Research Square

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Prevalence and Determinants of Chronic Complications of Diabetes in Patients Living with Type 2 Diabetes Mellitus in the Dschang Health District

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Abstract

Background

Type 2 diabetes mellitus (T2DM) is a chronic disease, affecting 90% of people living with diabetes mellitus (DM) in the world. Over time, 30–70% of these patients develop chronic complications. The determinants of these complications are, however, poorly known. This study aimed at determining the distribution of chronic complications in the Dschang Health District (DHD), and the need for interventions in order to reduce the incidence of these complications in patients living with T2DM.

Methods

We carried out a hospital-based cross-sectional study in three reference hospitals of the DHD with two main parts: a descriptive part targeting people living with T2DM and an analytical case-control part. Cases were people with a confirmed documented diagnosis of T2DM presenting at least one documented chronic diabetes mellitus-related complication, and controls were people with a confirmed documented diagnosis of T2DM without any documented chronic diabetes mellitus-related complication. Data was collected through a face-to-face interview using a pre-designed questionnaire assessing sociodemographic characteristics, diabetes knowledge and practices, and perceptions of care. A multivariate logistic regression was performed, and $p < 0.05$ was considered significant.

Results

We enrolled 212 participants (145 females), with a mean (SD) age of 66 years (± 12.7). Among them, 83 (39.1%) presented at least one documented chronic complication. A longer duration from diagnosis of T2DM was associated with the presence of chronic complications in patients living with T2DM (OR = 2.7 [95% CI 1.2–6.2], $p = 0.03$). Having less than 2 visits in the hospital per month (OR = 3.9 [95% CI 1.3–10.8], $p = 0.01$), meeting a health care provider less than 12 times a year (OR = 2.1 [95% CI 1.06–4.3], $p = 0.03$), not trusting the health care provider (OR = 2.2 [95% CI 1.1–4.8], $p = 0.03$), and having only one chronic complication (OR = 5.3 [95% CI 2.5–11.3], $p = 0.001$) increases the chances of having a chronic complication due to T2DM. Nevertheless, having met a diabetologist (OR = 0.46 [95% CI 0.2–0.98], $p = 0.04$) and having less access to screening for chronic complications (OR = 0.18 [95% CI 0.078–0.42], $p = 0.001$)

Conclusion

Four out of ten diabetic patients in the Dschang Health District have at least one chronic complication. Results encouraged regular screening for chronic complications, and follow up of patients living with T2DM by a diabetologist, which are the main determinants of these complications in patients living with

T2DM in the DHD. However, our findings still encourage access to education on T2DM and its chronic complications.

I. Background

The World Health Organization (WHO) defines type 2 diabetes mellitus (T2DM) as a chronic disease that arises when the pancreas does not produce sufficient insulin, or when the body cannot effectively use the insulin produced. It is a non-transmissible disease that accounts for 6.28% of global mortality and about 90% of all diabetes cases worldwide [1]. Moreover, over time, T2DM can cause serious damages to vital organs. Studies have proven that more deaths are recorded as a result of complications associated with T2DM, than of the disease itself [2]. A recent study indicates that almost half (47.8%) of people living with T2DM have at least one chronic complication [3]. These complications could be acute or chronic. Some of these complications begin within months of the onset of diabetes, although most tend to develop after a few years. Complications lead to an increase in the number of medical appointments and hospitalisations, affecting patients' quality of life and increasing the burden of hospital care costs [4]. Chronic complications due to T2DM are further classified under macrovascular complications which commonly manifest as cardiovascular diseases, and microvascular complications which mainly involves retinopathy, neuropathy, nephropathy and diabetic foot ulcers [5]. Amongst others, macrovascular complications are the primary cause of mortality in T2DM patients [6].

Current management approaches all over the world (including Cameroon) for patients with diabetes, primarily focus on medications to control glycaemic levels, and thereby hope to prevent the progression to complications [7, 8]. Nevertheless, this approach has not succeeded in reducing the overall weight of complications due to this disease. Studies have still demonstrated elevated plasma concentrations of total cholesterol, triglycerides, and low-density lipoprotein in patients manifesting concurrent diabetic neuropathy, thereby further increasing their cardiovascular risk, despite the intake of the metformin tablets in the prescribed doses [9]. Complications lead to an increase in the number of medical appointments and admission, reducing patients' quality of life and increasing the disease’s financial and social burden [4]. A vacuum is therefore created as nothing new is being done over time to prevent the incidence of complications from increasing at a higher rate.

