
Diabetes Awareness and Complications in Patients from Clinics in the Centre Region, Cameroon

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To cite this article:

Abah Abah Aristide Stephane, Atabonkeng Etienne Philemon, Kom Bernadette Flaure, Haoua Farida Oumarou, Nwaha Nwaha Marcel Wilfried, Ateba Ohana Joseph Alain, Ngo Sack Francoise Fidele, Metogo Mbarga Bernard, Mapa Tassou Clarisse, Mbala Carine Florence, Mbanya Nganou Jean Claude. Diabetes Awareness and Complications in Patients from Clinics in the Centre Region, Cameroon. *World Journal of Public Health*. Vol. 8, No. 1, 2023, pp. 23-28. doi: 10.11648/j.wjph.20230801.14

Received: January 9, 2023; **Accepted:** February 6, 2023; **Published:** February 21, 2023

Abstract: Background: Diabetes mellitus is a major public health problem with complications having significant morbidity and mortality on the populations. It is a growing condition in developing countries, which are hosting nearly 75% of the world's diabetic patients. In the present study, we assessed the knowledge, attitude and practices of diabetic patients about the disease risk factors (smoking, alcohol, lack of exercise), and determined the frequencies of complications and some links between risks factors and complications in patients attending health clinics in the centre region of Cameroon. Methodology: The study was conducted from June 2017 to June 2020 in diabetes clinics of the Centre region of Cameroon. Diabetic patients attending the clinics for routine follow-up were enrolled in the study after they consented and signed an informed consent form. Their socio-demographic data, dietetic habit (eating, cigarette and alcohol intake, physical activity) were recorded on a questionnaire while the disease complications were obtained from their medical record. Results: A total of 588 patients were involved in the study including 68.20% females and 31.80% males. Fourteen (2.4%) patients were type 1 diabetes while 96.60% were type 2 diabetes. The mean age of participants was 31.28 ± 4.38 and 59.00 ± 12.21 years old for type 1 and type 2 diabetes, respectively 37.52% participants regularly consumed alcohol whereas 3.74% were smokers. Complications of diabetes such as hypertension and ketoacidosis were detected in 62% and 15% of the diabetic participants, respectively. Physical activity significantly prevented or delayed the onset of hypertension, stroke and dyslipidemia. Significant association was observed between stroke and dyslipidemia in smokers as compared to non-smokers. Conclusion: This study reveals that diabetic patients had poor level of awareness, non-appropriated attitude toward preventing the outcome of disease complications.

Keywords: Diabetes Mellitus, Patient's Behaviors, Awareness and Complications

1. Introduction

Diabetes mellitus is a major public health problem, and is a growing condition in developing countries, which are hosting nearly 75% of the world's diabetic patients [1]. It is a multifactorial disorder associating genetic predisposition and factors such as sedentary lifestyle, nutritional factors and obesity. Diabetes can end up with complications such as cardiovascular diseases, neuropathy, nephropathy and retinopathy [2]. A study in northern Africa described retinopathy, albuminuria, nephropathy and neuropathy as chronic diabetes complications [3] instead, in sub-Saharan African countries, the rate of undiagnosed diabetes is high and individuals who are unaware they have the disorder are at very high risk of developing chronic complications [4]. The onset of these complications may be due to lack of knowledge's, non-appropriated attitudes towards risks factors. In order to check the influences of these factors which are essential in the fight against diabetes, we carried out the present study on assessing knowledge, describing attitudes and behaviors as well as vascular complications in patients followed-up in clinics in the city of Yaounde, Cameroon.

2. Materials and Methods

This study is an exploitation of the database of the Cameroon National diabetes and Hypertension program (CNDHP) project in diabetes clinics that took place from June 2017 to June 2020.

2.1. Study Sites

Diabetes clinics of the Centre region of Cameroon.

2.2. Participants

All the diabetic patients who attended the clinics for clinical follow-up were eligible for the study and were involved after agreeing and signing the informed consent form. We did not considered participants that presented evidences of other chronic diseases (cancers) in this study.

2.3. Questionnaire

A questionnaire was elaborated to collect sociodemographic data, participants eating habits, behaviours, their knowledge on diabetes and the complications (organs dysfunctions related to diabetes) were recorded on their medical reports.

