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Knowledge, Attitudes and Practices of Diabetic Patients on Ocular Complications of Diabetes in Lomé (Togo)

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Abstract

Introduction: The frequency and severity of eye complications from diabetes make patient education essential, which is the basis for adequate management. What is the level of education of diabetic patients in Lomé? The aim of this study was to assess the knowledge, attitudes and practices of diabetic patients on the ocular complications of diabetes in Lomé. **Methods:** We conducted a cross-sectional study by surveys on diabetic patients from April 1 to June 31, 2020, in 6 diabetes management centers in Lomé. The correct response rate was established for each component. Knowledge: poor (≤ 50%), low (50% - 65%), medium (65% - 85%) and good (≥ 85%). Attitudes: harmful (≤ 50%), erroneous (50% - 65%), approximate (65% - 85%) and fair (≥ 85%). Practice: harmful (≤ 50%), inadequate (50% - 65%) and adequate (>65%). **Results:** Over the study period, 150 patients were enrolled. The mean age was 56.98 ± 13.37 years with a sex ratio of 1.1 (79 men/71 women). The overall level of knowledge was insufficient (50.6%) with 65.5% for general knowledge about diabetes and 35.8% for ocular complications of diabetes. Attitudes were approximate (68.7%). In the case of hyperglycemia, 31.3% of patients would confide in a diabetologist and 22.0% in a general practitioner. If decrease in vision, 84.3% of patients would contact the ophthalmologist. The level of practice was harmful (20.4%). For diabetic follow-up, 36.7% of patients have already seen an ophthalmologist, 41.3% have performed a fundus examination, 17.3% retinal angiography, 4% laser retinal photocoagulation and 2.7% intravitreal injection (IVT). An awareness session on the ocular complications of diabetes was followed by 52.7% of patients and 50.7% of patients followed a therapeutic education session. **Conclusion:** This study has shown

that the level of knowledge was poor, attitudes approximate and practices harmful. It is therefore important to raise awareness about diabetes and its ocular complications with the aim to change behavior.

Keywords

Knowledge, Attitudes, Practices, Eye Complications, Diabetes, Lomé

1. Introduction

Diabetes is defined as a set of heterogeneous metabolic disorders leading to chronic hyperglycemia resulting from a defect in insulin secretion or insulin action or these two associated abnormalities [1]. Diabetes is the most common endocrine disease in the world. It is a major public health problem. The number of diabetics in the world is estimated at 536.6 million, *i.e.* a prevalence of 10.5%; this number will increase and will be 783.2 million, *i.e.* a prevalence of 12.2% in 2045 [2]. Ocular complications of diabetes take a special place because of the socio-professional impact and the major handicap they cause, which can jeopardize the visual and vital prognosis. The frequency and severity of ophthalmological damage in diabetes make patient education essential. What is the current state of knowledge, attitudes and practices of diabetics on the ocular complications of diabetes in Togo? It is to answer this question that this study was initiated with the objective of evaluating the knowledge, the practical attitudes of diabetic patients on the ocular complications of diabetes.

2. Patients and Methods

This was a descriptive cross-sectional study on diabetic patients followed in 6 diabetes care centers in Lomé, Togo. Our study took place from April 1 to June 30, 2020, *i.e.* over a period of three months. Diabetic patients followed for at least six months, received in consultation during the study period in the centers concerned, after informed consent, were included in the study. We excluded those patients who have omitted to answer two or more items of the questionnaire. This was a non-exhaustive random sampling. The sample size was calculated from the following Schwartz formula:

$$n = \frac{(U\alpha)^2 \times (pq)}{i^2}$$

n = sample size,

$U\alpha$ = 1.96 which is the reduced deviation for a risk of error α = 5%,

p: Prevalence of diabetes among the Togolese population in 2010 was 2.6%; p = 2.6,

q = 100 − p,

i = 2.6% (desired precision).

$$n = \frac{(1.96)^2 \times (2.6 \times 97.4)}{2.6^2}$$

n = 143.91 or 144 diabetics. Minimal sample size was 144 diabetic subjects to be surveyed. The sampling was exhaustive and the study took place over 3 months. Indeed, all patients present at the survey site during the study period, fulfilling the inclusion criteria, able to answer the questionnaire and having given their consent to participate in the interview were taken into account.