However, given the overgrowing prevalence of T2DM and its complications, studying the interventional needs as possible determining factors has become a necessity. Cameroon still has a high prevalence of T2DM (6.9%) [10], and chronic complications keep increasing in these patients daily. IDF states that about 70% of patients living with diabetes have at least one complication due to the disease [11]. Many studies lay emphasis on the determinants of chronic complications but little to no emphasis is laid on the interventional needs of patients who live with the disease [12]. To the best of our knowledge, no studies have been carried out regarding the interventional needs of T2DM patients and their impact on the occurrence of chronic complications in Cameroon. Regarding this, a loophole is created which is a call for concern.

Our study therefore throws more light on the determinants of T2DM, not just based on its clinical factors, but also on interventional needs. These will subsequently bring into play the active role of public health interventions in the eradication of the complications of the disease, and eventually of the disease itself through well planned strategies. We belief that, paying attention to patients' interventional needs represents a pivotal measure for enhancing patients' disease prognosis, preventing chronic complications and thereby improving their quality of life.

II. Methods

2.1. Study design

A cross sectional study with two main parts was carried out: a descriptive part and an analytical case control study, on participants living with T2DM in the Dschang Health District, from March 2025 to May 2025.

2.2. Study setting and population

This study was carried out in the Dschang Health District. The latter follows the geographical contours of the Menoua subdivision in the Western Region of Cameroon. It covers a surface area of 1060 Km^2 and is inhabited by around 245,829 people. Four of the six administrative precincts of Menoua are included in this health district. They include; Dschang, Nkong-ni, Fongo Tongo and the Fondonera group, and Fokoué [15]. Many health facilities are present in this district, the referral ones being the Dschang Regional Hospital Annex, Saint Paul Catholic Hospital Dschang, and our ladies of Lourdes Batsingla Hospital. These three health facilities each have an internal medicine department and a unit for monitoring people living with diabetes. These choices were made based on the referral characteristics of these hospitals and their high turnover of participants.

2.3. Study population

The study population was made up of people living with T2DM who are followed up in any of the reference health facilities stated, in the DHD. Patients living with T2DM were defined as anyone with a confirmed diagnosis of T2DM and/or is taking antidiabetic drugs, meeting the American Diabetes Association 2024 criteria for diabetes. We then included every T2DM participant followed up at any Dschang Health District reference hospital, who possesses his patient hospital booklet and has given his consent to participate. Every T2DM participant who refused to share the information found in his hospital follow up booklet was eventually excluded from the study. For our case control component, cases were considered as people with a confirmed documented diagnosis of T2DM, presenting at least one documented chronic complication, coming for consultation or treatment, and the controls were all people with a confirmed diagnosis of T2DM, presenting no documented chronic complication due to T2DM, coming for consultation or treatment at these hospitals during the data collection period. In each of the health facilities, all persons meeting the inclusion criteria and who gave their full consent to participate were selected and included into the study, one case compared to one control.

2.4. Sample size

Sample size: The sample size was calculated using the Cochran's formula (Stat calc of EPI Info Software®), for our descriptive component. We used the prevalence of T2DM in Cameroon of 6.9% [13] , with an 80% power to detect significant associations. This gave us a minimum sample size of 99 patients, using an accepted margin of error of 5% (standard value of 0.05) [16] and a non-response rate of 7.8%.

$$n = \frac{Z^2.p.(1-p)}{E^2}$$

Where; N= Sample size, p= prevalence (6.9%) E= margin of error Z= Z score (constant)

We then used the Fleiss formula for unmatched case control studies, to get the sample size of our analytical case control component. This gave us an estimated minimum sample size of 148 participants, i.e. 74 cases and 74 controls.

$$ncases = \frac{(Z\alpha\ 2 + Z\beta)2P(1-P)(r+1)}{(d*)2r}$$

Where; Zα 2 =1.96 for 95% CI, Zβ = 0.84 for 80% power, P = Prevalence: 6.9%[13], r = ₦ controls / ₦ cases (1:1), d = level of difference wished p1-p0 (0.082), p1= risk of exposure amongst cases, p0= risk of exposure amongst controls.