2.4. Administration of the Questionnaire and Data Collection

After enrolment in the study, the participants were interviewed on their socio-demographic information, alcohol consumption and tobacco. There after the body weight, height and blood pressure were also collected. The patient's medical history of arrhythmia, coma,--nephropathy,

retinopathy, cataracts and dyslipidaemia was collected from their medical record.

2.5. Statistical Analysis

Data were keyed in and analysed using GRAPH PAD software. P values were calculated using Fischer exact test and were considered significant when $P \leq 0.05$.

3. Results

3.1. Population Description

Among the 10 diabetes clinics, the highest number of participants recorded was from the National obesity center of the Yaounde central hospital, followed by Olembe's district hospital and Biyem Assi district hospital (Table 1).

Table 1. Participants distribution as function of health facilities.

Health facilities	Number	Percentage (%)
Elig Essono district medical center	6	1.02
Mendong district medical center	2	0.34
National obesity center of the Yaounde central hospital	256	43.54
Akonolinga district hospital	11	1.87
Bafia district hospital	24	4.08
Biyem Assi district hospital	61	10.37
Efoulan district hospital	23	3.91
Eseka district hospital	13	2.21
Mbalmayo district hospital	29	4.93
Nanga Eboko district hospital	21	3.57
Obala district hospital	64	10.88
Olembe's district hospital	78	13.27
Total	588	100

3.2. Description of Study Population as Function of Gender

Out of five hundred and eighty eight (588) participants that fulfilled our inclusion criteria, 68.2% (401) were female and 31.8% (187) were male, with a sex ratio of 2.14.

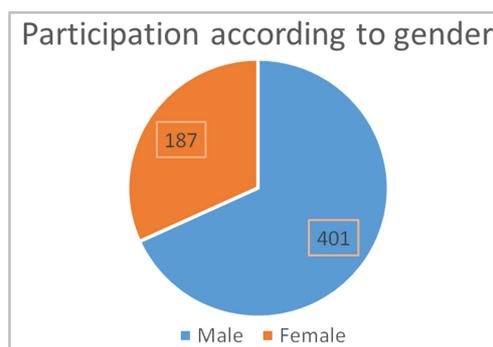


Figure 1. Participation as function of gender.

Female participants were more represented in this study, despite the fact that diabetes seems more common in men.

3.3. Description of the Two Populations According to the Type of Diabetes

Of the 588 participants to the study, 2.4% were type 1

diabetes while 96.60% were type 2 diabetes (Table 2). The mean age of type 1 diabetic patients was 31.28 ± 4.38 years old as compared to 59.00 ± 12.21 years old for type 2 diabetes participants (Table 2).

Table 2. Characteristics of the populations in terms of age.

	Type 1 diabetes	Type 2 diabetes
Number of subjects (n)	2.4% (14)	96.6% (574)
Mean age \pm SD (years)	31.28 \pm 4.38	59.00 \pm 12.21
Median age (years)	26 (16-71)	60 (31-99)
Modal age	16	60

96% of participants was found in type 2 diabetes group where the mean age was around 59 years old, the median age

been 60; in type 1 diabetes group, the mean and median age were 31 and 26 years old respectively.

3.4. Distribution of Study Population as Function of Age Groups

The distribution of the population as function of age group (figure 1) showed the highest frequencies between 45 to 74 years old for type 2 diabetes participants with 34.41% and 43.02%, respectively for participants between (45-59) and (60-74) years old while the lowest frequencies were found in type 1 diabetes patients (2.04%) between (15-29) years old patients.

