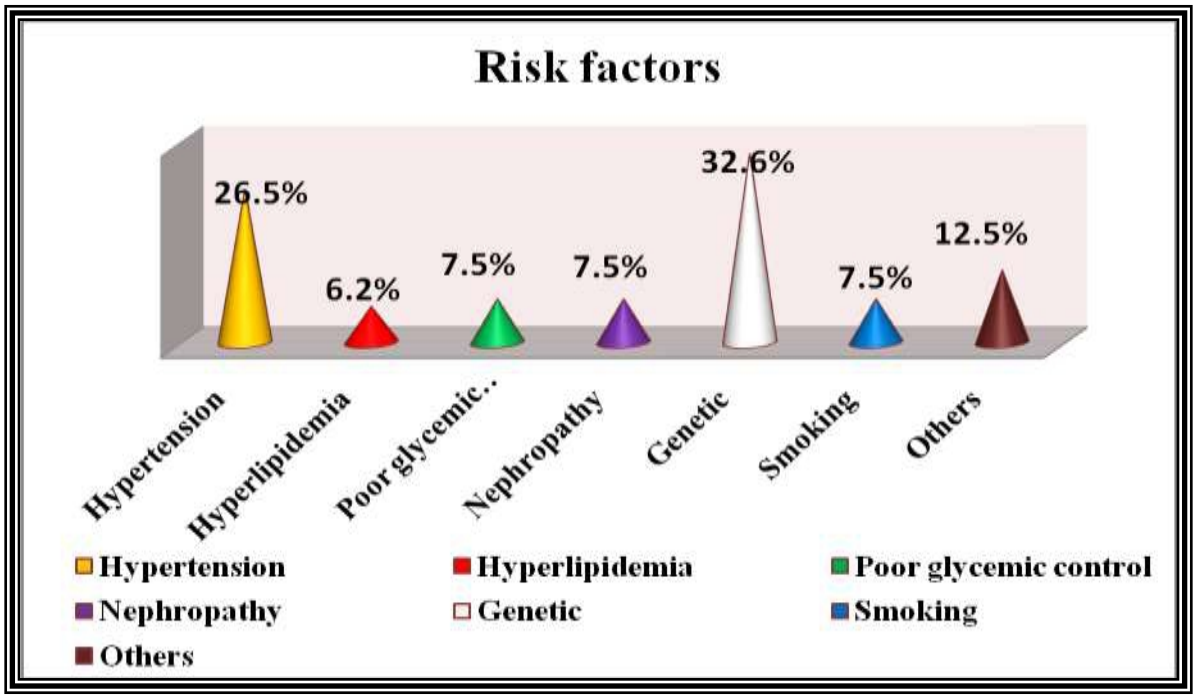


Figure (1). The risk factors among study population (n=90).

Figure No (1) shows nearly third (32.6%) of the study population had genetic predispose factor for diabetes. In contrast to more than quarter (26.5%) of them had hypertension .while similar percentage (7.5%) had poor glycemic control, nephropathy and smoking.

Table (5). The distribution of the study population according to hyperglyce mia attact and last hyperglycemia attact. (n=90).

Hyperglycemia attack	Frequency	Percent
Always	10	11.1 %
Rarely	56	62.2 %
Never	24	26.7 %
Total	**90**	**100 %**
Last Hyperglycemia attact		
Month ago	27	30 %
2-3months ago	10	11.1 %
More than 4 month	4	4.4 %
Not remember	25	27.8 %
Never	24	26.7 %
Total	**90**	**100 %**

Table No (5) clarifies that more than three fifth (62.2%) of study population are rarely had hypoglycemic attact. Furthermore , same percentage (26.7%)never complain from this attach.

Less than third (30%) of study population reveal that the last experience of hypoglycemic attact in the month ago. On other hand (27.8%)reveal they are not remember .

