



*Full Length Research Paper*

# Diabetic retinopathy social risk factors among sudanese diabetic patients in Khartoum-Sudan 2016: hospital based cross-sectional study

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Diabetic retinopathy is one of the major complications of Diabetes that causes progressive damage to the retina. It is a serious sight-threatening disorder that may lead to blindness. The objective of this research was to study the social risk factors of diabetic retinopathy among diabetic patients aiming to gain information for prevention and control. This was a hospital based cross-sectional study conducted among 251 participants in 2016. The questionnaire was composed of 21 close-ended questions and study was estimated at 95% confidence level. 72% of the study group was living in rural areas. The majority of the study participants were of low income, less than 1000 SDG per month (35%) and less than 5000 SDG (42%). Educational level of 34% of the study candidates was Secondary level, 28% of the candidates were illiterate and 23% completed the basic level. Low income and low socio-economic status, low educational profile and living in rural areas or far from the center were significant factors associated with Diabetic retinopathy among Sudanese Diabetic Patients.

**Keywords:** Diabetic retinopathy, rural residency, sudanese population, low income, education

## INTRODUCTION

Diabetes mellitus (DM) is a group of metabolic diseases in which there is high blood sugar level over a prolonged period.<sup>[1]</sup> If left untreated, diabetes can cause many complications.<sup>[2]</sup> Acute complications include diabetic ketoacidosis and nonketotic hyperosmolar coma.<sup>[3]</sup> Serious long-term complications include cardiovascular disease, stroke, chronic kidney failure, foot ulcers, and damage to the eyes.<sup>[4]</sup>

Diabetes is due to either the pancreas not producing enough insulin or the cells of the body not responding properly to the insulin produced.<sup>[5]</sup> There are three main types of diabetes mellitus:

Type 1 DM results from the pancreas' failure to produce enough insulin.

Type 2 DM begins with insulin resistance, a condition in which cells fail to respond to insulin properly. As the

disease progresses a lack of insulin may also develop.<sup>[6]</sup>

This form was previously referred to as "non-insulin-dependent diabetes mellitus

Gestational diabetes is the third main form and occurs when pregnant women without a previous history of diabetes develop a high blood sugar level.

Globally, as of 2010, an estimated 285 million people had diabetes, with type 2 making up about 90% of the cases.<sup>[7]</sup> In 2015 an estimation of 415 million people had diabetes worldwide and expected to be 642 million by 2040.<sup>[8]</sup> In Sudan there were more than 1.4 million cases of diabetes in 2015 according to International Diabetes Federation. Diabetes mellitus occurs throughout the world, but is more common in the more developed countries. The greatest increase in prevalence is, however, expected to occur in Asia and Africa, where

most patients will probably be found by 2030. The increase in incidence in developing countries follows the trend of urbanization and lifestyle changes, perhaps most importantly a "Western-style" diet. This has suggested an environmental (i.e., dietary) effect, but there is little understanding of the mechanism(s) at present, though there is much speculation, some of it most compellingly presented.<sup>[9]</sup>

Diabetic Retinopathy (DR) is one of the major complications of Diabetes that causes progressive damage to the retina, the light sensitive lining at the back of the eye. It is a serious sight-threatening complication of diabetes.

DR is the result of damage to the tiny blood vessels that nourish the retina. They leak blood and other fluids that cause swelling of retinal tissue and clouding of vision. The condition usually affects both eyes but usually not similar in severity. The longer a person has diabetes, the more likely he will develop diabetic retinopathy. If left untreated, diabetic retinopathy can cause blindness.

### Magnitude of Diabetic Retinopathy

There are approximately 93 million people with diabetic retinopathy, 17 million with proliferative diabetic retinopathy, 21 million with diabetic macular edema, and 28 million with vision-threatening DR (VTDR) worldwide.<sup>[10]</sup>

Globally, diabetic retinopathy accounts for 5% of all blindness, affecting 2 million people<sup>[11]</sup> and it is the leading cause of blindness in people aged 15 – 64 years in industrialized countries.

A recent pooled analysis from 35 population-based studies estimated that 93 million people worldwide have diabetic retinopathy, of whom 17 million (18%) have proliferative DR, 21 million (23%) have diabetic macular edema (DME), and 28 million (20%) have sight-threatening DR.

Among people with diabetes, this translates to an overall prevalence of 34.6% for any DR, 7.0% for proliferative DR, 6.8% for DME, and 10.2% for sight-threatening DR. Pooled analyses showed no difference in prevalence between men and women. Asians had the lowest prevalence and African Americans the highest.

## MATERIAL AND METHODS

**Study Design:** Hospital based cross-sectional study.

### Study setting

The study was carried out among diabetic patients presented to Makkah Eye Complex (MEC). MEC is a tertiary specialized ophthalmic hospital in Khartoum-Sudan. It was established on 2003. The monthly average of total patient attending the outpatient and special clinics

is about 24000 patients and the average surgeries per month is about 2200 surgeries according to the hospital records.

### Study population

The population of this study was diabetic adult patients of both male and female gender with diabetic retinopathy attending Makkah Eye Complex clinics in Khartoum-Sudan.

### Data collection instrument

Data were collected using a pre-coded, pre-tested administered close ended questionnaire. The questionnaire was composed of 22 close-ended questions. The questionnaire was pretested using pilot survey method among 5 participants from the targeted group with insuring not to be included in the group of the study.

### Sample size and the sampling technique

The sample size was estimated by using the formula  $n = N / (1 + N(d)^2)$  where  $n$  = sample size,  $N$  = population and  $D$  = level of precision.

$$n = 676 / (1 + 676(0.05)^2) = 251.$$

### Sampling technique

Simple random sampling by selecting patient with Diabetic retinopathy from those attending retina clinics and fulfilling the inclusion criteria.

