# Evaluation of the Knowledge of Type 2 Diabetic Patients on Diabetes in the Endocrinology-Diabetology Department of the Yopougon University Hospital, Abidjan

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## ABSTRACT

The diabetic patient's knowledge of his pathology is an integral part of his care, and his training in this area has become a public health priority.

The objective of this study was to assess the knowledge of type 2 diabetic patients followed in the Endocrinology Department of the University Hospital of Yopougon. We carried out a cross-sectional and analytical descriptive study in 2019, in type 2 diabetic patients followed for at least one year who consented to participate in the study. Data were collected using a questionnaire designed for the study and administered by the investigators. A total of 137 patients were included, of which 68.7% were women. The overall level of patient knowledge was insufficient at 59%, 53.1% had a blood glucose meter and only 15.7% had already attended at least two therapeutic education sessions (TPE) conducted in the service. The threshold for defining diabetes was known in 17.7% of patients, signs of hyperglycemia were known in 70.6% of patients and signs of hypoglycemia were known in 53.1% of them. Chronic complications were known in 72.8% of patients. After multivariate logistic regression, the factors associated with a good level of knowledge were: possession of a blood glucose meter $p<0.01$, high school level $p<0.01$ and duration of diabetes $p=0.02$. The higher the school level or the older the diabetes, the better the level of knowledge was $p<0.01$.

## ARTICLE DETAILS

**KEYWORDS:** Diabetic patient's knowledge; blood glucose meter; high school level; duration of diabetes; University Hospital of Yopougon.

## INTRODUCTION

Diabetes is a chronic metabolic disease that poses a major public health problem due to its frequency, which has evolved exponentially in recent decades. Indeed, in 2019, according to the International Diabetes Federation (IDF), its prevalence worldwide was estimated at 463 million and by 2045 it would reach 700 million. In Africa it would increase from 19 million in 2019 to 47 million in 2045 (International Diabetes Federation., 2021). The complexity of this disease justifies the need to inform and educate patients so that they acquire knowledge and actively participate in their care. Lack of timely and personalized information can delay intervention and diminish motivation to improve patients' self-management of diabetes. In contrast, structured, team-based care (with a doctor, nurse, diabetes educator, or other healthcare professional) improves clinical outcomes compared to usual care (International Diabetes Federation., 2021). Although knowledge alone does not guarantee the behavioral changes required or effective self-management, the assessment of knowledge about diabetes is an important first step in identifying the gains and shortcomings of patients so that the information collected can be used in the design and implementation of actions to improve and adapt teaching programs for diabetics.

In Côte d'Ivoire, diabetes represents a major public health problem due to its high prevalence (6.2%), ie 700,000 people affected in the population (Agence Ivoirienne de Presse de Côte d'Ivoire, 2022)and complications of diabetes, are common causes of disability, early mortality and absence from work due to illness. Preventing complications would

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reduce disease-related mortality (Kouakou et al., 2016)and actions aimed at preventing diabetes and its complications remain the primary concern of practitioners.

No study going in the direction of evaluating the knowledge of diabetic patients had yet been carried out in Côte d'Ivoire and, like other developing countries, therapeutic education programs are poorly structured although several studies show that diabetes self-management education by the patient is effective on HbA1c levels (Warsi et al., 2004). We carried out a study with the objectives of determining the level of knowledge of type 2 diabetic patients followed at the Endocrinology-Diabetology Department of the University Hospital Center of Yopougon about their disease and to identify the factors associated with the good level of patient knowledge.

**MATERIALS AND METHODS**

The study took place within the consultation unit of the Diabetology Endocrinology Service (SED) of the Yopougon University Hospital in Abidjan. This was a cross-sectional, descriptive and analytical study over a period of 3 months from February 15 to May 15, 2019. We enrolled type 2 diabetic patients for at least a year, followed in the SED CHU YOP, and having given their oral and written consent to participate in the study. The SED is a service comprising 8 care and research units (USR). The therapeutic and dietary education USR is directed by two doctors from the department, assisted by one or more general practitioners assigned to the department who organizes dietary consultations and weekly collective education sessions by forming groups of 7 to 10 patients revolving around the clinic, complications, treatment, physical activity and nutrition of diabetics. These sessions are offered to all patients followed in the service. We recruited a number of patients limited to the feasibility of the study, taking care to offer the study to the majority of patients visiting the site during the study period. We collected the data using a pre-established questionnaire for the purposes of the study. We solicited patients in the consultation waiting room. Then, after having explained to them the interest of the study, we obtained or refused their consent. For patients who agreed to participate in the study, we collected the data ourselves using a face-to-face questionnaire, which was created specifically for the needs of the study based on questionnaires, SKILLD score and Michigan Diabetes Knowledge (Jeppesen et al., 2012; Meadows et al., 1988; Sunsoa, 2015)our questionnaire consisted of 23 questions related to: the definition of diabetes, its clinic, its complications, and drug treatment. The level of knowledge about diabetes was the primary endpoint. We determined the percentage of correct answer. Each of the correct answers was scored on a point and an overall score was calculated and expressed as a percentage. The patients were then classified in level of knowledge: Insufficient (<50%), Good (≥50%). Data were entered into Microsoft Office Excel 365®, then processed and analyzed using Stata Statistical Software: Release 14. College Station, TX: StataCorp LP.

