

Causes and Risk Factors Contributed and Responsible for Prevalence and Incidence of Retinopathy in Al- Walidain Hospital in Omdurman – Sudan

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Abstract: *The objectives of this study is to assess and determine the causes and risk factors which contributes and responsible for the prevalence and steadily increased incidence of retinopathy, which includes diabetes, hypertension, age and sex . This is a descriptive cross-sectional hospital based study, conducted on 100, retinopathy patients attending Al-Walidain Hospital in Omdurman; during the period of the study, which was carried out on 2007; from March to May 2007.*

The Study found that males are affected greater than females (57%), and it was found that most patients with retinopathy of age greater than 60 years .Also, it has been found that the retinopathy is common in Khartoum than out of it. Diabetic retinopathy is frequently encountered and hypertensive retinopathy remains a recognized

As new blood vessels form at the back of the eye as a part of *proliferative diabetic retinopathy* (PDR), they can bleed (ocular hemorrhage) and blur vision. The first time this happens, it may not be very severe. In most cases, it will leave just a few specks of blood, or spots, floating in a person's visual field, though the spots often go away after a few hours. These spots are often followed within a few days or weeks by a much greater leakage of blood, which blurs vision. In extreme cases, a person will only be able to tell light from dark in that eye. It may take the blood anywhere from a few days to months or even years to clear from the inside of the eye, and in some cases the blood will not clear. These types of large hemorrhages tend to happen more than once, often during sleep.[1].

manifestation of target organ damage in hypertensive patients.

1. Introduction

Retinopathy is a general term that refers to some form of non-inflammatory damage to the retina of the eye. Frequently, retinopathy is an ocular manifestation of systemic disease which affects up to 80% of all patients who have had diabetes for 10 years or more [1]. Diabetic retinopathy often has no early warning signs. Even macular edema, which may cause vision loss more rapidly, may not have any warning signs for some time. In general, however, a person with macular edema is likely to have blurred vision, making it hard to do things like read or drive. In some cases, the vision will get better or worse during the day.

On funduscopic exam, a doctor will see cotton wool spots, flame hemorrhages (similar lesions are also caused by the alpha-toxin of *Clostridium novyi*), and dot-blot hemorrhages. Elevation of blood-glucose levels can also cause edema (swelling) of the crystalline lens (hyperphacosorbitomyopiosis) as a result of sorbitol (sugar alcohol) accumulating in the lens. This edema often causes temporary myopia (nearsightedness). A common sign of hyperphacosorbitomyopiosis is blurring of distance vision while near vision remains adequate ^[1].

As the disease progresses, severe non-proliferative diabetic retinopathy enters an advanced, or proliferative stage when blood vessels proliferate (i.e. grow). The lack of oxygen in the retina causes fragile, new, blood vessels to grow along the retina and in the clear, gel-like vitreous humour that fills

the inside of the eye. Without timely treatment, these new blood vessels can bleed, cloud vision, and destroy the retina. Fibro-vascular proliferation can also cause tractional retinal detachment. The new blood vessels can also grow into the angle of the anterior chamber of the eye and cause neo-vascular glaucoma. Non-proliferative diabetic retinopathy shows up as cotton wool spots, or micro-vascular abnormalities or as superficial retinal hemorrhages. Even so, the advanced proliferative diabetic retinopathy (PDR) can remain asymptomatic for a very long time, and so should be monitored closely with regular checkups^[1].

Blindness is one of the most feared complications of diabetes but also one of the most preventable. Diabetes is the commonest cause of blindness in people aged 30 to 69 years [3].

All people with diabetes mellitus are at risk – those with Type I diabetes (*juvenile onset*) and those with Type II diabetes (*adult onset*). The longer a person has diabetes, the higher the risk of developing some ocular problem. Between 40 to 45 percent of Americans diagnosed with diabetes have some stage of diabetic retinopathy.⁽¹⁾ Twenty years after the onset of diabetes, almost all patients with type 1 diabetes and over 60% of patients with type 2 diabetes will have some degree of retinopathy.^[3]

Diabetic retinopathy is due to microangiopathy affecting the retinal precapillary arterioles, capillaries, and venules. Damage is caused by both microvascular leakage from breakdown of the inner blood-retinal barrier and micro-vascular occlusion. These two pathological mechanisms can be distinguished from each other by fluorescein angiography^[3].