The data was collected using a survey form (see **Appendix**) composed of 38 items and concerning the following parameters: sociodemographic data (age, sex, profession, ethnicity, religion, place of residence and level of education); general knowledge about diabetes; knowledge of ocular complications of diabetes; attitudes about ocular complications of diabetes and practices on ocular complications of diabetes. Knowledge was classified into 4 levels based on the rate of correct answers: bad for less than 50% of correct answers; insufficient for 50% to 65% of correct answers; average for 65% to 85% of correct answers; good for more than 85% of correct answers. The attitudes were classified into 4 levels: harmful for less than 50% of correct answers; wrong for 50% to 65% of correct answers; approximate for 65% to 85% of correct answers; correct for more than 85% of correct answers. The practice was classified into 3 levels: harmful for less than 50% of correct answers; inadequate for 50% to 65% of correct answers; adequate for more than 65% of correct answers. The overall rating is the average of the correct answers.

The following tools were used for data collection: an individual interview guide addressed to the subjects surveyed and the patient medical records. The interview technique in face-to-face interviewer-respondent mode using a questionnaire composed of semi-closed questions was adopted in the context of this study. We used the semi-directed interview which consisted of asking the patient the question and waiting for his answer, we only intervened if it was necessary to clarify the question.

The data was collected on a pre-established individual survey form. Data collection took place in six diabetes monitoring centers selected in Lomé. We used EPI-INFO 7.3.2 software for data entry and analysis. The quantitative variables were presented in the form of means ± standard deviation and the Student's test made it possible to compare these variables with a significance threshold of a p value less than 0.05. The qualitative variables were presented in the form of numbers and percentages and were compared using Fisher's tests with a significance threshold of a p value of less than 0.05.

3. Results

3.1. Sociodemographic and Clinical Data

During the study period, 150 patients were included. The mean age was 56.98 ± 13.37 years with extremes of 21 and 90 years. The 60 to 70 age group was the most represented with 46 respondents, *i.e.* 30.7% (**Figure 1**). There were 79 men for 71 women, *i.e.* a sex ratio M/F of 1.1. There were 26 respondents (17.3%) with no schooling and 125 (83.3%) married. Hypertension was associated in 91

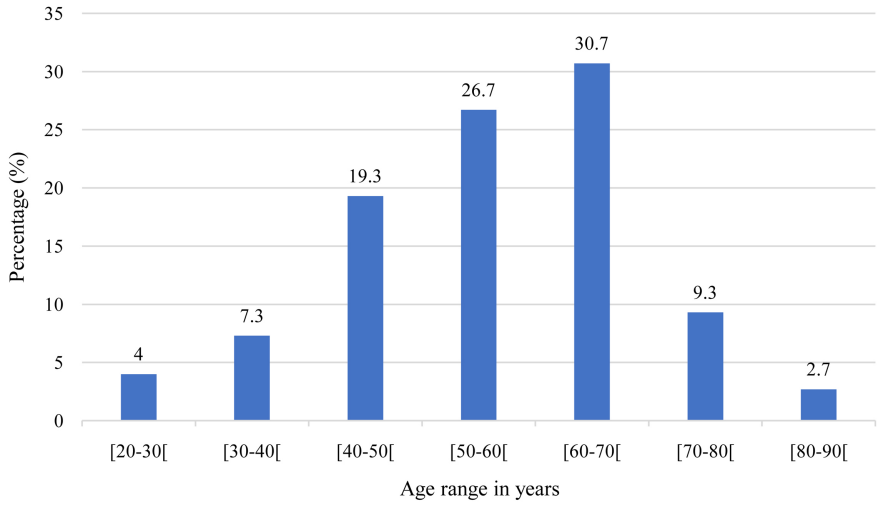

Figure 1. Age distribution of patients.

respondents (60.7%). Type 2 diabetes was found in 131 respondents (87.3%) and type 1 in 19 respondents (12.7%). According to the age of diabetes, 109 respondents (72.7%) had diabetes for less than 10 years.