2.5. Study Variables

The collected variables included sociodemographic characteristics, history of diabetes, information on complications, Access to education on diabetes complications, Access to screening for complications and follow up by qualified health care personnel. A last part on the presence of complications from patients' interview and from patients' Para clinical tests were also included. Patients living with T2DM were defined as anyone with a confirmed diagnosis of T2DM and/or is taking antidiabetic drugs, meeting the American Diabetes Association 2024 criteria for diabetes. Access to education was evaluated using an Access to Diabetes Education Score (ADES) which laid emphasis on the availability of education, the frequency, the affordability, the delivery mode and the quality of education received. access to screening for complications was evaluated using and Access to Screening for Complications score (ASCS) which laid emphasis on the history of screening (eye exam, foot exam, kidney screening and cardiovascular screening in the last twelve months), access to the service (defined by screening availability at patient's

usual health facility, affordability of screening services and distance to screening) , and continuity of care (defined by regular follow up for diabetes care in the last twelve months) [14]. We evaluated follow up by a qualified health personnel using the Follow up by a Qualified Personnel score (FQPS). Which is based on key indicators of effective follow-up as recommended by global diabetes care guidelines. It takes into consideration the frequency of follow up, the type of health personnel, the continuity of care, documentation of care, patient education given, and stating referrals where necessary. We also reconsider meeting a diabetologist for the disease, as being followed up by a qualified health personnel. Diabetologists according to our study was synonym to endocrinologists who are known to manage diabetes in patients, and/or diabetes related complications.

2.6. Procedures

2.6.1. Administrative and ethical authorizations

After validation of the protocol by the co-directors and thesis director of the Faculty of Medicine and Pharmaceutical Sciences of the University of Dschang, we simultaneously obtained an ethical clearance from the "R**egional Ethics Committee for Human Health Research for the West Region**" (CRERSH-WE) and the approval of the three health facilities.

2.6.2. Data collection tool:

Data was collected using a standardized anonymous pre-tested questionnaire designed for this purpose. The information collected was then stored in a computer database. The structured questionnaire included all the variables listed above.

2.6.3. Data collection

- **Recruitment**

We collected data from the patient alone, or if necessary in the presence of an interpreter, with the permission of the patient. Patients were recruited based on convenience, as they visited the diabetes units of our study sites within the time frame of our study. We approached patients as they came in, and patients who respected our inclusion criteria were provided with an information leaflet explaining the aim of the study and additional explanations were made if requested. A consent form was subsequently presented to the patient for signature, if she agreed to participate.

- **Data collection**

After signature of the consent form, we used a two-part, anonymized, self-administered, standardized, and pre-tested questionnaire to collect our data. Hospital booklets of patients were also checked when necessary. For those who could not read and/or write, the questionnaire was filled during an interview conducted by a study investigator. The first part of the questionnaire gathered information on socio-demographic characteristics (age, sex, marital status, residence, occupation), past medical of T2DM in

the close entourage (family) and their clinical characteristics. The second part of the questionnaire assessed the respondent's general access to education on T2DM, access to screening for complications and follow up by a qualified health personnel, based on the variables of interest. After collection, the participant's data sheet was registered with an attributed code.

2.7. Operational terms

- **People living with type 2 diabetes:** A person with a diagnosis of T2DM or taking an antidiabetic treatment
- **Chronic complications of T2DM:** Were defined as long term health problems that result from persistent high blood sugar (hyperglycaemia), damaging blood vessels and nerves over time. Included Diabetic retinopathy, neuropathy, nephropathy, cardiovascular diseases and diabetic foot ulcers.
- **Comorbidities/ chronic health problems:** were defined as chronic health conditions causally related to T2DM and complications of T2DM. Examples include; hypertension, HIV/AIDS, renal diseases, cancer and gout
- **Interventional needs of patients living with T2DM:** These refers to the specific actions or treatment required to improve the quality of life of people living with T2DM. Main interventional needs include; education, coaching or social support. In our study, some trained health personnel stated interventional needs as access to and effectiveness of education, access to screening for chronic complications, and access to proper follow up.

- Access to education: This refers to the process of giving and receiving systematic instructions, advice or directions that are useful to individuals in a particular domain. In our study, access to education was evaluated using an Access to Diabetes Education Score (ADES) which laid emphasis on the availability of education, the frequency, the affordability, the delivery mode and the quality of education received.

- **Access to screening:** Screening is the act of carrying out a test or examination in order to discover if there is anything wrong with someone, most at times medically. In our study, access to screening for complications was evaluated using and Access to Screening for Complications score (ASCS) which laid emphasis on the history of screening (eye exam, foot exam, kidney screening and cardiovascular screening in the last twelve months), access to the service (defined by screening availability at patient's usual health facility, affordability of screening services and distance to screening) , and continuity of care (defined by regular follow up for diabetes care in the last twelve months)[14].
- **Follow up by a qualified health personnel:** Follow up is the act of maintaining contact with an individual (patient), in order to monitor and control the progress of his/her pathology. A qualified health care personnel here is an individual who is qualified by education, training, licensure/regulation (when applicable), and performs a professional service within his/her scope of practice, and independently reports to that professional service. In our context, a qualified health

personnel is one who is capable of filling up the interventional needs of patients living with T2DM. this was evaluated using a Follow up by a Qualified Personel Score (FQPS).

