Iraqi JMS

Published by Al-Nahrain College of Medicine
ISSN 1681-6579
Email: iraqijms@colmed-alnahrain.edu.iq
http://www.colmed-alnahrain.edu.iq

# Awareness and Knowledge of Diabetic Ocular Diseases among Diabetic Patients at Aden Diabetic Center, Aden, Yemen

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## Abstract

**Background** Awareness about diabetic eye complications and regular eye examinations plays an important role in avoiding blindness.

**Objective** To assess the level of awareness and knowledge regarding diabetic ocular diseases among diabetic patients attending Aden Diabetic Center at Al-Gamhoria Teaching Hospital in Aden.

**Method** This is a cross sectional study including a sample of 182 diabetic patients attending this center during the period from January – March 2013. To achieve the objectives of the study, a closed-ended questionnaire including different variables related to diabetic patients' awareness supplied to each patient. The authors filled in the questionnaire during interviews with the patients.

**Result** The results showed that 109 patients were females and 73 were males with a mean age 53 years and half of the patients were illiterates. Of the total 182 respondents, 157 (86.3%) had variable awareness and knowledge of ocular complications of diabetes mellitus. From those 157 respondents, 124 (79%) had awareness of blindness as an ocular diabetic complication. Awareness of diabetic complications affecting other organs was 93.6%. Awareness regarding the importance of controlling issues caused by diabetes mellitus and its impact on preventing eye complications as well as other body organs was 73.9%. About 36.8% of respondents never visited eye specialists. Medical staff together with the media was the main source of information about eye diseases.

**Conclusion** The majority of patients was aware of diabetes mellitus complications and had knowledge of cataract, glaucoma, and retinopathy as the most known ocular complications.

**Key words** Awareness, eyes, diabetes mellitus, complications.

**List of Abbreviation:** DM = Diabetes mellitus, IDF = International Diabetic Federation, DRP =diabetic retinopathy, EMR = Eastern Mediterranean Region, ADC = Aden Diabetic Center

## Introduction

Diabetes mellitus (DM), particularly type II, is a major public health concern worldwide. In developing nations, the estimated increase in patients with DM could approximately be 150%, from 30 million in 2000, to 80 million in 2030 [(1)].

In 2005, the International Diabetic Federation (IDF) confirmed that diabetes is one of the most common non-communicable diseases globally, and it constitutes the fourth leading cause of death in most developed as well as many developing and nearly industrialized countries [(2)]. In 2007, the United Nations resolution adopted to mark DM as a significant global public health issue [(3)]. In Yemen, two studies showed that the prevalence of DM ranged between 4.6% [(4)] to 9.7% [(5)].

Diabetic eye disease refers to a group of eye problems that people with diabetes may face as a complication of diabetes. All diabetic retinopathy (DRP), cataract, and glaucoma can cause severe vision loss or even blindness [(6)]. Moreover, diabetics are 25 times more likely to become blind than non-diabetics due to DRP [(7)].

However, 90% of diabetes-related blindness is preventable through early detection, treatment, and appropriate follow-up care [8].

The most commonly reported barrier to screening by people with diabetes is that they did not know the need for eye examination. Since DRP remains asymptomatic in its early stages, another major barrier to achieving the first and regular eye examination is the belief that" nothing is wrong with my eye" [9].

In the United State of America, an American Diabetes Month considered more important in that it encourages people with diabetes to take steps to prevent complications of diabetes [10]. They realized that people with diabetes should have annual dilated eye examinations to identify early signs of DRP and other diabetic eye disease [10].

The International Agency for the Prevention of Blindness Eastern Mediterranean region (EMR) had motivated the professional bodies of the member countries to improve eye care for diabetics. For this purpose, the theme for the 'World Sight Day 2004' was Eye in Diabetes [11].

Optimum management of the problem requires an individual to be aware of the nature and consequences of the disease; the treatment and its complications [12]. Increasing the awareness will lead to an increase inthe understanding and accepting of the importance of routine eye examination for early detection and treatment, thereby decreasing visual impairment [13].

Realizing the importance of studying this problem as an important public health difficulty affecting the majority of population, comprehending consequences of this problem in Yemen, in addition to the scarce studies conducted on this problem, which are all considered as factors that motivated authors to address this problem. Results achieved by this study provide health system policy makers in Yemen with a real estimation of this problem in order to suggest plans for controlling methods for this problem in the future. Avoidance of visual impairment caused by diabetes requires regular eye examinations. Awareness about diabetes eye complications can play an important role in encouraging people to seek timely eye care [14].

