# Knowledge, attitude and practices among medical officers and diabetic patients regarding diabetic retinopathy in Ogun state of Nigeria

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## ABSTRACT

***Objective:*** To assess the knowledge, attitudes and practices regarding Diabetic Retinopathy (DR) among Medical Officers (MO) and diabetic patients in Ogun State of Nigeria.
***Design:*** This was a cross-sectional study.
***Setting:*** Diabetic clinics based in three hospitals in Ogun state.
***Methods:*** Medical officers in all the general hospitals were interviewed via telephone while one teaching hospital and two state hospitals were randomly selected to conduct face-to-face interviews with diabetic patients. Data obtained from these interviews was filled into a structured questionnaire.
***Results:*** All the medical officers in the general hospitals were aware that DM affects the eyes while 43% believed that diabetic patients need a monthly eye examination. About 36% examined the eyes of diabetic patients on each visit. All medical officers would refer a diabetic with poor vision to an ophthalmologist. Majority (75%) of the patients recruited were female. Fifty-one per cent of patients were not aware that diabetes affects the eyes while only 35% had ever had a fundoscopy.
***Conclusions:*** The medical officers in the general hospitals in the state are all aware that diabetes can cause DR but don't have eye clinics. Less than half of them (43%) screen for DR. Known diabetics are not having regular eye examination.

***Key words:*** Medical Officers, Diabetic retinopathy, Ogun State, Screening

## INTRODUCTION

Diabetic Mellitus (DM) is one of the leading causes of death, disability and economic loss globally. The World Health Organisation (WHO) estimated that in the year 2000, there were about 171 million people worldwide with diabetes mellitus, and has predicted that this will rise to about 366 million people by 2030[1].

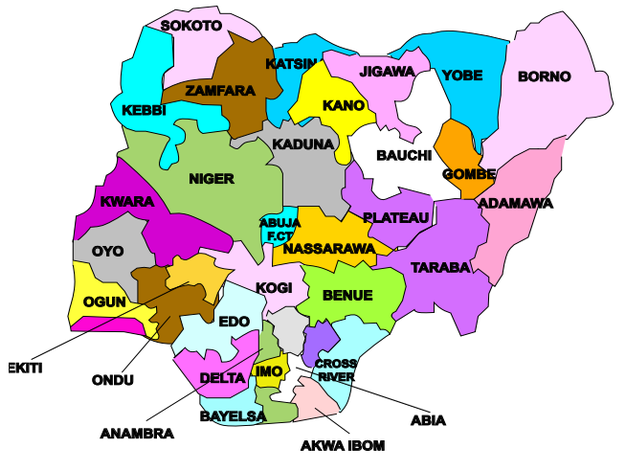
Diabetes has been on the increase in Nigeria, Africa and indeed the world. This is due to massive migration to towns and cities with attendant change in lifestyle leading to poor nutrition and little physical activity[2, 3].

Population based surveys conducted in various parts of Nigeria estimate the prevalence of diabetes to be 2-3.3% with notable variations between urban and rural settings[3,4]. It is estimated that 4.8% of global blindness (1.8 million persons) is due to Diabetic Retinopathy (DR). The proportions of blindness due to DR ranges from close to 0% in most of Africa to 3-7% in much of southeast Asia and the western pacific to 15-17% in the wealthier regions of Americas, Europe and the western pacific[2]. According to the Nigerian national blindness survey (2007), the prevalence of DR was 0.02%, age-related cataract (1.8%) and glaucoma (0.7%)[6].

The screening of diabetics for DR is important because early detection is the key to preventing blindness. With early detection, treatment is effective and vision is not usually affected in early DR[7, 8]. Fundus examination has a key role in the screening of DR.