According to the treatment, 101 respondents (67.3%) were on oral antidiabetics, 31 respondents (20.7%) on insulin, 15 respondents (10.0%) on insulin and oral antidiabetics and 3 respondents (2.0%) had recourse to traditional therapy. The complications of diabetes were diabetic retinopathy in 72 respondents (48.0%), diabetic neuropathy in 61 respondents (40.7%) and diabetic foot in 13 respondents (8.7%). **Table 1** summarizes the sociodemographic and clinical data.

3.2. Knowledge about Diabetes

3.2.1. General Knowledge about Diabetes

For the definition of diabetes, 126 respondents (85.7%) knew that diabetes was related to high blood sugar. On the chronic nature of diabetes, 74 respondents (49%) did not know that diabetes could not be cured. Concerning the knowledge about the treatment of diabetes, 108 respondents (73.5%), knew that diabetes medications were taken every day compared to 42 respondents (26.5%) who considered that medications were taken when blood sugar levels were high. For the knowledge of the organs affected by diabetes, 123 respondents (83.7%) knew the organs affected by diabetes complications but 27 respondents (16.3%) believed that no organ was affected by diabetes complications. And among the 123 respondents, 115 respondents (78.2%) reported the eye as the most affected by diabetes followed by the nerves (65.3%).

3.2.2. Knowledge about Ocular Complications of Diabetes

1) Knowledge about vision loss due to ocular complications

One hundred and nineteen (119) respondents (79.3%) were aware of the risk of vision loss due to diabetes against 13 (8.8%) who believed that there was no

Table 1. Summary of sociodemographic and clinical data.

	Effective	Percentage
Educational level		
Secondary	66	44
Primary	32	21.3
University	26	17.3
No schooling	26	17.3
Marital status		
Single	13	8.7
Married	125	83.3
Divorced	5	3.3
Widowed	7	4.7
Comorbidities		
Hypertension	91	60.7
Obesity	24	16
Dyslipidemia	14	9.3
Heart disease	12	8
No comorbidities	9	6
Length of time with diabetes		
[1-10 years]	109	72.7
[10-20 years]	32	21.3
[20-30 years]	5	3.3
[30-40 years]	2	1.3
[40-50 years]	2	1.4
Present complications		
Diabetic retinopathy	72	48.0
Diabetic neuropathy	61	40.7
Diabetic foot	13	8.7
Silent myocardial ischemia	6	4.0
Diabetic nephropathy	6	4.0
No complications	42	28.0
Treatment		
Oral antidiabetics	101	67.3
Insulin	31	20.7
Insulin and oral antidibetics	15	10.0
Traditional therapy	3	2.0

such risk. There was no statistically significant difference between knowledge of vision loss due to diabetes or gender (p = 0.2) or level of education (p = 0.2).

2) Knowledge of ocular complications in diabetes

One hundred and four (104) respondents (69.3%), did not know any ocular complications from diabetes and 30 respondents (20.0%) mentioned cataracts.

3) Knowledge of symptoms pointing to an ocular complication

Seventy-nine (79) respondents (53.7%) knew that the decline in vision was a sign directing towards ocular complications.

4) Knowledge of the systematic nature of the ophthalmological examination and its frequency.

Eighty-four (84) respondents (57.1%) knew the systematic nature of the ophthalmological examination and 8 respondents (5.4%) knew how often to perform this examination.

5) Knowledge of the examination allowing the early detection of ocular complications.

One hundred and twenty-three (123) respondents (83.6%), knew that systematic ophthalmological examination would allow early detection of ocular complications.

6) Knowledge of fundus examination

Seventy-seven (77) respondents (52.4%) have already heard of the fundus in the follow-up of diabetes against 73 respondents (47.6%) who have never heard of it.

7) Knowledge of paraclinical explorations.

The paraclinical explorations are very little known by the patients. Thus 99 respondents (66.0%) had never heard of retinal fluoresce in angiography and 134 respondents (89.3%) were unaware of optical coherence tomography.