The goal of the current study is to assess the level of awareness and knowledge of diabetic ocular diseases among diabetic patients who attended Aden Diabetic Center (ADC); and to equip targeted patients with knowledge about diabetes eye complications and the importance of periodic examination**.**

## Methods

A cross-sectional study conducted during the period from January- March 2013 and targeted all diabetic patients presented for consultation in ADC at Al-Gamhoria Teaching Hospital, which is the only national center in Aden city that can give results representing diabetic patients from the whole city.

Non-randomize sampling method was applied. Only respondents from those who attended the center on the first two days of the week were selected during the study period.

### Instrument for data collection

Data collection conducted using personal interview- questionnaire, which was available in English and Arabic languages. It was administered in Arabic language to the respondents and the authors filled the questionnaire on their behalf. The questionnaire included information on patient background data, education, knowledge about diabetes and its ocular complication, the duration and family history of diabetes and medical history of any eye diseases, surgery and drugs. Questions regarding awareness and knowledge of ocular diabetic diseases were answeredin the form "yes or no". The assessment was done as following: the answer to each question ranged from (0 Poor) to (3 Excellent), this scoring was divided into two parts by the median so the lowest part (Poor, Fair) was considered to be (Not aware) and the highest part (Excellent, Good) was considered to be (Aware). The questionnaire also included the awareness in relation to the duration since diagnosis, different types of eye complications, the sources where the

information obtained from and frequency of doctor visiting as well.

The data were processed and analyzed using Statistical Package for Social Sciences (SPSS) program version 15. A choice was made to treat awareness as a dichotomous variable.

### Ethical consideration

Permission was taken from the director of the center, the purpose of the study was explained to the patients and data were collected, after obtaining verbal consent from the patients. The Research and Ethics Committee of the Faculty of Medicine and Health Sciences of Aden University have approved this study

## Results

Table 1 shows the sociodemographic distribution of the sample. It was found that, out of the total 182 patients interviewed; 109 patients were females and 73 patients were males, the mean age of the patients were 53.2±11.8 years old. Concerning distribution within age groups, 22 patients were within age group less than 40 years; 102 of were between 40-59 years old and 58 of patients within 60 years old and more. Illiterates or having basic level of education were 110 patients, while 72 patients with secondary high school and university levels of education. The relation of these socio-demographical characteristics with the awareness of patients towards eye complication of DM was tested. There was no significant relationship between awareness and gender (Pearson $\chi 2$ 1df = 1.769, $P$ = 0.183) and between awareness and age of the participants (Pearson $\chi 2$ 2df = 1.718, $P$ = 0.424). While, there was significant relationship between awareness of the participants and level of education (Pearson $\chi 2$ 3df = 11.636 $P$ = 0.009), with 0.05 level of significant.

**Table 1. Socio-demographical characteristics of the study sample according to their awareness**

| Parameter | | Yes | No | Total | *P* value |
|---|---|---|---|---|---|
| | | Freq. (%) | Freq. (%) | Freq. (%) | |
| Gender | Male | 66 (90.4) | 7 (9.6) | 73 (100.0) | 0.183 |
| | Female | 91 (83.5) | 18 (16.5) | 109 (100.0) | |
| Age (years) | < 40 | 18 (81.8) | 4 (18.2) | 22 (100) | 0.424 |
| | 40-59 | 91 (89.2) | 11 (28.6) | 102 (100) | |
| | 60 & more | 48 (82.8) | 10 (17.2) | 58 (100) | |
| Educational level | Illiterate | 51 (75.0) | 17 (25.0) | 68 (100) | 0.009 |
| | Basic | 39 (92.9) | 3 (7.1) | 42 (100) | |
| | Secondary | 38 (92.7) | 3 (7.3) | 41 (100) | |
| | University | 29 (93.5) | 2 (6.5) | 31 (100) | |
| | Total | 157 (86.3) | 25 (13.7) | 182 (100) | |

Table 2 shows the distribution of patients according to their educational level and awareness about the influence of DM complications on other body organs, and ability to avoid DM complications by the control of blood sugar. The study found that 116 (73.9%), out of 157 patients were aware that controlling DM may prevent complications (Pearson $\chi 2$ 1df = $P$ = 0.005) and 147 (93.6%) from the 157 patients, were aware that complications of DM affects other body organs (Pearson $\chi 2$ 3df = $P$ = 0.413).

Table 3 shows the distribution of patients according to their period of DM by the knowledge and awareness of ocular complication of DM. Of the total 182 participants, 58.3% of patients diagnosed their disease since < 10 years, while 41.8% diagnosed their disease since 10 years and more. The mean period of diagnosis of DM among the patients

was 8.5 ± 5.9 years. There is no significant relationship between knowledge and awareness of ocular complication of DM and duration of diseases (Pearson Chi square test 3df = 7.193 *P* = 0.066).