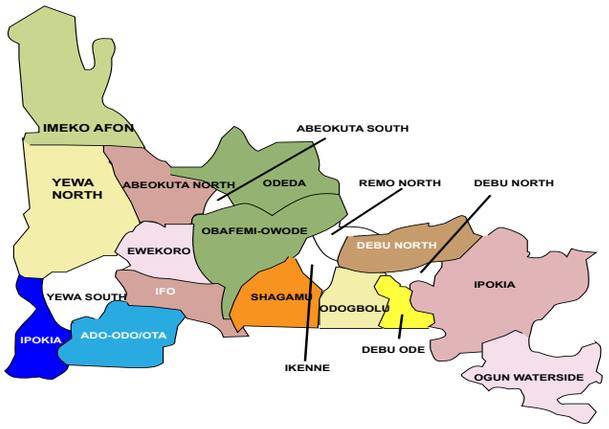
Lack of comprehensive DR screening programmes, poor early detection and management in Nigeria have made the vision 2020 recommendation very imperative: to incorporate eye care services for diabetic patients into the strategic vision 2020 national plans: public health intervention for its control. In diabetic patients, regular examination of the fundus is essential, followed by appropriate treatment if required[1, 9, 10]. Nigeria is one of the countries in West Africa with an estimated population of 140 million people[11, 12]. It is made up of 36 states plus the federal capital territory Abuja. Ogun state is one of the 36 states that make up Nigeria (Figure 1). It is located in the southwest zone of Nigeria with a population of 3.7 million. It is made up of 20 local government areas (Figure 2). About 45% of the population is urban while 55% is rural[11, 12].

**Figure 1:** Map of Nigeria showing states of the federation.




Source: Nigeria official website

**Figure 2:** Map of Ogun state showing 20 local governments that make up the state




Source: Ogun state official website

In the Nigeria national blindness survey, prevalence of diabetes mellitus in people aged ≥ 40 years is 3.3% (48% newly diagnosed) [6]. Prevalence of diabetic DR among DM patients is 17.3% of whom 12% had Sight-Threatening Diabetic Retinopathy (STDR)[6]. When these figures are extrapolated to Ogun State it suggests there are approximately 4000 people aged over 40 years with DR (Table 1).

**Table 1:** Estimation of the DM/DR for Ogun State using results from Nigeria national survey[6, 13]

| Population of Ogun State (n= 3,700,000) | Population |
|---|---|
| Number >40 years | 740,000 |
| Number with diabetic mellitus (DM) (3.3%) | 24,420 |
| Number of DM with diabetic retinopathy (DR) (17% of all DM) | 4,151 |
| Number with sight threatening DR (12% of DR) | 498 |

There is lack of information about activities throughout Ogun state in terms of screening for DR and referral for treatment in timely fashion. There has been no assessment of the level of awareness of DR among medical officers. A DR workshop was organized by EFCPB in 2008 for healthcare workers but don't know who attended and whether it was useful.

Medical officers in Ogun state are qualified medical doctors that run various departments in the general hospitals including diabetic clinics. They are not specialists but are very important because they have acquired experience over the years and they are closer to the communities than specialists.

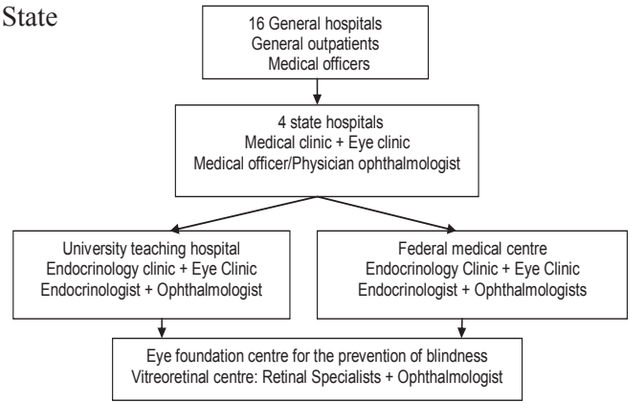
The purpose of this study was to assess the knowledge, attitudes and practices regarding Diabetic Retinopathy (DR) among medical officers in all General Hospitals and diabetic patients who attend diabetic clinics in three hospitals in Ogun State, Nigeria.