8) Knowledge on the treatment of complications.

One hundred and twenty four (124) respondents (84.4%) knew that the ocular complications of diabetes can be avoided and 19 respondents (12.9%) knew that these complications could be treated. Therapeutic means such as laser are not known by 118 respondents (78.6%) as well as intravitreal injections are not known by 140 respondents (93.3%).

The overall level of knowledge was insufficient, *i.e.*, 50.6%, divided into 65.47% for general knowledge about diabetes and 35.82% for ocular complications of diabetes (Table 2).

3.3. Attitude of the Patients

3.3.1. Attitude in the Face of Hyperglycaemia

Fifty-six (56) respondents (38.1%), called on a nurse for care, 47 respondents (31.3%) of patients confided in a diabetologist and 33 respondents (22.0%) in a general practitioner. There was no statistically significant difference between the caregiver consulted in case of hyperglycaemia and gender (p = 0.9), on the other hand, there is a statistically significant association between the level of education and the caregiver consulted in case of hyperglycemia (p = 0.005).

Table 2. Knowledge summary.

	Effective	Percentage (%)	Interpretation
General knowledge of diabetes			
Definition of diabetes	128	85.3	Good
Chronic nature of diabetes	31	20.7	Bad
Daily treatment	110	73.3	Average
Organs affected by diabetes	124	82.6	Average
General knowledge of diabetes summary	-	**65.5**	**Average**
Knowledge of ocular complications			
Loss of vision	120	80	Average
Different ocular injuries	42	28	Bad
Decreased vision as ocular complications	80	53.3	Insufficient
Systematic ophthalmological consultation	8	5.3	Bad
Possibility of early detection	126	84	Average
Eye background	79	52.7	Insufficient
Angiography	51	34	Bad
OCT	16	10.7	Bad
Possibility of treatment of ocular lesions	29	19.3	Bad
Laser treatment	9	6	Bad
IVT	31	20.7	Bad
Knowledge of ocular complications summary	-	**35.8**	**Bad**
Overall level of knowledge	-	**50.6**	**Insufficient**

3.3.2. Attitude to Diabetes-Related Vision Loss

One hundred and thirty-four (134) respondents (84.3%), said they would go directly to the ophthalmologist in the event of a decline in vision, compared to 6.8% of the respondents who would see a diabetologist. There is no statistically significant difference between gender ($p = 0.2$), level of education ($p = 0.2$) and caregiver consulted in the event of a decline in visual acuity.

In summary, attitudes were approximate at 68.8%. In case of hyperglycemia, 31.3% of patients would confide in a diabetologist and 22.0% in a general practitioner. In case of reduced vision, 84.3% of patients would contact the ophthalmologist (Table 3).

3.4. Practice

3.4.1. Practice on Ophthalmological Follow-Up

Ninety-four (94) respondents (62.7%) had never consulted an ophthalmologist within the framework of the diabetic follow-up against 56 respondents (37.4%) who have already done so. Among the 56 respondents who had already had an

Table 3. Attitudes and practices summary.

	Effective	Percentage (%)	Interpretation
Attitudes			
In case of hyperglycemia	47 + 33	53.3	Wrong
In case of reduced vision	134	84.3	Approximate
Attitudes summary	-	**68.8**	**Approximate**
Pratices			
For ophtalmological follow up	56	37.4	Harmful
Fundus pratice	64	41.5	Harmful
Retinal angiography pratice	25	16.7	Harmful
Pratice on laser photocoagulation	9	4.1	Harmful
Pratice of intravitreal injection	4	2.7	Harmful
For Diabetic education	79	52.7	Inadequate
Education for awareness session on the ocular complications of diabetes	76	50.7	Inadequate
Summary of practice	-	**29.4**	**Harmful**

ophthalmological follow-up, 39 (69.6%) respondents had a history of diabetes less than 5 years.

3.4.2. Fundus and Retinal Angiography Practice

Eighty-six (86) respondents (58.5%) had never performed fundus examination against 64 respondents (41.5%) who had already done so. Angiography was already performed by 25 respondents (16.7%).