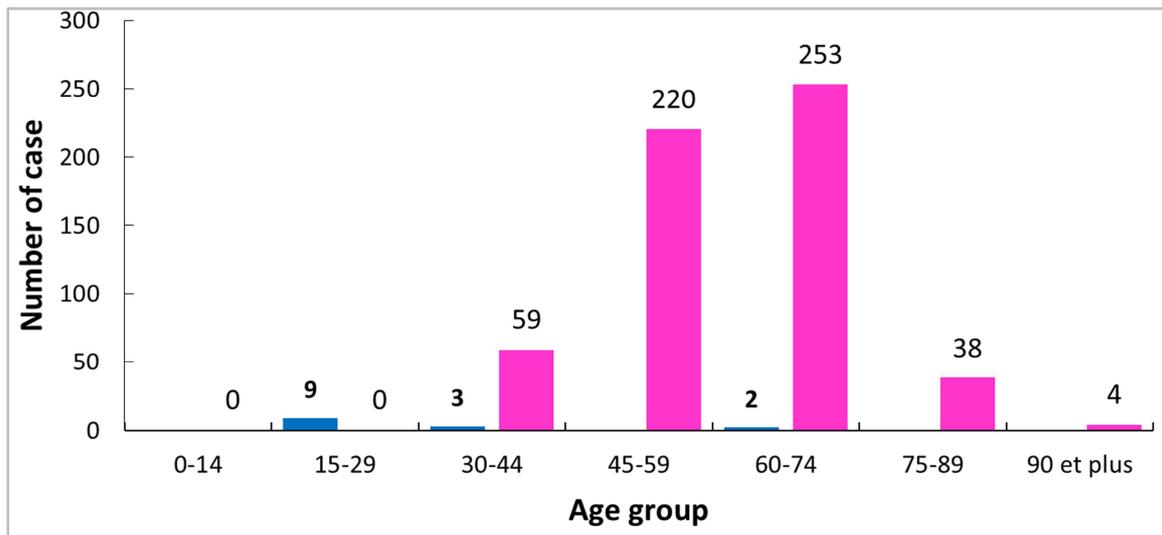


Figure 2. Description of the population as function of age groups.

3.5. Distribution of Participants According to Occupation

Diabetes concern almost all social sectors with the most represented being the group constituted of (farmers, breeders, traders) (23.47%), the housewives (17.70%), the retired

people (12.75%), administrative officers (9.01%). The smallest group of participants was made up of religious (priests, pastor and imams) (Figure 2).

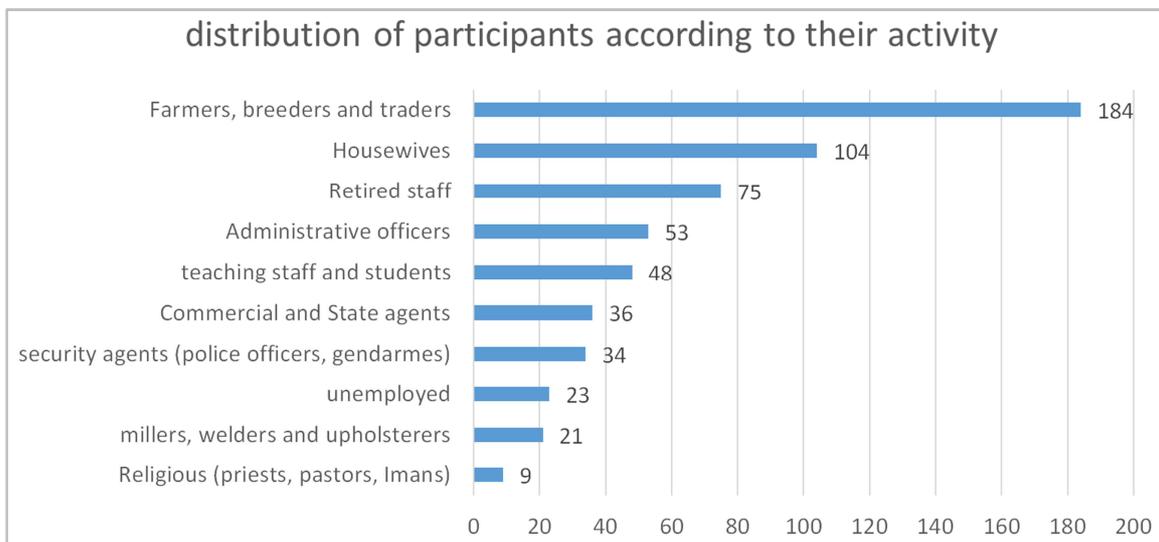


Figure 3. Number of participants as function of their activity.