## MATERIALS AND METHODS

This was a cross-sectional study. All the 16 general hospitals in Ogun state were mapped and one medical officer per hospital was identified and interviewed via telephone. The data obtained was used to fill a pre-tested structured questionnaire.

All hospitals in Ogun state which have a high number of diabetic patients attending their diabetic medical outpatient clinics were also identified. Out of these, one teaching hospital (Olabisi Onabanjo University Teaching Hospital, OOUTH) and two state hospitals (State hospital Ijebu-ode and state hospital Ota) were randomly selected to participate in the study. The first 40 patients attending diabetic services on consecutive clinic days were recruited in each of the three hospitals. This was based on what was considered to be feasible within the time frame and to allow a comparison between hospitals. Interviews were conducted using a structured questionnaire. The Principal Investigator (PI) conducted all the interviews except in some cases where the patient is well educated when the patients complete the forms themselves and, after completion, the PI went through the responses to make sure it is appropriately filled. In state hospital Ota, the required number of patients could not be identified due to time constraints so additional patients were recruited on ad-hoc basis from the general outpatient clinic.

**Figure 3:** Structure of diabetic related services in Ogun State




Note: This is the situation on the ground in Ogun state in terms of DR services. It may not be the accepted health system strategy.

This study was conducted according to the guidelines of the declaration of Helsinki. Ethical approval was given from the ethics committee of the London School of Hygiene and Tropical Medicine (LSHTM) and Olabisi Onabanjo University Teaching Hospital (OOUTH) Sagamu in Ogun State, Nigeria. Approval was also sought and obtained before collecting data from various hospital heads of department and units. An information sheet and consent form was given to each patient to read and sign. If any patient cannot read or write it was explained to them and they gave consent via thumbprint.

## RESULTS

The general hospitals don't have any ophthalmic staff except for one hospital with an ophthalmic nurse. They equally don't have any eye clinic (Table 2).

**Table 2:** Number of ophthalmic staff in 2010

| Ophthalmic staff | No. (%) |
|---|---|
| None | 13 (93) |
| One | 1 (7) (ophthalmic nurse) |

A total of 560 diabetic patients were seen at various medical out-patient clinics in the 16 general hospitals in Ogun state in the year 2010 (Table 3).

**Table 3:** Number of diabetics registered in 2010

| General Hospital | Town/Local government | No. of diabetics registered |
|---|---|---|
| Ijebu-Ife | Ijebu-ife, (ijebu-east) | 40 |
| Odogbolu | Odogbolu, (Odogbolu) | 70 |
| Ipokia | Ipokia (Ipokia) | 40 |
| Ogbere | Ogbere, (ijebu-east) | 20 |
| Ibiade | Ibiade, (ogunwaterside) | 20 |
| Itori | Itori, (Ewekoro) | 40 |
| Iperu | Iperu-remo | 60 |
| Ijebu-Igbo | Ijebu-igbo, (ijebu-north) | 30 |
| Ikenne | Ikenne, (Ikenne) | 80 |
| Ifo | Ifo, (Ifo) | 40 |
| Ishara | Ishara, (Remo north) | 20 |
| Imeko | Imeko, (Imeko) | 30 |
| Aiyetoro | Aiyetoro, (Yewa north) | 50 |
| Atan | Atan, (Ijebu-northeast) | 20 |
| | Total | 560 |

Out of the 16 identified MOs in the general hospitals, fourteen were interviewed. The other two were unreachable for the duration of the study.

All the MOs were aware that diabetes affected the eyes (100%). All MOs refer diabetic patients with poor vision to an ophthalmologist (Table 4).