### Ethical considerations

An ethical clearance was obtained from the Institutional Review Board at Elneelain University.

A permission from the hospital research committee.

An informed consent from each participant prior to interview.

I was ensured that the entire participants were given my phone number or one of the data collectors to clarify queries if any.

All data was anonymised once it had been collected. The original list of participants was held by the primary researcher only. All field assistants were trained in matters of confidentiality and they had access to primary data only when it was necessary – for example when discussing data. All data was kept in a locked cabinet and computer used was password protected.

## RESULTS

72% of the study group was living in rural areas.



Figure I: Monthly income of participants in SDG, Low income was an associated risk factor Less than 1000 SDG per month (35%) and less than 5000 SDG (42%)

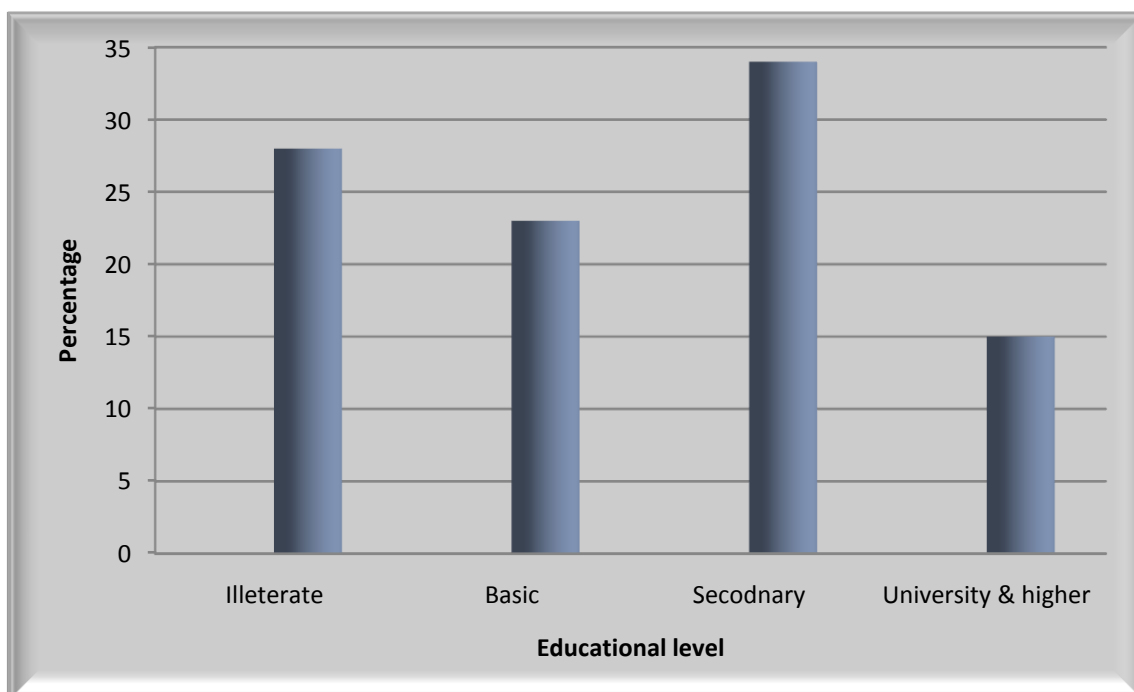


Figure II: Educational level of study participants. Majority were of low educational profile.

The majority of the study participants were of low income, less than 1000 SDG per month (35%) and less than 5000 SDG (42%) (Figure I).

Educational level of 34% of the study candidates was Secondary level, 28% of the candidates were illiterate and 23% completed the basic level and (Figure II).

## DISCUSSION

Blindness is a public health issue that affects the population life and it has significant negative impacts on their health, activity, psychological and socio-economic status in addition to the burden that it causes on the

countries health expenditure and the health system. Diabetic Retinopathy is a serious disorder that may lead to permanent blindness if not treated but it's a preventable and relatively manageable disorder if diagnosed at early stage. This study was conducted to reveal the Social risk factors associated with Diabetic Retinopathy aiming to gain information for prevention and control of the disorder and contribute to minimize the impact and burden of blindness.

The majority of the study candidates were living in rural and far areas from the center which make their access to health services is limited especially in such condition that needs high tertiary level of ophthalmic services. Living in rural areas is suggested to contribute in the problem through delayed referral or seeking medical advice and may be due to lack of awareness regarding prevention and control measures. A referral from primary care level which is available at most of the rural and far areas of the country could participate in treatment and control of the problem by diagnosing or suspecting the cases.

77% of the study participants were of low income, less than 1000 SDG per month (35%) and less than 5000 SDG (42%) and both considered as low socio-economic status which adds another issue of limiting the access to high level health care services due to transportation cost from rural area, residency, living cost in addition to healthcare cost in comparison to the gross low income and this is suggested to be one of the main factors that contribute to delayed or non referral to tertiary Diabetic eye care.

Educational level of the study candidates was generally of low profile. 58% of them were under university levels (Basic and Secondary levels) and 28% were illiterate, thus low educational level was found to be of significant association with Diabetic Retinopathy.

## CONCLUSION

Among Sudanese Diabetic participants of this study, it was observed that low income/ low socio-economic status, low educational profile and living in rural areas or far from the center were of significant factors associated with Diabetic retinopathy.

Lack of awareness, delayed referral and limitation to access tertiary level of healthcare services were suggested to be of significant relation with Diabetic Retinopathy.

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