3.6. Evaluation of Alcohol and Tobacco Consumption Amongst the Study Population

The distribution of participants in terms of alcohol and tobacco consumption is shown in Table 3. An interesting number of diabetes patients (37.52%) consumed alcohol while 3.74% consumed tobacco.

Table 3. Description of population according to alcohol and tobacco consumption.

	Alcohol consumption			Tobacco consumption		
	Alcohol+	Alcohol -	Total	Tobacco +	Tobacco -	Total
T1 diabetes	14.28% (2)	12 85.71% (12)	100% (14)	7.14% (1)	92.86% (13)	100% (14)
T2 diabetes	34.50% (198)	65.50% (376)	100% (574)	3.65% (55)	96.34% (553)	100% (574)
Total	37.52% (200)	62.47% (388)	100% (588)	3.74% (56)	96.59% (566)	100% (588)

3.7. Assessment of Information, Education and Communication (IEC) on Disease Amongst Participants

Still on the basis of the participants' medical records, it was questioned whether they were sufficiently educated and informed and communicate easily about their disease; Table 4 gives the distribution according to their answer.

Table 4. Distribution of participants as function of IEC.

Factor	IEC
Informé	82 (13,4%)
Non Informé	506 (86,6%)
Total	588 (100%)

According to the patients' medical records and consultation, only 13.4% declared to have been informed and educated on risk factors and hygiene rules to prevent occurrence of complications.

3.8. Evaluation of the Practice of Physical Activity and Hygiene Amongst Participants

Physical activity was practice by 39.5%of participants

Table 6. Complications identified in type 1 and type 2 diabetes patients.

Complications	Type 1 diabetes patients		Type 2 diabetes patients	
	Effective	(%)	Effective	(%)
Stroke	1	7,57	40	6,8
Dyslipidemias	0	0	71	12,07
Renal disorders	0	0	4	0,68
Arterial hypertension	2	14,36	371	63,1
Cataract	0	0	4	0,68
Retinopathies	0	0	19	3,23
Neurologic disorders	1	7,57	17	2,89
Arthropathies	0	0	6	1,02
Ketoacidosis	0	0	74	12,59

Despite the small number of type 1 diabetic patients, it was found 14.36% of arterial hypertension, and 7.57% of stroke and neurological disorders. On the other hand, in type 2 diabetic patients, many complications were noted, namely arterial hypertension (63%), ketoacidosis (12.5%), dyslipidemia (12%), stroke (7%), neurological disorders, retinopathies and kidney disorder.

while diabetic hygiene was practiced by 77.6% participants as shown in table 5.

Table 5. Frequency of physical activity and hygiene practiced by the participants.

	Practice of activity	Practice of diabetes hygiene
Yes	232 (39.5%)	456 (77.6%)
No	356 (60.5%)	132 (22.4%)
Total	588 (100%)	588 (100%)

Table 5 shows that 40% of patients engage in physical activity compared to 60% that did not; moreover, 77% practiced diabetic hygiene.

3.9. Description of Complications Identified in Type 1 and Type 2 Diabetic Patients

Table shows the main complications noted in the two groups of diabetes. Hypertension was detected in 63% of patients with type 2 as compare to type 1 diabetes. Also, type 2 diabetes presented more complications than type 1 diabetes patients, with dyslipidemia (12.07%), retinopathies (3%) ketoacidosis (13%) (Table 6).

3.10. Correlations Between Risks Factors and the Frequency of Occurrence of Major Complications

The risk of complications was assessed based on physical activity, alcohol and tobacco consumption (Tables 7, 8 and 9).

Table 7. Assessment of the occurrence of complications related to the practice of physical activity.

	Practice physical activities	Absenceof physical activities	Total	P. value
Stroke +	7	25	32	p=0,0407*
Stroke -	225	331	556	
Dyslipidemia +	19	52	71	p=0,0200*
Dyslipidemia -	213	304	517	
HTA +	109	219	328	p=0,0007***
HTA -	123	137	260	

The risk of stroke, dyslipidemia and high blood pressure is reduced by the practice of physical activity; thus diabetic patients practicing a regular physical activity were less exposed to these complications ($p < 0.05$).

Table 8. Assessment of the occurrence of complications related to alcohol consumption.