**Table 4:** Awareness of DR and need for screening

| Awareness that diabetes affects the eyes | No. (%) |
|---|---|
| Yes | 14 (100) |
| No | -- |
| Referral to ophthalmologist of DM patient with poor vision | |
| Yes | 14 (100) |
| No | -- |

The knowledge on how frequent fundus examination should be conducted varied, with 36% of the MOs saying the fundus should be examined at each visit to the clinic, 21% on weekly basis while 43% indicated monthly examination was adequate. (Table 4)

Only 43% of the MOs have access to an ophthalmoscope. The frequency of actual fundus examination varied with only 36% performing fundoscopy on diabetics at each clinic visit.(Table 5).

**Table 5:** Current protocol and equipment for ophthalmic examination of diabetics

| How often diabetic eyes should be examined | No. (%) |
|---|---|
| At each visit to the clinic | 5 (36) |
| weekly | 3 (21) |
| monthly | 6 (43) |
| Availability of ophthalmoscope | |
| Yes | 6 (43) |
| No | 8 (57) |

Thirty six percent of the MOs attended the DR workshop of Eye Foundation Centre for the Prevention of Blindness (EFCPB) in 2008. All reported being interested in attending future workshop. A refresher course on how to use the direct ophthalmoscope to examine for DR and more exposure on DR were key areas that MOs want covered in future workshops.

**Table 6:** Attendance/impact of MO at previous DR workshop run by (EFCPB)

| Attendance at DR workshop of Eye foundation in 2008 | No. (%) |
|---|---|
| Attended | 5 (36) |
| Not aware | 5 (36) |
| Did not attend | 3 (21) |
| Blank | 1 (7) |
| MOs interested in attending future workshop | |
| Yes | 14 (100) |
| No | -- |
| What MOs want covered in future workshop | • How to use the direct ophthalmoscope to examine for DR<br>• More exposition on DR |

**Note:** The need to send diabetic patients for dilated fundoscopy was stressed.

One hundred and twelve patients were interviewed. Their ages ranged from 19 to 90 years old. The mean age was 60.3 years.

**Table 7:** Distribution of socio-demographic characteristics of interviewed patients (N=112)

| Age group | No. (%) |
|---|---|
| <50 | 17 (15) |
| 50-59 | 32 (29) |
| 60-69 | 34 (30) |
| 70+ | 29 (26) |
| Sex | |
| Male | 28 (25) |
| Female | 84 (75) |
| Education | |
| No formal education | 24 (21) |
| Primary education | 41 (37) |
| Secondary education | 25 (22) |
| Tertiary education | 22 (20) |

**Table 8**: Distribution of patients by study hospital (n=112)

| Hospital of study | No. (%) |
|---|---|
| OOUTH, Sagamu | 40 (36) |
| State hospital Ijebu-ode | 40 (36) |
| State hospital Ota | 32 (29) |

About 79% of the patients were type-2 DM, 4% type-1 DM and 17% of did not know their type of diabetes. Of the patients interviewed, 41 (37%) had been advised to visit an eye doctor for further evaluation. (Table 8). Duration of diabetes ranges from <1 year to 27 years, mean is 6.8 years.

**Table 9**: Distribution of types of diabetes and patients told to see ophthalmologist (n=112)

| Type of DM | No. (%) |
|---|---|
| Type 1 | 5 (4) |
| Type 2 | 88 (78) |
| Don't know | 19 (18) |
| Told to visit eye doctor | |
| Yes | 41 (37) |
| No | 71 (63) |

**Table 10:** Distribution of patients' awareness of diabetes affecting the eyes (n=112)

| Knows DM affects eyes | Total (%) |
|---|---|
| Not aware | 57 (51) |
| Aware | 55 (49) |

**Table 11**: Distribution of patients by attendance of eye screening (n=112)

| Ever had eye exam because of their diabetes | No. (%) |
|---|---|
| Yes | 39 (35) |
| No | 73 (65) |
| Eye exam in the last 12 months | |
| Yes | 26 (23) |
| No | 86 (77) |

**Table 12**: Awareness of patients about eye examination (n=112)

| How often they think DM eyes should be examined | No. (%) |
|---|---|
| ≤6 months or yearly | 18 (16) |
| When having poor vision | 40 (36) |
| Don't know | 54 (48) |