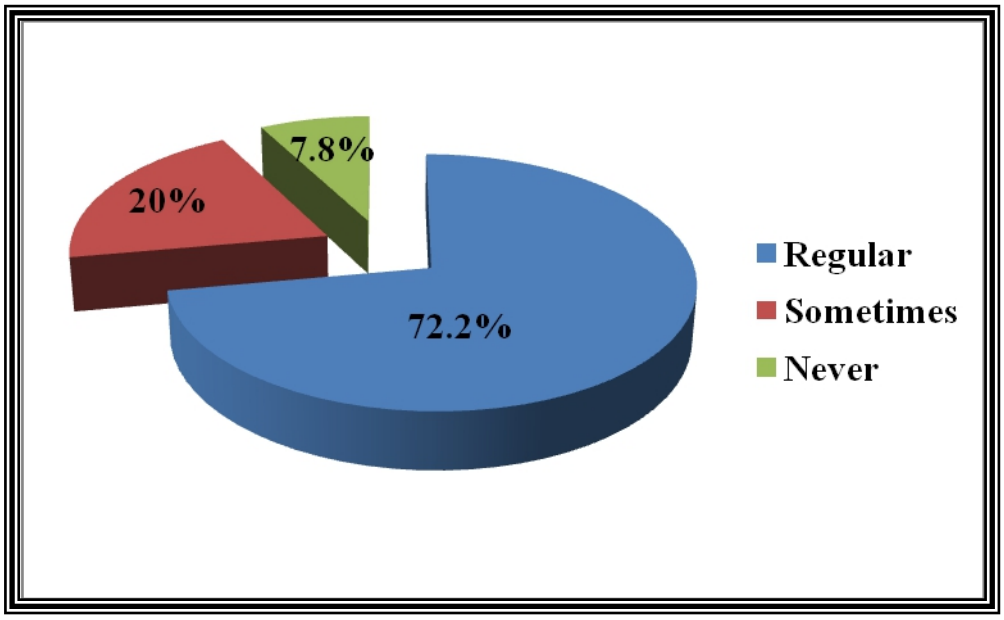


Figure (2). The Diabetes follow up among study population (n=90).

As regarding the Diabetes follow up among patients figure (2) Displays that most of the study population (41.6%) are on regular follow up. While fifth of them (20%) are sometimes on follow up.

Table (6). The experience of visual disturbance among study population (n=90).

Visual disturbance experienc	Frequency	Percent
Never	26	28.9 %
Recently	64	71.1 %
Total	**90**	**100 %**

The above table demonstrates that (71.1%) of study population experience of visual disturbance recently. With only 28.9% mentioned that they are never had visual disturbance.