- **Long duration of T2DM:** was considered as living with T2DM for a period of 10 years and above.
- **Poor glycemic control:** was defined by glycated haemoglobin (HbA1C) above or equal to 7%.
- **Low socio-economic level:** a monthly income below 167 USD defines a low socio-economic class. Other social classes are classified on average (by income between 167 and 334 USD) and high (by income above this amount) [26].
- **Regular follow-up:** at least one medical visit per quarter of a year.

2.8. Data Analysis

The data collected was entered into a data entry mask designed from Kobo collect software, following the layout of the questions in the questionnaire in a comprehensive manner, and then exported to Microsoft Excel® 2016, then to SPSS® version 27.0 software for analysis. . Questions were asked taking reference from the Health educational impact questionnaire and the Diabetes Care Profile, and a score brought up. In the end, participants who scored 0-4 were termed as having poor, while those who scored 5-8 were termed good. The data was then described using the means and standard deviations for continuous variables and proportions and frequencies for categorical variables. Qualitative variables were expressed in absolute and relative frequencies. Microsoft Excel 2016 was used to generate tables and figures, which are the formats in which the data was presented. To determine whether access to education, access to screening and follow up by a qualified health personnel are associated to the occurrence of chronic complications in people living with T2DM, a chi-square test of independence and modelling using a binary logistic regression and multiple logistic regression model was used. Crude and adjusted odds ratios (ORs), 95% confidence intervals (CIs) and p-values set at 5% were presented to indicate the statistical significance of the results obtained.

2.9. Ethics approval and Consent to participate

This work was approved by the Institutional Council of the Faculty of Medicine and Pharmaceutical Sciences and the R**egional Ethics Committee for Human Health Research for the West Region**" (CRERSH-WE) for the study setting in the West Region, with a reference number (N° **346/27/05/2025/CE/CRERSH-OU/VP**). Prior authorization for the research was obtained from the directors of the Dschang Regional Hospital Annex Saint Paul's Hospital or Our Ladies of Lourdes Hospital Batsengla'a. All ethical principles concerning human research were strictly adhered to: respondents' rights to withdraw from the study, confidentiality, participant privacy, risks and benefits involved in the study were duly explained to participants, after which interested respondents voluntarily signed written consent forms. Our study was carried out in strict compliance with the principles of medical research on human beings.

III. Results

3.1. General Characteristics of the study population

We recruited 212 participants with a mean age (±SD) of 66 years (±12.7) among which 48.1% have been living with T2DM for more than ten years. Over half of the participants (47.2%), had achieved at least a secondary level of education. Marital status distribution showed a higher proportion of married participants (56.6%), followed by widows/widowers (37.7%). Self-employment was the most common employment status (50.5%), with agriculture and trading being the main activities, and 43.9% of participants functioning on low income. The most observed comorbidity in this population was hypertension (33.9%), as shown on **Table I**.

3.2. Distribution of chronic complications in patients living with T2DM in the Dschang Health District.

From documented data, out of the 212 patients included in the study, 83 participants have at least one chronic complication due to T2DM. The prevalence of chronic complications of T2DM in the DHD is 39.1% (CI of [32.5-45.3]) as demonstrated in **Fig 1**.

3.3. Distribution of access to education, access to screening for chronic complications and follow up by a qualified health personnel

- Distribution of patients having access to education on T2DM and T2DM chronic complications

Following the predefined variables, based on the scores set, analysis prove that 156 (73.5%) of the participants have good access to education on T2DM and its complications, among which 32.1% present at least one chronic complication due to T2DM and 67.9% presents no chronic complication due to T2DM as shown on Table II.

-Distribution of patients having access to screening for T2DM chronic complications

Based on the score, analysis prove that 42 (19.8%) of the participants have a good access to screening for chronic complications, among which 35.7% present at least one chronic complication due to T2DM and 64.3% present no chronic complication due to T2DM as shown on Table III.

- Distribution of participants Followed up by a Qualified Health Personnel

Following the predefined variables, based on the scores set, analysis prove that 41 (19.3%) of the participants are followed up by a qualified health personnel, among which 26.8% present at least one chronic complication due to T2DM and 73.2% present no chronic complication due to T2DM as shown on Table IV.

3.4. Association between follow-up by trained health personnel, access to education on diabetes complications and the occurrence of chronic complications of diabetes.