**Table 13**: Comparison of diabetics who have had previous eye exam and those who have never

| Age group (years) | Ever had eye exam No. (%) | Never had eye exam No. (%) | (P-value*) |
|---|---|---|---|
| <49 | 3 (18) | 14 (82) | |
| 50-59 | 9 (28) | 23 (72) | |
| 60-69 | 12 (35) | 22 (65) | |
| >70 | 15 (52) | 14 (48) | p = 0.096 |
| Sex | | | |
| Male | 7 (18) | 21 (29) | |
| Female | 32 (38.1) | 52 (61.9) | p = 0.256 |
| Education group | | | |
| No formal education | 9 (38) | 15 (63) | |
| Primary education | 14(34) | 27 (66) | |
| Secondary education | 9 (36) | 16 (64) | |
| Tertiary education | 7 (32) | 15 (68) | p = 0.980 |
| Has diabetics been told to visit ophthalmologist | | | |
| Yes | 34 (83) | 7 (17) | |
| No | 5 (7) | 66 (93) | p = 0.0001 |
| How often diabetic should visit an eye doctor | | | |
| Every year or less | 11 (61) | 7 (39) | |
| When having poor vision | 10 (48) | 11 (52) | |
| When the physician say so | 6 (32) | 13 (68) | |
| Don't know | 12 (22) | 42 (78) | p = 0.012 |
| Hospital of study | | | |
| OOUTH ,sagamu | 19 (46) | 21 (54) | |
| State hospital, ijebu-ode | 11 (27.5) | 29 (72.5) | |
| State hospital, ota | 9 (28) | 23 (72) | p = 0.117 |

*p-value from Chi Square or fishers exact

## DISCUSSION

In the general hospitals in Ogun state (Table 3), there are no eye clinics and no ophthalmic staff except for only one of the hospitals where there is an ophthalmic nurse (Table 2). All the MOs that were interviewed were aware that diabetes can damage the eyes, refer patient with poor vision to the ophthalmologist, believe that diabetics are at increased risk of other eye diseases and believe DR can be treated, so their awareness about DR is high.

Only 43% of the MOs have direct ophthalmoscope, and 36% examine the fundi of diabetics when seen routinely in the clinic (Table 5). This may be because of absence of ophthalmic instrument and ophthalmic staff, these might have discouraged them and they just refer to the ophthalmologist. Even though the MOs refer to the ophthalmologists, it will still be preferable that they all examine the fundus of their diabetic patients. They could be a good source of screening diabetics for DR and they will lessen the work load on the ophthalmologists who are only three in the whole state.

This study is comparable to the study in Yangon, Myanmar where majority of the General Practitioners (GPs) are aware that diabetes can affect the eyes and only 49% examine the fundus[15].

In 2008, EFCPB organized a workshop on DR whereby all the healthcare providers in Ogun state were invited but only 36% of the MOs attended this workshop (Table 6). The aim of the workshop was to bring about awareness of DR and inform healthcare providers where DR can be treated. It also conducted practical demonstrations on how to perform an eye exam for DR. The low attendance showed that it was not adequately publicised as attested to by the MOs interviewed (36%). This type of workshop is not uncommon and it is recommended by the WHO[16-18]. All the MOs interviewed were willing to attend future workshops on DR where they would like updates on the use of the direct ophthalmoscope (this is what is available and affordable in General hospitals for now) and examination of the fundus for DR and more lectures on DR (Table 6).