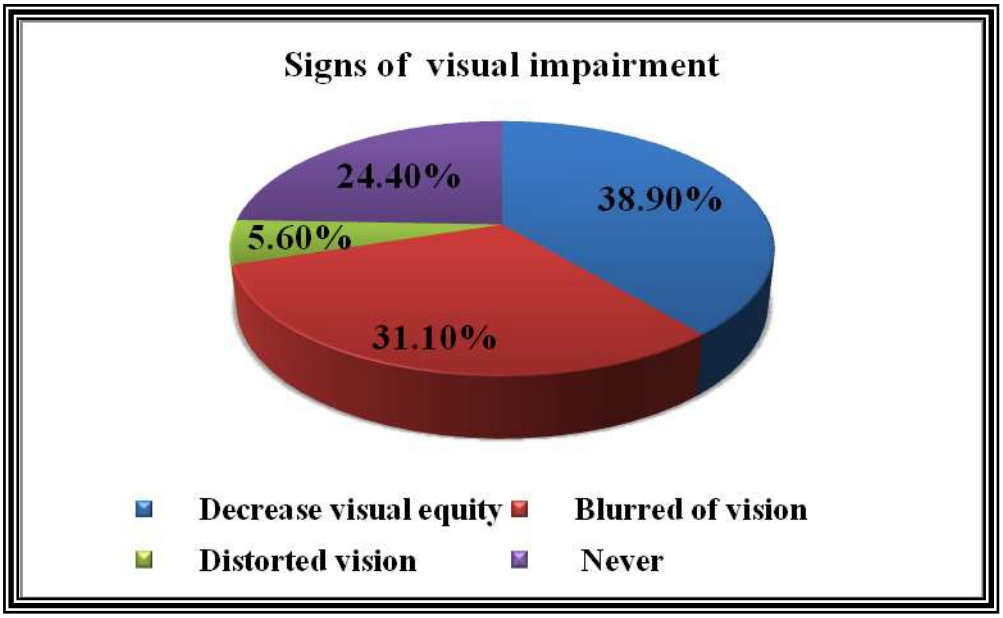


Figure (3). The Signs of visual impairment before among study population (n=90).

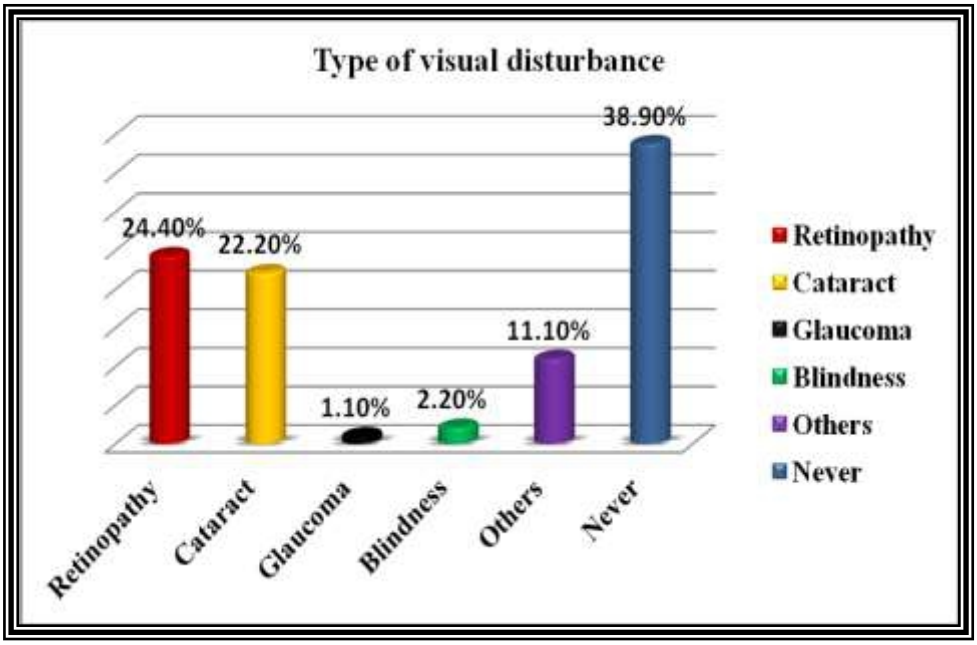
Figure No (3) shows nearly two fifth (38.9%) of the study population reveals that they had complain from decrease visual equity before this is in contrast to less than one third (31.1%) of them complain from blurred of vision before .while 24.4% had never complain signs of visual impairment.

Table (9). The performance of eye examination by physician among study population (n=90).

Eye examination by physician	Frequency	Percent
Yes	56	62.2 %
No	34	37.8 %
Total	**90**	**100 %**

Table No (9) reveals that less than two third (61.8%) of study population were performing Eye examination by physician.

Figure (4). The distribution of the study population according to type of visual disturbance. (n=90).



This figure explains that less than quarter (24.4%, 22.2%) of study population had developed retinopathy and cataract, respectively. While more than one third (28.9%) of study population never develop this complications.

Table (11). The distribution of the study population according to Visual equity and range of vision loss. (n=90).

Visual equity	Range of vision los	Frequency	Percent
6/9-6/6-6/4	Normal	32	35.6 %
6/18	Mild	23	25.6 %
6/24	Moderate	9	10 %
6/36	Sever	14	15.6 %
6/60	Profound	12	13.3 %
Total		**90**	**100 %**

Table (11) clarify that (35.6%) of study population had normal visual equity. Quarter of them (25.6%) had mild vision loss with eye equity 6/18 and only (13.3%) had profound vision loss. (15.6%, 10%) of the diabetic patient had moderate to severe vision loss with eye equity more than 6/36-6/60.