**RESULTS**

1.  **Sociodemographic and clinical characteristics of the population**

The sociodemographic and clinical data of the population are shown in Table 1. Of 147 patients interviewed, 31.3% were men and 68.7% women. The average age was 54.9 years. School-going patients accounted for 70.8%. More than half of the population had an income of less than 60,000 CFA francs, which is the guaranteed interprofessional minimum wage in Côte d'Ivoire (SMIG). The French language was commonly spoken, more by men than by women with a significant difference.

The average duration of diabetes was 7.9 years, a family history of diabetes was found in 55.7% of patients. We noted 48.8% of patients on Oral Anti Diabetics. The average fasting blood sugar of the 128 patients who performed it was 159mg/dl with extremes of 77 and 448 mg/dl. Only 35.4% of patients had achieved HbA1c, which represents less than half of the sample, and these patients had an average HbA1c of 7.4%. Patients who had a blood glucose meter accounted for 53.1%.

**Table 1: Sociodemographic and clinical characteristics of the population**

|  | Total N=147 | (%) | Insufficient N=87 | (%) | Good N=60 | (%) | p-value |
|---|---|---|---|---|---|---|---|
| Sex |  |  |  |  |  |  | 0.65 |
| Man | 46 | 31.3 | 26 | 29.9 | 20 | 31.3 |  |
| Women | 101 | 68.7 | 61 | 70.1 | 40 | 66.7 |  |
| Educational level, n (%) |  |  |  |  |  |  | <0.01 |
| Unschooled | 43 | 29.2 | 39 | 44.8 | 4 | 6.7 |  |
| Primary | 30 | 20.4 | 22 | 25.3 | 8 | 13.3 |  |
| Secondary | 49 | 33.3 | 20 | 23.0 | 29 | 48.3 |  |
| University | 25 | 17.1 | 6 | 22.9 | 19 | 31.7 |  |
| Speak French fluently |  |  |  |  |  |  | <0.01 |
| Yes | 102 | 69.4 | 49 | 56.3 | 53 | 88.3 |  |

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| | n | % | n | % | n | % | p |
|---|---|---|---|---|---|---|---|
| Nope | 45 | 30.6 | 38 | 43.7 | 7 | 11.7 | |
| Monthly income*, n (%) | | | | | | | <0.01 |
| <60000 | 82 | 55.8 | 59 | 67.8 | 23 | 38.3 | |
| [60000-200000] | 41 | 27.9 | 22 | 25.3 | 19 | 31.7 | |
| >200000 | 24 | 16.3 | 6 | 6.9 | 18 | 30.0 | |
| Marital status | | | | | | | 0.05 |
| Single | 18 | 12.2 | 6 | 6.9 | 12 | 20.0 | |
| Married/Concubinage | 105 | 71.4 | 66 | 75.9 | 39 | 65.0 | |
| Divorce | 3 | 2.1 | 3 | 3.4 | 0 | 0.0 | |
| Widower | 21 | 14.3 | 12 | 13.8 | 9 | 15.0 | |
| Age groups | | | | | | | |
| <35 years old | 4 | 2.7 | | | | | |
| 35 – 50 years old | 39 | 26.6 | | | | | |
| 51 – 65 years old | 72 | 51.0 | | | | | |
| >65 years old | 29 | 19.7 | | | | | |
| ATCD fam diabetes | | | | | | | 0.33 |
| Yes | 82 | 55.8 | 48 | 55.2 | 34 | 56.7 | |
| Nope | 58 | 39.5 | 33 | 37.9 | 25 | 41.7 | |
| DK | 7 | 4.7 | 6 | 6.9 | 1 | 1.6 | |
| FTE support | | | | | | | 0.85 |
| Yes | 23 | 15.7 | 14 | 16.1 | 9 | 15.0 | |
| Nope | 124 | 84.3 | 73 | 83.9 | 51 | 85.0 | |
| Blood glucose meter | | | | | | | <0.01 |
| Yes | 78 | 53.1 | 34 | 39.1 | 44 | 73.3 | |
| Nope | 69 | 46.9 | 53 | 60.9 | 16 | 26.7 | |
| Duration of diabetes | | | | | | | 0.08 |
| 1-4 | 56 | 38.1 | 39 | 44.8 | 17 | 28.3 | |
| 5-10 | 45 | 30.6 | 26 | 29.9 | 19 | 31.7 | |
| >10 | 46 | 31.3 | 22 | 25.3 | 24 | 40.0 | |