	Drink alcohol	Do not drink alcohol	Total	p value
Stroke +	32	9	41	p=0,0001***
Stroke -	168	379	539	
Dyslipidemia+	43	28	70	p=0,0001***
Dyslipidemia -	157	360	510	
Hypertension +	126	245	209	p=0,7849
Hypertension -	74	135	371	

The relationship between alcoholism and the complications noted in patients shows that alcohol positively influenced the onset of stroke and dyslipidemia ($p < 0.05$); however, no direct link was found between alcoholism and high blood pressure ($p > 0.05$). Patients who consumed alcohol regularly were therefore more at risk of developing stroke and dyslipidemia.

Table 9. Assessment of the occurrence of complications related to tobacco consumption.

	Smokers	Non smokers	Total	p, value
Stroke +	28	13	41	p=0,0001***
Stroke -	27	520	547	
Dyslipidemia +	25	49	74	p=0,0001***
Dyslipidemia -	30	484	514	
HTA +	37	341	378	p=0,6607
HTA -	18	192	210	
Retinopathy +	2	16	18	p=0,6859
Retinopathy -	54	516	570	
Ketoacidosis +	9	65	74	p=0,3978
Ketoacidosis -	47	468	515	

Table 9 shows that smoking influenced stroke, dyslipidaemia; diabetic patient that consumed tobacco are therefore at risk of developing these two complications.

4. Discussion

Our study revealed that the patients have a poor knowledge of the disease and this can be related to poor relations between medical doctors and patients. More times to IEC during consultations and counseling could help reduce this poor knowledge and improve patient's lifestyle. It has also been revealed that large number of participants did consume alcohol and tobacco, which are known to be harmful to their health, and may exacerbate diabetes complications and more communications and advertisements are needed to cover this gap.

Hypertension, stroke and neurological disorders were the main complications in type 1 diabetes patients whereas

hypertension (63%), ketoacidosis (12.5%), dyslipidemia (12%), stroke (7%), neurological disorders, retinopathies and kidney disorder were found in type 2 diabetes patients. These complications are close to those describe in northern Africa where retinopathy, albuminuria, nephropathy and neuropath emerged as chronic diabetes complications [3]; however, hypertension, dyslipidemia and ketoacidosis observed in the current study may be linked to others risks factors such as alcohol, tobacco or lack of physical activities that were frequent in patients from these clinics. In fact it has been described that physical activities are important in prevention of cardiovascular disease [5]. Dyslipidaemia was the consequences of tobacco as describe by Catapano et al and Vinci et al; [6, 7], Also, alcohol has benn describe to be associated to dyslipidemia [8]. It has been noted in our study that these conditions were significantly low in patients exercising a physical activity as compared to those not exercising, thus reflecting the importance of regular activity [9, 10]. Excess of alcohol can predispose to stroke and dyslipidemia as observed in this study. This observation was previously confirmed by a meta-analysis of 35 observational study on the effect of alcohol consumption in relation to the occurrence dyslipidemia and stroke, where it was demonstrated that regular alcohol consumption of up to 60 g per day is associated with an increased risk of stroke [11, 12]. However, a very close and highly significant association was observed with stroke and dyslipidemia in smokers compared to non-smokers. Similarly, previous studies reported doubled risk of stroke in smoker's diabetic patients [13]. Moreover, a strong dose-dependent relationship has been observed between smoking and the risk of stroke [14], this observation is still in favor of occurrence of complications in diabetes patients from these clinics.

5. Conclusion

This study demonstrates that very few diabetic patients are informed of risk factors and good attitudes that could help prevent the disease complications, with many of them

consuming aggravating factors such as alcohol and tobacco. The main complications of the disease were arterial hypertension, neurologic disorder and coma in type 1 diabetes patients whiles stroke, dyslipidemia arterial hypertension, retinopathy and ketoacidosis were observed in type 2 diabetes patients.

Funding

This project was found by the WDF (World Diabetes Foundation).

Acknowledgements

We sincerely thanks all the patients that were enrolled in this study, the staff of the diabetic clinics, all the members of the HOPIT organization and particularly M. NGWA Edwin, Dr Tegua Stephanie Sitchie, Dr Assah Félix, the Cameroon Minister of Public Health.

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