Table. (12) The relation between the level of education and diabetes follow up (n=90).

		Diabetes follow up			Total	P-value
		Regula	Sometimes	Never	**Total**	
level of educatio	Illiterate	35	11	3	**49**	**0.00**
	Primary	19	3	4	**26**	
	High schoo	10	4	0	**14**	
	University Graduate	1	0	0	**1**	
Total		**65**	**18**	**7**	**90**	

*** Significant at P. value ≤ 0.05**

**** Highly significant at p. value≤ 0.001**

This table illustrates the significant statistical relation between the level of education and diabetes follow up (p-value 0.05).

Table (13) the relation between the age and range of vision loss (n=90).

		Range of vision loss					Total	P-value
		Norma	Mild	Moderate	Sever	Profound		
age	30-35 years	1	2	0	0	0	**3**	**0.01**
	36-40 years	2	3	0	1	0	**6**	
	41-45 years	11	4	2	2	0	**19**	
	More than 45	18	14	7	11	12	**62**	
Total		**32**	**23**	**9**	**14**	**12**	**90**	

*** Significant at P. value ≤ 0.05**

**** Highly significant at p. value≤ 0.001**

Table (14) the relation between the Duration of diabetes and type of visual disturbance (n=90).

		Type of visual disturbance						Total
		Retinopath	Cataract	Glaucom	Blindnes	Other	Nevei	
Duration o diabetes	5-10 years	15	12	0	1	5	31	**64**
	11-15 years	2	3	0	1	3	3	**12**
	16-20 years	2	4	1	0	0	0	**7**
	More than 20	3	1	0	0	2	1	**7**
Total		**22**	**20**	**1**	**2**	**10**	**35**	**90**
P-value		**0.03**						

*** Significant at P. value ≤ 0.05**

**** Highly significant at p. value≤ 0.001**

Table (15) the relation between the Type of medication and range of vision loss (n=90).

		Range of vision loss						P-valu
		Norma	Mil	Moderat	Seve	Profoun	Tota	
Type of medicatio	Oral hypoglycemi agent	19	12	2	9	6	**48**	**0.09**
	Insulin	10	11	7	4	6	**38**	
	Diet only	3	0	0	1	0	**4**	
Total		**32**	**23**	**9**	**14**	**12**	**90**	

*** Significant at P. value ≤ 0.05**

**** Highly significant at p. value≤ 0.001**

Discussion

The prevalence of diabetes is increasing due to longer survival and lifestyle changes, in some countries its prevalence is reaching more than 10%. After 20 years, 90% of patients with diabetes type I, and 60% of those with type II will have some form of retinopathy; of these, 5% will require treatment to avoid irreversible blindness.

According to the World Health Organization (WHO), approximately 314 million people worldwide are visually impaired, 45 million are blind, and nearly 80% of the world's blindness can be prevented or treated. Disparities in vision health (eye disease, visual impairment, and related disability) exist among certain age, sex, socio-demographic, racial, and geographic subgroups **(Who, 2010)**. There-fore, this descriptive, cross-sectional hospital-based study attempt to assess the prevalence of visual disturbance and associated risk factors among diabetic patients in outpatient clinic in Elmek Nimer hospital Patient in outpatient clinic in Elmek Nimer hospital. In period extend from April to December 2014.