3.4.3. Practice on Laser and Intravitreal Injections

One hundred and forty-one (141) respondents (95.9%) had never had retinal laser photocoagulation compared to 9 respondents (4.1%) who had already done so. Compared to the intravitreal injection, 4 respondents (2.7%) have already had it.

3.4.4. Practice on Diabetic Education

Seventy-nine (79) respondents (52.7%) had followed a therapeutic education session on diabetes and 76 respondents (50.7%) also followed an awareness session on the ocular complications of diabetes.

In summary, the level of practice was harmful, 29.4%. For diabetic follow-up 36.7% of patients had already consulted an ophthalmologist, 41.3% had performed an eye fundus, 17.3% had a retinal angiography, 4% a retinal laser photocoagulation and 2.7% an IVT; 52.7% had followed a therapeutic education session and 50.7% also followed an awareness session on the ocular complications of diabetes (Table 3).

4. Discussion

The mean age of 56.9 years and the male predominance found in our study are in line with the study of Mossi *et al.* in Togo [3], who noted a mean age of 55.8 years and a male predominance in a study on the prevalence of complications of diabetes mellitus in Lomé. Similarly, Millogo *et al.* in Burkina [4] and Coulibaly *et al.* in Mali [5], also noted a male predominance in their work on diabetes in urban areas.

We noted an association of diabetes with hypertension (HTA) in 60.7% of cases and obesity in 16% of cases. Our results are consistent with those of Hue *et al.* [6] in Ivory Coast who noted an association with hypertension in 72.18% of cases and obesity in 77.7%. This same observation is shared by Méda *et al.* in Burkina Faso who found comorbidity of hypertension in 57.7% of cases [7]. This strong association could be explained not only by the fact that these two pathologies are more often observed in adults, but also by the role of diabetes in the incidence of arterial hypertension.

We found 87% of type 2 diabetics against 13% of type 1. Our results are comparable to those described in our country by Mossi *et al.* [3], Nemi *et al.* [8] and Diomandé *et al.* [9] in Ivory Coast who found respectively 84.12%, 75% and 89.5% of type 2 diabetes. Our results could be explained by the predominance of type 2 diabetes, which would be the prerogative of adults and the elderly, in relation to the age group most represented in our study.

The complications were diabetic retinopathy in 48.0%, diabetic neuropathy in 40.7% and diabetic foot in 8.7%. Méda *et al.* [7] in Burkina Faso reported figures higher than ours, notably 64% of diabetic retinopathy, 67% of diabetic neuropathy and 13.4% of diabetic foot.

The overall knowledge level was insufficient *i.e.* 50.6%, Hamdi *et al.* reported an average knowledge level of 60.37% in 2016 in Tunisia [10]. This result may be due to insufficient awareness about diabetes, and also to the educational level of the respondents. The expected answer on the definition of diabetes was given by patients in 85.3% of cases comparable to the result of Sharmila *et al.* in 2016 who reported in Madagascar that 83.2% knew the definition of diabetes [11]. This could be explained by an accurate translation of diabetes into the local language. Thirty percent of our samples believe that diabetes can be cured. Our results are higher than those of Ben Abdelaziz *et al.* who reported 11.9% in 2007 during the study on the knowledge of type 2 diabetic patients about their disease in Sousse [12]. This lack of knowledge would be related to the level of education of our population combined with the preconceived ideas of traditherapy.

Majority of the patients, *i.e.* 79.3% were aware of the risk of vision loss due to ocular complications compared to 8.8% who felt that there was no such risk. Our results are similar to those of Mohamed et al who noted in Ghana in 2016 that 74.6% of patients were aware of the risk of vision loss compared to 10.7% during the study, carrying knowledge about ocular complications of diabetes [13].

Majority of the patients, *i.e.* 69.3% did not know any ocular complications of

diabetes and 20% mentioned cataracts. Our results are superposable with those of Hakeem *et al.* who noted in Pakistan in 2017 an unawareness of ocular complications of diabetes in 71.65% of cases [14]. Pereira *et al.* noted in Brazil that 27% of patients mentioned cataract as an ocular complication of diabetes [15]. Knowledge about ocular complications was not associated with age, sex or level of education. Achigbu *et al.* did not note a significant association between educational level, sex, age and attitudes of diabetic patients in Nigeria in 2015 [16].