Following bivariate analysis, statistically significant variables that could be associated to the presence of chronic complications in patients living with T2DM were included into a regression model for

multivariate analysis and are presented on table V. This analysis identified several factors that are significantly associated to the presence of chronic complications. Results show that; the number of visits to the hospital per month, the number of times a patient meets a health care provider per year, meeting a diabetologist for the disease (p= 0.04), trusting your health care provider, the presence of comorbidities and access to screening for complications are significantly associated to the occurrence of chronic complications in patients living with T2DM.

From the logistic regression model (**Table V**), this indicates that, having <2 visits to the hospital per month (OR=3.9 [95% CI 1.3-10.8], p= 0.01), meeting a health care provider less than 12 times a year (OR=2.1 [95% CI 1.06-4.3], p= 0.03), not trusting the health care provider (OR=2.2 [95% CI 1.1-4.8], p=0.03), and having only one chronic complication (OR=5.3 [95% CI 2.5-11.3], p= 0.001) increases the chances of having a chronic complication due to T2DM. Nevertheless, having met a diabetologist (OR=0.46 [95% CI 0.2-0.98], p= 0.04) and having less access to screening for chronic complications (OR=0.18 [95% CI 0.078-0.42], p=0.001) reduce the risk of having a chronic complication. All the other variables were found non-significant in the multivariate model, although some showed trends in the expected direction.

IV. Discussion

The main objective of this study was to estimate the distribution of known chronic complications of T2DM and assess the contribution of interventional needs on the occurrence of known chronic complications amongst people living with T2DM in the Dschang Health District. Upon analysis, 39.1% of the people living with T2DM in the DHD have at least one documented chronic complication due to T2DM. 73.5% of the people living with T2DM in the DHD have good access to education on T2DM and its chronic complications, 19.8% have good access to screening for chronic complications and 19.3% are being followed up by qualified health personnel. A long duration of diagnosis of T2DM (5-10years and >10 years), is associated to the occurrence of chronic complications due to T2DM. Poor access to screening as well increases the chances of having chronic complications in patients living with T2DM. Access to education and being followed up by a qualified health personnel are not associated to the occurrence of chronic complications. However, meeting a diabetologist for the disease reduces the chances of having chronic complications in patients living with T2DM.

Our findings indicate a high prevalence of chronic complications in patients living with T2DM at 39.1% in the DHD. This finding is relatively low, regarding the estimated value stated in a study in 2023 as 47.8% for Cameroon [3]. This is however high and within the range of IDF's predictions regarding the prevalence of chronic complications among T2DM patients in Cameroon (30%-70 %), for those presenting at least one chronic complication)[15]. However, this prevalence is similar to that obtained in 2017 by Gedebjerg et *al.*, which showed 35.8% chronic complications of diabetes among people living with T2DM [16]. Though these differences are highlighted, this prevalence remains within the range stated by the WHO and IDF [17].

The distribution of participants having access to education on T2DM was done based on the ADES earlier defined. Following the predefined variables, based on the scores set, analysis prove that 156 participants (73.5%) have good access to education on T2DM and its complications. Moreover, more participants are informed about T2DM (97.1%) as compared to its chronic complications (84.4%), which is a call for concern. These results indicate the diminished weight of access to education among people living with T2DM, especially regarding the educational content on chronic complications. Similar results were confirmed in a systematic review by Cunningham et *al.* in 2018 in America [18].

The distribution of participants having access to screening for complications was done based on the ASCS. Distributions according to the ASCS showed more participants presenting no chronic complications who do not have access to screening for complications (67.1% participants). These indicating that regular screening enables early diagnosis of complications, thereby facilitating control of these complications[19]. Furthermore, it is observed that patients who visit their health care provider 2 or more times a month are found mostly not to present chronic complications due to T2DM (66.5%). This suggests that infrequent contact with health services may limit access to early screening and intervention as seen in the study carried out by Fenton et *al.* on the frequency of visits by T2DM patients [12]. These strongly highlight the need for timely screening in each patient with DM, as it enables the patient to follow up his/her health condition and permits the health professional following them up, to easily track the progression of the disease [20-22].

The distribution of participants according to follow up by qualified health personnel was as well expressed based on the FQPS. Distributions according to the score showed less participants with chronic complications who were followed up by a qualified health personnel (26.8%), compared to those without complications (73.2%). This indicates the importance of quality follow up in patients living with T2DM, specifically by a qualified health personnel as defined earlier based on the variables included. More participants were as well followed up by a general practitioner (35.5%), as compared to other health personnel. These all tie with a study carried out by Arrieta et *al.* in 2014 which indicates that frequent visits to the hospital per year and being followed up by a general practitioner (≥4 times a year) reduces the occurrence of chronic complications in patients living with T2DM [23].