The present study reveal that more than two third of study group (68.9%, 66.7%) were female and their age more than 45years, respectively. With only 21.1 % of study population their age rang 41-45 years. The elderly diabetic patient is 1.5 times more likely to develop vision loss and blindness than is an age-matched non diabetic person. Just as age is a risk factor for developing multiple chronic medical conditions, so that age a risk factor for developing multiple visual comorbidities. Indeed, cataracts, glaucoma and macular degeneration are four times more likely to cause vision loss and blindness than is diabetic retinopathy **(Sinclair AJ, etal.2010).**

Concerning the educational level the study revealed that less than half (54.4%) are Illiterate. More than quarters of them (28.9%) are primary school. the highly significant statistical relation had been found between the

level of education and diabetes follow up (p-value 0.05). On the other hand less than half of the patients are Unemployed retired. The employed are (27.8%). This mean the study population there are increase chance of developing visual impairment with illiteracy. So that they neglect their checkups and so that irreversible changes that could lead to blindness occur

The collective evidence from this study showed that (64.4 %) of study population had Type 2 of diabetes. More than third of them (35.6 %) had Type 1 of diabetes. More than two third of patients (71.1%) their duration of diabetes between 5-10 years. While same percentage (7.8%) of them their duration of diabetes range between 16-20 years. For that reason, the incidence and mortality of visual impairment, perhaps to be high, remarkably constant and the frequency is increasing particularly amongst Type 2 of diabetes with long duration. There was a significant statistical relation between duration and type of visual disturbance (P-value, 0.03).

The highly proportion (53.3%) of study population use Oral hypoglycemic agent. While more than two fifth (42.2%) of the study population use insulin. With 4.4% of study population depend on diet only. As well as more than two third (71.1%) study group are in diabetes dietary program. Nearly third (32.6%) of the study population had genetic predispose factor for diabetes. In contrast to more than quarter (26.5%) of them had hypertension .while similar percentage (7.5%) had poor glycemic control, nephropathy and smoking. Therefore important that effort should made using the media to create diabetic awareness in rural areas with less health services and emphasize the importance of dietary program and screening of risk factors as appears to be better media to reach a wider audience.

The study showed that more than three fifth (62.2%) of study population are rarely had hypoglycemic attact. Furthermore, same percentage (26.7%) never complain from this attach. While, less than third (30%) of study population reveal that the last experience of hypoglycemic

attact in the month ago. On other hand (27.8%)reveal they are not remember . the finding from this research indicate that a proper follow up of all diabetic patient .it is justifiable that hypoglycemic attack is not occur if the diabetes management are established early and they follow the screening recommendations including glucose monitoring and control.

As regarding the Diabetes follow up among patients the study displays that most of the study population (41.6%) are on regular follow up. While less than two third (61.8%) of study population were performing eye examination by physician. Majority (71.1%) of study population experience of visual disturbance recently. nearly two fifth (38.9%) of the study population reveals that they had complain from decrease visual equity before. in contrast to less than one third (31.1%) of them complain from blurred of vision before This is good indication for services provided by medical team in outpatient clinic. This finding are compatible with those of **(Veterans health institute, 2002)** the eye examination should be provided by an optometrist or ophthalmologist. Retinal photographs may be done to assist with patient screening and management; however, it is not intended to replace the need for a comprehensive eye exam.

This study explains that less than quarter (24.4%, 22.2%) of study population had developed retinopathy and cataract, respectively. While more than one third (28.9%) of study population never develop this complications. on the other hand, nearly two fifth (38.9%) of the study population reveals that they had complain from decrease visual equity before this is in contrast to less than one third (31.1%) of them complain from blurred of vision before. this finding is constant with study done in Yemenis with diabetes which reveal that Cataract, proliferative diabetic retinopathy (PDR) and diabetic maculapathy were the main causes of visual impairment and blindness. Patients with PDR and maculapathy were significantly more likely to have visual impairment compared to patients without retinopathy**(S.A. Al-Akily, 2011).**

According to **(World health organization, 2007)** stated the prevalence of visual impairment and blindness due to diabetic retinopathy and diabetic eye complications is on the rise. Diabetic retinopathy is a priority disease in the VISION 20/20initiative for the global elimination of avoidable blindness and World Health Organization (WHO) has made prevention of visual impairment and blindness an international priority. Most diabetes-associated blindness is due to complications of diabetic retinopathy and diabetic maculapathy **(WHO, 2007)**

It has been found from this study (35.6%) of study population had normal visual equity. Quarter of them (25.6%) had mild vision loss with eye equity 6/18 and only (13.3%) had profound vision loss. (15.6%, 10%) of the diabetic patient had moderate to severe vision loss with eye equity more than 6/36-6/60.which reflect Screening for diabetic visual impairment in patients with diabetes mellitus has been going on in our hospital . All patients with diabetes mellitus are examined annually.