**Table 2. Educational level and knowledge about prevention of diabetes mellitus complications that affect other organs**

| Educational level | Diabetes complication influence on other organs | | Control of diabetes prevents the complication | | Total |
|---|---|---|---|---|---|
| | Yes | No | Yes | No | |
| | Freq. (%) | Freq. (%) | Freq. (%) | Freq. (%) | Freq. (%) |
| Illiteracy | 48 (90.5) | 5 (9.4) | 32 (60.4) | 21 (39.6) | 53 (100) |
| Basic | 37 (92.5) | 3 (7.5) | 32 (80.0) | 8 (20.0) | 40 (100) |
| Secondary school | 34 (94.4) | 2 (5.6) | 27 (75.0) | 9 (25.0) | 36 (100) |
| University | 28 (100) | 0 (0.0) | 25 (89.3) | 3 (10.7) | 28 (100) |
| Total | 147 (93.6) | 10 (6.4) | 116 (73.9) | 41 (26.1) | 157 (100) |
| *P* value | 0.413 | | 0.005 | | |

**Table 3. Distribution of patients according to time since diagnosis of diabetes mellitus in relation to awareness and knowledge of its complication**

| Duration of diseases (years) | Knowledge and awareness of ocular complication of DM | | | *P* value |
|---|---|---|---|---|
| | Yes | No | Total | |
| | Freq. (%) | Freq. (%) | Freq. (%) | |
| < 5 | 40 (76.9) | 12 (23.1) | 52 (100) | 0.066 |
| 5-9 | 46 (85.2) | 8 (14.8) | 54 (100) | |
| 9-14 | 39 (92.9) | 3 (7.1) | 42 (100) | |
| 15 & more | 32 (94.1) | 2 (5.9) | 34 (100) | |
| Total | 157 (86.3) | 25 (13.7) | 182 (100.0) | |

Table 4 shows the distribution of patients according to their awareness about DM eye complications. Out of the total 157 of award respondents, 23.6 % knew that Cataract was one of DM eye complications, while 17.8 % and 57.3 % of the award respondents mentioned Glaucoma and Retinopathy respectively. Finally, 124 (79.0%) patients award that blindness was a complication of DM. It was found that there was a significant relationship between awareness and the participant knowledge about each eye disease.

**Table 4. Distribution of patients according to awareness about different diabetic eye complications**

| Awareness of patients on eye complication | Yes | No | Total | *P* value |
|---|---|---|---|---|
| | Freq. (%) | Freq. (%) | Freq. (%) | |
| Cataract | 37 (23.6) | 120 (76.4) | 157 (100.0) | 0.007 |
| Glaucoma | 28 (17.8) | 129 (82.2) | 157 (100.0) | 0.022 |
| Retinopathy | 90 (57.3) | 67 (42.7) | 157 (100.0) | 0.000 |
| Blindness | 124 (79.0) | 33 (21.0) | 157 (100.0) | 0.000 |

Table 5 shows the distribution of patients according to variables related to eyes. It was found that 78.6% of patients had eye complaints or problems (blurred vision, itching, and pain). Regarding to the frequency of visits to an eye doctor; it was found that 17 patients (9.3%) visited an eye doctor 1-2 times per year, and 8 patients (4.4%) visited an eye doctor once per 2 years, while 90 (49.5%) patients visited eye doctors occasionally and 67(36.8%) patients had never visited any.

By asking patients about their use of any eye treatment; 10(5.5%) patients used only eye drops, mostly were (antiglaucoma, antihistamine and lubricants), 13(7.1 %) patients out of 182 underwent eye operations ( for cataract or glaucoma), and five (2.7%) patients had Laser as an eye treatment.

**Table 5. Distribution of patients according to eye variables**

| Variable | | Frequency | % |
|---|---|---|---|
| Presence of any Eye problem | Yes | 143 | 78.6 |
| | No | 39 | 21.4 |
| Frequency of visits to Eye doctors | 1-2/year | 17 | 9.3 |
| | 1/year | 8 | 4.4 |
| | Occasionally | 90 | 49.5 |
| | Never | 67 | 36.8 |
| Use any eye treatment | Eye drop | 10 | 5.5 |
| | Operation | 13 | 7.1 |
| | Laser | 5 | 2.7 |
| | No treatment | 154 | 84.6 |
| | Total | 182 | 100 |

Table 6 shows the distribution of patients according to the sources of information about the influence of DM on any part of the body. It was found that only 7% of patients in the sample obtained the information from relatives and 28 (17.8 %) got information from their friends, while 68.2% of patients obtained information from medical staff (health teams), and 40.8% of patients got information from the mass media. The medical staff and the media were the main sources of information for the study sample.