## 2. Study of the level of knowledge

**Knowledge of the definition and clinical signs of diabetes**

Nearly half of the patients (49%) did not know the blood sugar value defining diabetes mellitus, 88.4% of the patients knew that it was an anomaly linked to an increase in blood sugar and 53 .1% knew that obesity and overweight favored the onset of diabetes. Signs of hyperglycemia were cited by 79.6% of patients and 20.4% of patients knew no signs of hyperglycemia. The most cited signs were polyuria and polydipsia.

**Knowledge of patients about complications and diabetes**

Almost half of the patients 46.9% did not know any sign of hypoglycaemia and concerning the chronic complications, 27.2% of the patients did not know any complication. Ocular, renal complications and amputation were the most known. Erectile Dysfunction (ED) was only known by 13.8% of patients.

**Knowledge about the drug treatment of diabetes**

In our population 61.2% of patients knew their treatment. Traditional therapy would be effective in the treatment of diabetes for 46.3%.

For 34.9% of patients, when the diabetes was balanced, they could do Ramadan fasting, unlike 47.2% who knew that fasting is prepared a few weeks before the start of the fasting period with the attending physician even in good health. glycemic balance. In a situation of normal glycaemia, the drug treatment could be interrupted according to 14.3% of the patients. Only 19% of patients knew that in case of hypoglycaemia one should take 3 squares of white sugar corresponding to 15g but most said that one should take soda or any other sugary drink without mentioning the quantity to consume.

**Global Patient Knowledge**

The overall level of our study population was good at 41% and insufficient at 59%.
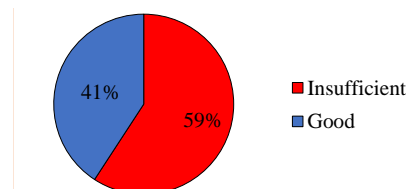


**Figure 1: Distribution of patients according to the overall knowledge score**

Adjusted for the other variables, only school level, possession of a blood glucose meter and duration of diabetes were associated with a good level of knowledge. The level of knowledge increased significantly with the level of study, the seniority of diabetes and the possession of a blood glucose

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meter. The higher the educational level, the more the patient was likely to have a good level of knowledge and if the patient did not have a blood glucose meter, he was less likely to have a good level of knowledge. These results are shown in Table 2.

**Table 2: Factors associated with a good level of knowledge in bivariate analysis**

|  | ORa | 95% CI | P |
|---|---|---|---|
| Sex (vs. man) |  |  |  |
| Feminine | 2.51 | 0.82-7.7 | 0.10 |
| Age | 0.99 | 0.95-1.04 | 0.97 |
| School level (Vs unschooled) |  |  |  |
| Primary | 3.41 | 0.84-13.75 | 0.08 |
| Secondary | 14.49 | 4.11-51.02 | <0.01 |
| Superior | 53.54 | 9.16-312.73 | <0.01 |
| Blood glucose meter (vs yes) |  |  |  |
| Nope | 0.30 | 0.12-0.70 | <0.01 |
| Duration of diabetes (Vs 1-4) |  |  |  |
| 5-10 | 2.41 | 0.83-6.96 | 0.10 |
| >10 | 3.35 | 1.15-9.77 | 0.02 |

**DISCUSSION**

The methodological limits of our study are the size of the sample, the non-evaluation of attitudes and practices, the mode of collection based on self-reported data by the patients themselves, the validity of which remains questionable.

The strengths of our study lie in the fact that we asked the questions ourselves to the patients, which encouraged an exchange and allowed them a greater richness of expression than if the questionnaire had been administered to them in writing. This study provides a first insight into the knowledge of type 2 diabetic patients about diabetes at SED CHU YOP, which had not been studied before. These results open up other questions and other avenues of research.

It is no longer to be demonstrated that the knowledge of patients suffering from chronic diseases about their disease considerably reduces the progression of the disease, the occurrence of complications, and improves the quality of life of patients.(Brown, 1988) (8) .