Conclusion

Based on the fining s of present study .it is concluded that:

The present study reveal that more than two third of study group were female and their age more than 45years. Concerning the educational level the study revealed that less than half are Illiterate. The highly proportion of study population use Oral hypoglycemic agent. Nearly third of the study population had genetic predispose factor for diabetes.

As regarding the Diabetes follow up among patients the study displays that most of the study population are on regular follow up. On the other hand quarter of study population had developed retinopathy and cataract. While they had complain from decrease visual equity. Quarter of them had mild vision loss with eye equity 6/18 and only had profound vision loss.

Recommendation

In the light of the results, the following recommendation can be made:

- Locally educational programmers are highly needed to reduce the risk of visual impairment and blindness among diabetics.
- Systematic screening for diabetic retinal disease should be provided for all people with diabetes and should be screened at least annually.
- Initiation of the Prevention of Blindness Programme in the Ministry of Health and Population should address for diabetic retinopathy and proper planning of a public health programme is crucial.
- Advocates the inclusion of primary eye care as a part of PHC system in Shendi locality.

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بسم الله الرحمن الرحيم

Shendi University

Faculty of Post- graduate studies

Questionnaire about prevalence and associated risk factors of visual disturbance among diabetic patient in Diabetic out patient at Elmak Nimer university hospital

Serial number: (…….)

Part (1):- Demographic profile:

1. **Age**
   a. 30-35 ☐ b.36-40 ☐ c.41-45 ☐ d. More than 45 ☐
2. **Sex:**
   a. Male ☐ b.Female ☐
3. **level of education:**
   a. Illiterate ☐ b.Primary ☐ c.High school ☐ d. University ☐ graduate
4. **job:**
   a. employed ☐ b. Unemployed retired ☐ c. Unable to work ☐
5. **Diabetes type:**
   a. Type I ☐ b. Type II ☐
6. **Duration of diabetes:**
   a.5-10 year's ☐ b. 11-15 year's ☐ c. 15-20 year's ☐ d. More than ☐ 20 year's
7. **Type medication for diabetes :**
   a. Oral hypoglycemic agent ☐ b.Insulin ☐ c. Diet only ☐
8. **Are you in diet programme?**
   a. Yes ☐ b. No ☐

Part (2): risk factors of visual disturbance:

9. **Risk factors do you have?**
   a. Hypertension ☐
   b. Hyperlipidemia ☐
   c. Poor glycemic control ☐
   d. Nephropathy ☐
   e. Genetic ☐
   f.Smoking ☐
10. **Do you have attack of hyperglycemia:**
    a. Always ☐ b. Rarely ☐ c. Never. ☐

11. Last attack?

a. Month ago ☐ b. 2-3 Month ago ☐ c. More 4 Month ago ☐ D. Not remember ☐

12. Diabetic follow up?

a. Regular ☐ b. Some times ☐ c. Never

Part (3): Patient visual disturbances:

13. Do you experience any visual disturbance?

a. Never ☐ b. Recently ☐

14. signs of visual impairment you are complain before:

a. Decrease visual equity ☐ b. Blurred vision ☐ d. Distorted vision ☐

15. Do you perform eye examination by physicians or trained technicians before:

a. Yes ☐ b. No ☐

16. Type of visual disturbance?

a. Retinopathy ☐ b. Cataract ☐ c. Glaucoma ☐ d. Blindness ☐ e. Others ☐

17. Visual equity……

18. Range of vision loss?

a. Normal ☐ b. Mild ☐ c Moderat ☐ d. Seve ☐ e. Profound ☐