**Table 6. Distribution of patients according to the source of information about the influence of diabetes mellitus on the eyes and other parts of body**

| Information source | Frequency | % |
|---|---|---|
| Relatives | 11 | 7.0 |
| Friends | 28 | 17.8 |
| Medical staff | 107 | 68.2 |
| Media | 64 | 40.4 |

## Discussion

Awareness creation is a vital important step in the creation of a successful program to fight against any disease in the community [13]. Awareness is not the same as knowledge, hearing about a problem is awareness, whereas understanding the causes or treatment of a disease is knowledge [15].

As reported, eye manifestations are important health problems in the diabetic population. The eye complications in this study sample were 30.2%, 14.6 and 3%, for retinopathy, cataract and glaucoma respectively [16].

In the current study, almost 86.26% of 182 respondents were aware that diabetes could affect the eye, males were 66 (90.4%) out of 73 and females were 91, (83.5%) out of 109. Of the total 157-awared patients, 79% had the knowledge that diabetes may cause blindness.

Moreover, patients who knew ocular disorders such as cataract (presumed problem in the lens) were 23.6%, glaucoma (high pressure of the eye)

17.8% and knowledge was higher forretinopathy (such as retinal hemorrhage or /and detachment), 57.3%. Some studies discussed the same understanding of possible ocular effects of diabetes 86% [14] 84% [15] 72.9% [17]. Moreover, study reported greater knowledge of diabetes eye complications as 98% [18]. On the other hand, in other studies, reported low Knowledge of DM ocular effects 37.1% [6], 3.8% [19].

Also among those who reported that diabetes could affect the eyes, 93.6% knew that diabetes could affect the body organs (presumed kidney, heart, and tooth). Moreover, 73.9% of the total 157 respondents knew that controlled diabetes (good control of blood sugar) prevents diabetic complications. In contrast, a published study reported that little awareness of diabetes might develop complications affecting the eyes, kidneys and nerve 6.8% [20].

In the current study, no significant association of gender regarding awareness and knowledge of diabetes complications was found. The same finding was reported [14]. In contrast, another study showed that awareness of diabetic eye diseases among females was higher than in male [21].

Like other studies [15,22] that supported the proposition that education is important in creating awareness, in this study, the level of awareness of diabetes ocular complications was found to be significantly associated with respondents' educational level. Another reason to explain this high level of awareness among respondents was information about ocular and organ complications presented in a lecture at Diabetic Center, where interviews were performed. Thirty-two (60.4%) illiterates in this study knew about the association of good control of blood sugar with preventing disease complications, compared to 89.3% of highly educated respondents.

In the ADC, there is no screening protocol for diabetic ocular diseases or retinopathy. Of the total 182 respondents, 36.8%, have never visited ophthalmologists (eye clinic) since they had DM, presuming that they had a good sugar control; while 49.5% did not know the frequency of eye checkups. For that reason the information given to diabetic patients, regarding eyes, should be clear including; signs and symptoms of eye involvement as well as complications, and how to prevent such eye complications by regular visits to the eye clinic. Unfortunately, 9.3% and 4.4% had routine eye examination of a frequency of 1-2 visits per a year and once per 2 years respectively. They claimed satisfaction from changing their spectacles at the optics shops. This may explain low rates of positive attitudes for healthy eye care. In contrast, studies showed better knowledge of routine eye checkups among diabetic patients 67.2% [14] and 50.8% [15] in spite of good control of DM. In this study, all patients in the ADC were advised and encouraged to seek timely eye checkups by ophthalmologists for early diagnosis and management of any eye complications before loss of their vision.

The majority of respondents 68.2% reported that medical staff was the main source of their information about diabetes and its complications, followed by media 40.8%, friends, and diabetic family member. The same findings were reported in other studies where the medical staff was the source of information but with less significant role of media [22, 23]. This illustrated the influence of the medical staff on patients` trust.

There are some limitations in this study; respondents were limited to one place, small number of patients, and limited parameters were included in the questionnaire. In conclusion, there is significant relationship between educational level and patients' awareness about diabetic eye complication, cataract, glaucoma, and retinopathy are the most mentioned diabetic eye complication and health team and media are the main sources of information about DM complications among studied patients.

We recommend to emphasis on the knowledge toward diabetic eye complications through health education programs and to strengthening the role played by DM centers for better eye healthcare for all patients.

## Acknowledgments

The authors thank administrators and staffs of ADC for their cooperation and support and appreciate the cooperation of all respondents.

## Author contributions

Dr. Sawsan did the interview and data collection with Dr Azal, and conducted the writing of manuscript; Dr. Ahmed review the manuscript and Dr. Jamil participated in data collections and statistical analysis review of the manuscript.

## Conflict of interest

The authors declare no conflict of interest.

## Funding

Self-funding.

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**Received 24th Nov. 2014: Accepted 9th Mar. 2015**