The level of awareness of diabetic patients about DR is very low in this state. This is in spite of the fact that the hospitals where the study took place are 3 of the 6 key hospitals in the state (one tertiary and two states (secondary) (Table 8). Fifty one per cent of diabetics interviewed were not aware that diabetes affects the eye (Table 10). This is in contrast to the study in Yangon, Myanmar where 86% of the patients know that diabetes could affect the eye[15]. In this study, 37% said they were

told to see an ophthalmologist for an eye examination (Table 9). Only 35% of diabetics had ever had a dilated eye examination because of their diabetes. This may be compared to the study in Tanzania where 59% of diabetics reported for dilated fundoscopy at a particular point in time (ever) since they were diagnosed as diabetics[14] and the study by Onakpoya *et al*[7] where 28.9% had previous dilated eye examination.

Awareness of when to have an eye exam was also low: 36% of the diabetics think they can only visit an ophthalmologist when they have poor vision or when the physician or medical officer tells them to do so, 48% simply don't know. Only 16% think they should see the ophthalmologist at least yearly (Table 12). This also differs from the study in Yangon where for the diabetics there, 58% felt they should see the ophthalmologist regularly and 34% said it is only when they have problems with their eyesight[15].

There is also a trend in this study which showed that some factors increase the rate at which diabetics might have had previous dilated eye exam. These include increasing age and longer duration of DM and as would be expected awareness that DM affects the eyes and, ever been told to visit an ophthalmologist and knowledge that they should visit an ophthalmologist within a year or less (Table 13). The proportion with eye exam was also higher at the teaching hospital compared to the state hospitals. There was no difference in proportion with eye exam by level of education or gender (Table 13). Some of these factors (like age, sex, duration of diabetics) compares with a previous study in Ile-Ife, Nigeria [7].

In this study 18% of the diabetic patients' interviewed have had DR treatment referral. This agrees with the fact that 17.3% of 3.3% diabetics have DR based on the Nigeria blindness survey [6, 13].

## LIMITATIONS OF THE STUDY

(i) No private hospital was included in the study and so findings are not generalizable to private facilities.
(ii) Semi-structured interviews could have been added or used. This would have added more information.
(iii) The study sample of 40 consecutive patients from 3 hospitals could have been more. This could have made it more widespread and more representative of Ogun State. All the two tertiary and the four state hospitals could have been used but time and duration of study could not permit.
(iv) Some patients (37) filled in the forms by themselves while for the rest data was collected by interview. This different method of data collection may have introduced some measurement bias. Semi structured interview could have been added to the patient interview. This could have given more information.
(v) Medical records in all the hospitals in the state are in deplorable state except in the tertiary centres. This has prevented knowing the number of diabetics that have been diagnosed with DR.
(vi) This study excluded diabetics not attending health facilities and undiagonised diabetics.

In spite of these circumstances, the study gave a good account of diabetic retinopathy needs in Ogun State of Nigeria.

## CONCLUSIONS

The medical officers in the general hospitals in the state are all aware that diabetes can cause DR. But less than half of them (43%) screen for DR. At the state hospitals, physicians/medical officers don't do dilated fundoscopy on diabetic patients and patients are referred to the ophthalmologist when they have poor vision. The majority of diabetic patients at the state hospitals and the general hospitals in Ogun state are not receiving a regular eye exam. The awareness among diabetics about DR is poor (49%) and only 35% have ever had dilated fundoscopy.

## RECOMMENDATIONS

There is need for:
(i) Intensive health education of the populace (patients and medical staff) on DR that it is cost-effective to go for screening to prevent DR.
(ii) Diabetic and ophthalmic services to work together interact and communicate. This will bring about more awareness among practitioners and patients and will increase screening activities which will ultimately reduce blindness due to DR.
(iii) More awareness of all healthcare providers in Ogun State and the patients at large about the treatment centre for DR.

**Long-term**:
There is need for:
(iv) Further work to find out the most cost-effective way to screen diabetics in this setting.
(v) Capacity for eye screening needs to be increased at the hospitals where diabetics are attending. There is the need for training of residents in both diabetic and ophthalmic services in conducting DR examination.
(vi) Advocacy for DM/DR in Ogun state. This will involve lobbying of the state legislators and influential government officials. Also campaigning to mobilize the public and media support for DM/DR.

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