Multivariate analysis showed a significant association between the access to screening for complications and the occurrence of chronic complications. This concords with the study carried out in 2018 by Gopalan et *al.* indicating that, the more a patient visits the hospital for screening, the less the chances of having chronic complications [24]. There is however no statistically significant association between access to education and the occurrence of chronic complications, though it shows trends in the right direction. This is in accord with a study carried out by Cunningham et *al.* in 2018 that shows that education being necessary, is insufficient to reduce the occurrence of chronic complications on its own [18]. Being followed up by a qualified health personnel is not associated to the presence of complications in people living with T2DM. However, meeting a diabetologist for the disease reduces the occurrence of chronic complications in patients living with T2DM, as supported by a study carried out in 2014 by David M Nathan et *al.* in Ethiopia [25].

Limitations and Strengths of our study

Despite the pertinent results gotten, this study should be interpreted in light of some limitations. The size of the population was small, compared to other studies on similar topics. Efforts were therefore put in in order to go beyond the minimum estimated sample size for our study. Other limitations included fewer days of consultation for diabetes patients in the reference health facilities of the DHD which reduced the opportunity of meeting people living with T2DM. We therefore opted to be present at the health facility every day, not only on consultation days.

However, it is important to note that, the active and interactive participation of every patient in our study served as a great strength throughout, facilitating data collection and eventual reliable results.

Conclusion

This study revealed; four out of ten people living with T2DM in the DHD have at least one documented chronic complication due to T2DM. Seven out of ten people living with T2DM in the DHD have good access to education on T2DM and its chronic complications. Two out of ten people living with T2DM in the DHD have good access to screening for chronic complications. Two out of ten people living with T2DM in the DHD are being followed up by qualified health personnel. Access to screening for complications and follow up of patients by diabetologists are confirmed determinants of chronic complications in patients living with T2DM. In the light of our study, we acknowledge that addressing interventional needs in this context requires a complex approach involving the health care system and a strong community engagement. However, acting on the above determinants will definitely reduce the occurrence of chronic complications in patients living with T2DM in the DHD.

Abbreviations

ADES: Access to Diabetes Education

ASGS: Access to Screening for complications score

CC: Chronic Complication

CI: Confidence Interval

DHD: Dschang Health District

DM: Diabetes Mellitus

FQPS: Follow-up by a qualified Personnel Score

HbA1c: Glycated Hemoglobin

HIV/AIDS: Human immunodeficiency virus/acquired immunodeficiency syndrome

IDF: International Diabetes Federation

IQR: Interquartile Range

OR: Odd ratio

T2DM: Type 2 Diabetes Mellitus

WHO: World Health Organization

Declarations

- **Ethics approval and consent to participate:** We obtained ethical approval from the R**egional Ethics Committee for Human Health Research for the West Region**" (CRERSH-WE) (n° **346/27/05/2025/CE/CRERSH-OU/VP**). We conducted this study in strict compliance with the fundamental principles of scientific research in medicine (Helsinki principles). Signed informed consent obtained before recruitment.
- **Consent to Publish**: Not Applicable
- **Clinical trial number**: not applicable
- **Data and document availability:** The data that support the findings of this study are available from the corresponding author upon reasonable request.
- **Conflict of interest:** The authors state that they have no competing interests.
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- **Author contributions**: Design and implementation: KNF, SRSN, JA, SPC. Data collection: KNF, SRSN, DMDT, AZ, HMM, SUPD, BGK, BWM. Data analysis and interpretation: KNF, SRSN, JA, SPC. Manuscript writing: KNF, SRSN, CMT, SON, CNO. Manuscript revision: CMT, SPC, JA. All the authors read and approved the final version for publication.
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Tables

Table I : Sociodemographic characteristics of the study population

Variables	Categories	Frequency (212)	Percentage (%)
Sex	Female	145	68.4
	Male	67	31.6
Age	<40	6	2.8
	40-59	67	31.6
	60-89	131	61.8
	≥90	8	3.8
Marital status	Married	120	56.6
	Divorced	5	2.4
	Single	4	1.9
	Widow/widower	80	37.7
	Cohabitation	3	1.4
Education Level	No formal education	3	1.4
	Primary	88	41.5
	Secondary	100	47.2
	Higher education	21	9.9
Occupation	Unemployed	53	25.0
	Public sector	20	9.4
	Private sector	13	6.1
	Informal sector (self-employed)	107	50.5
	Student/Pupil	1	.5
	Retired	18	8.5
Average monthly income	High (>150.000 FCFA)	44	20.8
	Medium (50.000-150.000 FCFA)	75	35.4
	Low (<50.000 FCFA)	93	43.9