Hypertensive retinopathy is damage to the retina due to high blood pressure (i.e. hypertension). The retina is one of the "target organs" that are damaged by sustained hypertension. Subjected to excessively high blood pressure over prolonged time, the small blood vessels that involve the eye are damaged, thickening, bulging and leaking^[4]. **Retinopathy of prematurity (ROP)**, previously known as **retrolental fibroplasia (RLF)**, is an eye disease that affects prematurely born babies. It is thought to be caused by disorganized growth of retinal blood vessels which may result in scarring and retinal detachment. ROP can be mild and may resolve spontaneously, but may lead to blindness in serious cases. As such, all preterm babies are at risk for ROP, and very low birth weight is an

additional risk factor. Both oxygen toxicity and relative hypoxia can contribute to the development of ROP^[5,6].

Solar retinopathy is damage to the eye's retina, particularly the macula, from prolonged exposure to solar radiation. It usually occurs due to staring at the sun or viewing a solar eclipse^[7,8].

Vision loss due to solar retinopathy is typically reversible, lasting for as short as one month to over one year^[7,8,9,10].

2. Materials and Methods:

2.1. Study Subjects: This study was carried out on 2007; from March to May; in Alwalidain Hospital in Omdurman ;that is a specialized hospital for treatment of eye diseases . During the period of the study; 100 patients with retinopathy; of both sexes; attending Al-Walidain Hospital; the mean of their ages were (46.8 ± 20.40 years).

Study Design: This is a descriptive cross-sectional hospital based study.

2.3. Methods of Data Collection: To determine the main factors associated with retinopathy; a questionnaire was constructed for this purpose .Data were collected about the name; age; sex ; location ;presence or absence of diabetes and hypertension from the files of Alwalidain Hospital in Omdurman .

2.4. Methods of Data Analysis: The analysis of data has been carried on manually .Data was summarized and a master sheet was formed . Also, data has been presented in the form of tables and charts.

3. Results:

3.1. Results of Sex: It has been found that 57% males and 43% females were found to be affected by the disease as presented in Fig.[1].

3.2. Results of Age: Among 100 patients (mean age 46.8 ± 20.4 years) included in this study 12% were <20 years; 19% >20 years; 32% >40 years and 37% >60years Fig.[2].

3.3. Results of Risk Factors : Of the 100 patients examined , 9% diagnosed with diabetes ;their mean ages(56.5 ± 10.90 years);female about 6% and male about 3%.Also,4% of patients were

presented with hypertension (mean age 61.20 ± 5.40 years); female about 2% and male 2%. Patients with diabetes and hypertension were found to be about 2%; female about 1% and male 1% (mean age 16.00 ± 6.00 years). The non-diabetic and hypertensive patients (mean age 44.80 ± 21.10 years) comprise 85%; (34% female and 51% males) as shown in Fig. [3].

3.4. Results of Location: Among 100 patients from various locations the study explain that the retinopathy is more common in Khartoum (76%) than out of Khartoum (24%) Fig.[4].