The low level of education of the participants, as well as the lack of a well-organized patient education program on ocular complications, could contribute to this low level of knowledge.

One hundred and thirty-four patients, *i.e.*, 84.3%, reported that they would go directly to the ophthalmologist in case of reduced vision. Al Zarea *et al.* reported in 2016 in Saudi Arabia, 65.10% of patients who confided directly in the ophthalmologist [17]. These good attitudes could be explained by the fact that eye care is done exclusively by ophthalmologists and ophthalmological clinical examination requires specific equipment that is often not available only in ophthalmology practices.

Fifty-six patients in our series, *i.e.* 37.4%, had already consulted an ophthalmologist as part of their diabetic follow-up, in contrast to the work of Srinivasan *et al.* in India, where 89.8% of the patients had already consulted an ophthalmologist [18]. Our figures are closer to those of Achigbu *et al.* in Nigeria in 2015, who noted that 31% of patients had an ophthalmological examination [16].

The poor practice of patients facing the ocular complications of diabetes is undoubtedly related to the low level of knowledge on the disease, by a difficulty of access both financially and geographically to ocular care facilities and especially the absence of a therapeutic education program on the ocular complications of the disease.

5. Limitation

Our study took place from April to June 2020, the period of restrictive measures due to the covid-19 pandemic. This greatly reduced the number of patients in the health centers and therefore the number of participants in our survey. The semi-directive interview, does not allow total objectivity. Indeed, the interviewer proceeds to the identification of the elements of the speech and to their classification according to his own interpretations. There is therefore, necessarily, a bias in interpretation. Some patients spoke only the national language. As the questionnaire is in French, this could also lead to translation and interpretation bias.

6. Conclusion

This study on the knowledge, attitudes and practices of diabetics regarding the ocular complications of diabetes revealed an insufficient level of knowledge, an approximate attitude and harmful practices. It is therefore important to institute awareness sessions on diabetes and its complications in the general population

and on a mandatory basis for diabetics.

Conflicts of Interest

The authors declare no conflict of interest.

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Appendix

Survey Sheet

Identification number

1) PATIENT INFORMATION

Last name and first names

Age

Sex

Educational level

Occupation

Marital status

Ethnic group

Place of residence

Comorbidities

type of diabetes

Age of diabetes in years:

Number of annual follow-up consultations (last 12 months)

Current treatment

Complications already present

2) GENERAL KNOWLEDGE ON DIABETES

What is diabetes ?

Can diabetes be cured?

How are diabetes medications taken?

Can diabetes have complications?

3) KNOWLEDGE OF OCULAR COMPLICATIONS OF DIABETES

Ocular complications during diabetes can lead to loss of vision?

In your opinion, what are the ocular complications that can be had in diabetes?

Do you think there are any symptoms that can lead you to suspect an ocular complication?

Eye examination in a diabetic is only recommended when vision is affected?

Have you ever heard of a fundus?

Have you ever heard of a retinal angiogram?

Have you ever heard of optical coherence tomography (OCT)?

Can the ocular complications of diabetes be treated?

Have you ever heard of laser treatment?

Have you ever heard of a vitreous injection (IVT)?

Can ocular complications of diabetes be prevented?

Does ophthalmological follow-up allow early detection of complications?

What do you think is the frequency of ophthalmological follow-up in diabetes?

4) ATTITUDES

Who to confide in if your blood sugar is high?

Who to contact in case of diabetes-related vision loss?

5) PRACTICES

Have you ever consulted an ophthalmologist as part of your diabetic monitoring?

Have you ever had a fundus exam?

Have you ever had a retinal angiography done?

Have you ever had a retina laser?

Have you ever had an injection in the vitreous?

Have you ever had an awareness of the complications of diabetes?

Have you participated in a therapeutic education session on the ocular complications of diabetes?