Table II: Distribution of participants according to the Access to Diabetes Education Score (ADES)

Variable	Frequency (%)		P value
	Chronic complication +	**Chronic complication-**	
Education availability	83 (39.1)	129 (60.8)	0.78
Education frequency	22 (73.3)	8 (26.7)	0.001
Affordability	83 (39.1)	29 (60.8)	0.002
Mode of delivery	20 (35.1)	37 (64.9)	0.45
Content covered	75 (41.9)	104 (58.1)	0.056
Language/cultural relevance	19 (34)	36 (66)	0.78
Delivered by trained personnel	02 (33.3)	04 (66.7)	/
Understanding confirmed	55 (34)	107 (66)	0.73
Total			
0-4	33 (58.9)	23 (41.1)	0.001
5-8	50 (32.1)	106 (67.9)	

Table III: Distribution of participants according to the ASCS

Variable	Modality	Frequency (%)		P value
		Chronic complication +	**Chronic complication-**	
A. Screening History	Eye exam (retinopathy screening in last 12 months)	70 (42.6)	94 (57.3)	0.031
	Foot exam (neuropathy screening in last 12 months)	02 (50)	02 (50)	/
	Kidney screening (urine microalbumin/creatinine in last 12 months)	77 (87.5)	11 (12.5)	0.001
	Cardiovascular screening (BP, lipids, ECG in last 12 months)	72 (45)	88 (55)	0.42
B. Service Access	Screening availability at patient's usual health facility	83 (39.1)	129 (60.8)	0.78
	Affordability of screening services	22 (59.1)	91 (73.3)	0.014
	Distance to screening (facility within 5 km or ≤30 min travel)	71 (45.5)	85 (54.5)	0.38
C. Continuity of Care	Regular follow-up for diabetes care (≥2 visits in last 12 months)	22 (73.3)	8 (26.7)	0.001
Total				
0-4	No access to screening	56 (32.9)	114 (67.1)	0.001
5-8	Access to screening	15 (35.7)	27 (64.3)	

Table IV: Distribution of participants according to the Follow up by a Qualified Health Personnel Score.

Variable	Frequency (%)		P value
	Chronic complication +	**Chronic complication-**	
Frequency of follow-up	22 (73.3)	8 (26.7)	0.001
Type of health personnel	65 (65)	35 (35)	0.016
Continuity of care	75 (41.9)	104 (58.1)	0.78
Documentation of care plan	83 (39.1)	129 (60.8)	0.002
Patient education received	55 (61.7)	34 (38.2)	0.005
Referral to specialist made	5 (16.6)	25 (83.3)	0.001
Total			
0-4	72 (42.1)	99 (57.1)	0.07
5-8	11 (26.8)	30 (73.2)	

Table V: Multivariate analysis for statistically significant variables

Variable	Modalities	Bivariate Analysis		Multivariate Analysis	
		OR_c [95% CI]	**p-value**	**OR_a [95% CI]**	***p*-Value**
Number of visits to the hospital per month	<2 visit	5.4 [2.2-12.9]	0.001	**3.8 [1.3-10.8]**	**0.01**
	≥2 visits				
How many times have you met any of the following for your diabetes?	12 and more				
	Less than 12	1.6 [0.9-2.9]	0.07	**2.1 [1.06-4.3]**	**0.03**
Have you ever met a diabetologist for your disease?	Yes	0.5 [0.2-0.8]	0.02	**0.46 [0.2-0.98]**	**0.04**
	No				
Do you think your health care provider helps you to prevent complications?	Yes				
	No	2.47 [1.2-4.7]	0.006	**2.2 [1.1-4.8]**	**0.03**
Age of diagnosis of T2DM	< 5 years				
	5–10years	2.5 [1.3-4.9]	0.005	1.6 [0.7-3.8]	0.24
	> 10 years	2.7 [1.1-6.1]	0.01	0.93 [0.3-2.7]	0.9
Chronic health conditions	No CC				
	1 CC	4.0 [2.1-7.3]	0.001	**5.3 [2.5-11.3]**	**0.001**
	≥ 2 CC	2.2 [0.6-7.9]	0.19	2.6 [0.5-12.2]	0.43
Access to education	0-4	3.04 [1.6-5.7]	0.001	2.06 [0.9-4.6]	0.08
	5-8				
Access to screening for complications	0-4	0.27 [0.13-0.55]	0.001	**0.18 [0.078-0.42]**	**0.001**
	5-8				
Follow up by qualified personnel	0-4	1.9 [0.9-4.2]	0.07	1.8 [0.7-4.8]	0.2