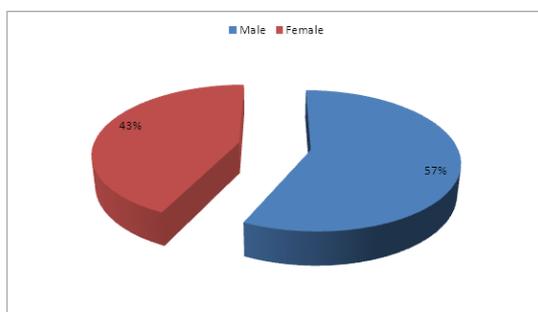


Figure [1]: Showing Distribution of Retinopathy Patients According to Gender

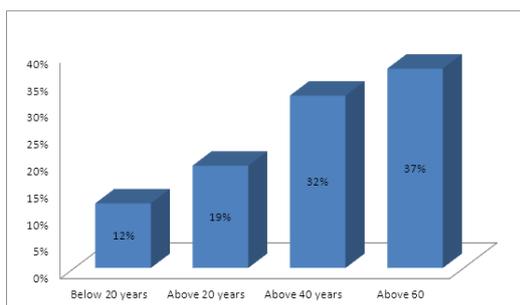
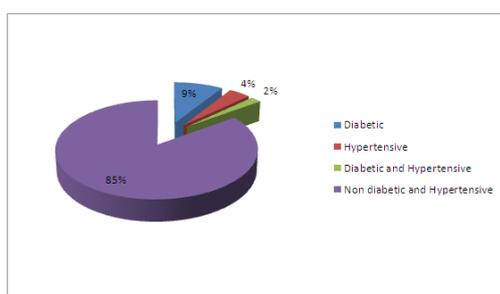
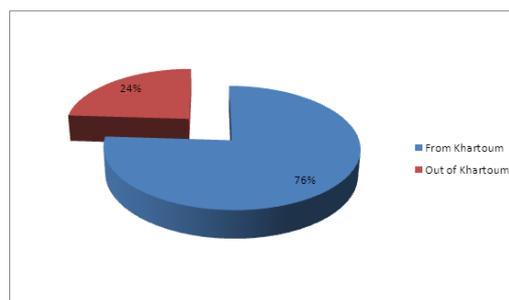


Figure [2]: Showing Distribution of Retinopathy Patients According to Age:



Figure[3]: Showing Frequency of Retinopathy Among Diabetic, Hypertensive and Patients With Both Diabetes and Hypertension:



Figure[4]: Showing Distribution of the Sample According to the Location:

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4. Discussion:

According to the present findings, males affected by retinopathy (57%) are greater than female which comprise 43%. The highest percentage of retinopathy patients was found to be in age group above sixty years (37%). Research found that about 9% of retinopathy patients under study was due to diabetes as a complication of diabetes mellitus; male comprise 3% and female 6%; which indicate that percentage of diabetic retinopathy female exceed percentage of diabetic retinopathy of male and this accepted the previous study.

Retinopathy is considered as a major health problem in Sudan, but the true dimensions of it, is not fully defined. Population based study should be conducted to analyze the situation in order to make situation specific plan of action and a proper screening program of retinopathy should be commenced. Also, Every diabetic and hypertensive patients should have check up ophthalmoscope training of medical staff especially at primary health care level is essential indeed.

5. References

[1] - "[Causes and Risk Factors](http://www.nlm.nih.gov/medlineplus/ency/article/001917.htm)". *Diabetic Retinopathy*. [United States National Library of Medicine](http://www.nlm.nih.gov/medlineplus/ency/article/001917.htm). 15 September 2009. <http://nihseniorhealth.gov/diabeticretinopathy/causesandriskfactors/02.html>.

[2] - Kertes PJ, Johnson TM, ed (2007). *Evidence Based Eye Care*. Philadelphia, PA: Lippincott Williams & Wilkins. ISBN 0-7817-6964-7.

[3]-Peter J Watkins: Retinopathy(2003).BMJ ; Apr 26; 326(7395): 924–926.

[4]- Wong TY, McIntosh R (2005). "Hypertensive retinopathy signs as risk indicators of cardiovascular morbidity and mortality". *British Medical Bulletin* **73-74**: 57-70. PMID [16148191](https://pubmed.ncbi.nlm.nih.gov/16148191/).

[5]https://en.wikipedia.org/wiki/Retinopathy_of_prematurity

[6]- Barnaby AM, Hansen RM, Moskowitz A, Fulton A(2007). Development of scotopic thresholds in retinopathy of prematurity. *Invest Ophthalmol Vis Sci* ;48:4854-4860.

[7]- https://en.wikipedia.org/wiki/Solar_retinopathy

[8]- Chen JC, Lee LR(2004). "Solar retinopathy and associated optical coherence tomography findings." *Clin Exp Optom*. 2004 Nov;87(6):390-3. doi:10.1111/j.1444-0938.tb03100.x PMID 15575813.

[9]- Hunyor AB(1987). "Solar retinopathy: its significance for the ageing eye and the younger pseudophakic patient." *Aust N Z J Ophthalmol*. Nov;15(4):371-5.

[10]-Stokkermans TJ, Dunbar MT(1998). "Solar retinopathy in a hospital-based primary care clinic." *J Am Optom Assoc*.69(10):625-36. PMID 9805443.