	5-8

ORc: Crude Odd Ratio. **ORa:** Adjusted Odd Ratio. **CI:** Confidence Interval **CC:** Chronic complications

Figures

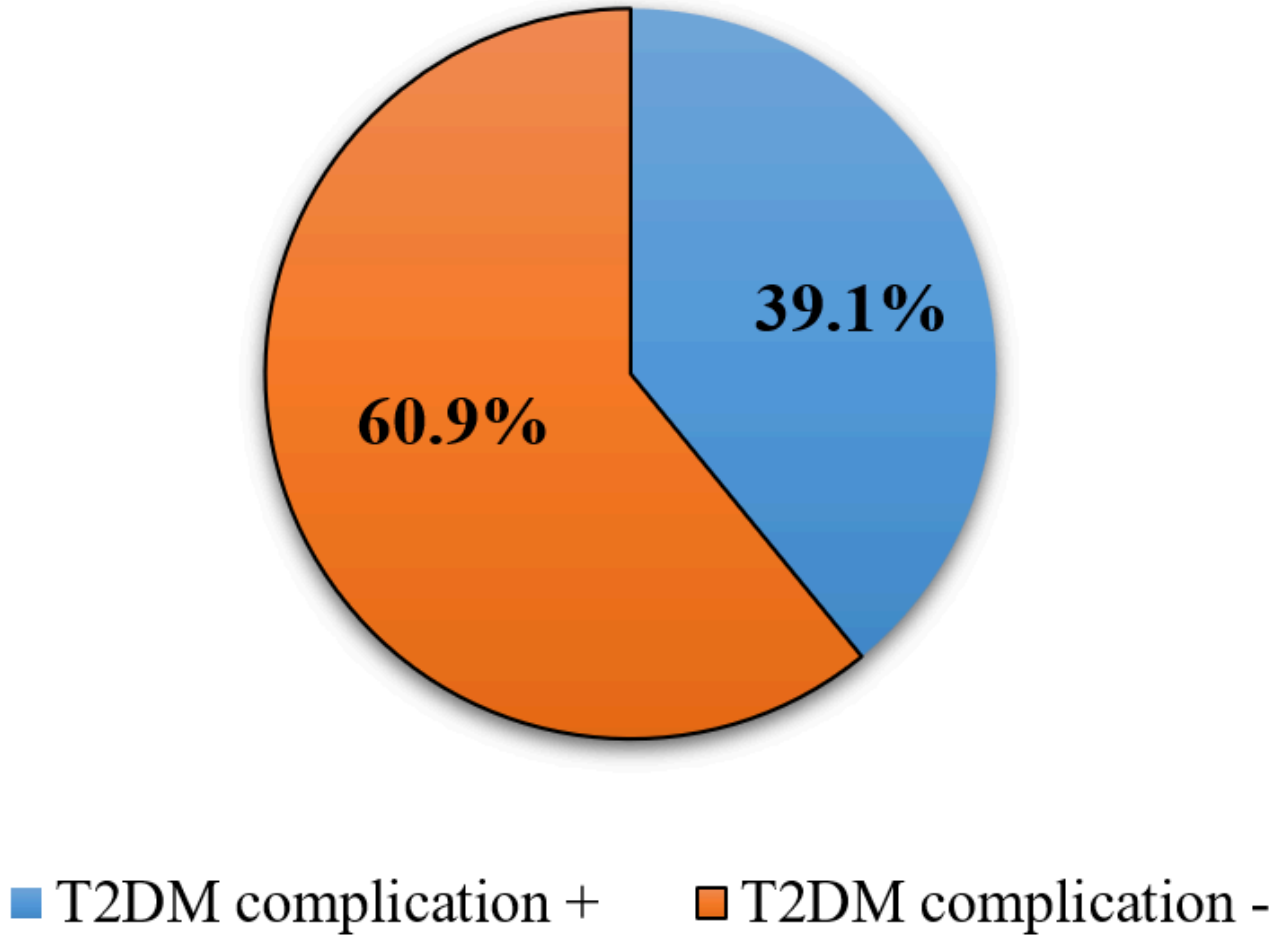


Figure 1

Prevalence of documented chronic complications of T2DM in the DHD.