The threshold value of fasting blood glucose allows the diagnosis of diabetes. In our study, 51% of patients knew this threshold value. Abdelaziz A Ben et al in Tunisia also found that half of the patients had a correct notion of the definition(ben Abdel Aziz et al., 2007) (9) . These insufficiencies could be explained by the fact that at the time of the diagnosis the doctors did not think that the concept of threshold value of definition of the disease was necessary for the patient and consequently, they did not endeavor to explain these Notions. Furthermore, the lack of knowledge of the definition of diabetes by the nursing staff, in this case general practitioners, the first actors when the disease is diagnosed, can also justify the poor level of knowledge of the patients. Also, when the diagnosis is announced, patients are more concerned about their pathological state and the outcome of treatment, so they focus more on retaining the target glycemic

balance values than the glycemia value allowing to make the diagnosis of diabetes. This information could be better integrated during awareness campaigns for prevention. Our results therefore suggest the realization of continuous training for GPs and nursing staff as well as the structuring of therapeutic education programs for diabetic patients.

Polyuria and polydipsia were the most cited signs because polyuria was the most troublesome sign for patients at the time of their diagnosis and according to the literature it is the polyuro-polydipsia syndrome which dominates the symptomatology in type 2 diabetes.(Monabeka and Moyen, 1999) (10) .

Chronic complications are generally known in 79.6% of cases. The most cited complications are ocular and renal complications and amputation. This can be explained by the seriousness of these lesions which constitute an obsession for all diabetic patients, namely blindness, renal failure and amputation. Bahru et al, on the other hand, found that knowledge of chronic complications was mediocre compared to other areas (Bahru and Abdulkadir, 1993). The item on erectile dysfunction due to diabetes generated a high proportion of "don't know". All as in Leneuf's study in Paris (Leneuf, 2017). However, this complication is much better known in men than in women. This can be explained by the difficult experience of men faced with this situation.

The signs of hypoglycaemia were unrecognized by 46.9% of the patients. The majority of patients said they had never been informed of the signs of hypoglycaemia. These results are close to Sahli in Morocco who also found in a T2D population that the signs of hypoglycaemia were known by 50% of the patients (Sahli et al., 2014). The lack of information may explain this low rate of knowledge of the signs of hypoglycaemia but also the fact that our patients are mostly on ADO, in this case metformin, the first molecule used in the

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treatment of T2DM, which remains an antihyperglycemic agent by therefore not causing hypoglycaemia.

Regarding the factors associated with the good level of knowledge, the possession of a blood glucose meter, the school level, and the seniority of diabetes significantly increased the level of knowledge, but only 53.1% of our patients had a blood glucose meter, which is explained by the socio-economic level of our sample, which is considered low with more than half of the population having an income below the minimum wage, we can therefore think that facilitating access to the blood glucose meter glycemia but above all the use of the latter could improve the overall level of knowledge of our populations.

As in our study, Bahru et al also found a link between high school level and good level of knowledge (Bahru and Abdulkadir, 1993), indeed the literacy rate of our sample was 66.4% with more than 30% of patients having a secondary level. However, a message adapted to uneducated populations must be planned, because 43.6% of our patients had not been to school. Other authors also found that a low level of education, an absence of mastery of the French language, were associated with a lower level of knowledge (Hamdi et al., 2016; Mosnier Pudar et al., 2011), 63.4% of the patients spoke the French language fluently although this does not guarantee a mastery of the latter.

Assal et *al* have shown that patients receiving regular information on diabetes tend to have a better level of knowledge with ultimately better glycemic control.(Assal et al., 1997; Moodley and Rambiritch, 2007) Although the link between participation in therapeutic education sessions and a good level of knowledge has not been studied, the fact remains that according to the literature, a good level of knowledge requires regular monitoring and good education. We found no association between the level of knowledge and age Hamdi et al found that the older the patients were, the less they had a good level of knowledge (Hamdi et al., 2016).

## CONCLUSION

This study allowed us to quantify the lack of knowledge of type 2 diabetics followed at the SED CHU YOP with regard to their health problem. Therefore, it is essential to promote therapeutic education adapted to our context, considering the inadequacy of our human and financial resources. Furthermore, it would be appropriate to strengthen the training of doctors and other health personnel in the field of therapeutic education.

## FUNDING

## AUTHORS' CONTRIBUTIONS

NPZNG is the main author, designed the study and developed the protocols. NB collected and analyzed the data. JDK participated in the development of protocols. YA wrote and corrected the manuscript. KD reviewed and made the necessary editorial corrections to the manuscript. JA supervised this work and definitively approved the submission of the revised version. All authors have read and approved the final version.

## ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The study protocol was carried out in accordance with the Helsinki declaration. No name or clue that could reveal the identity of the patient has been written on the pre-established technical sheet to guarantee confidentiality and all records have been kept in a safe place.

## ACKNOWLEDGEMENTS

## CONFLICTS OF INTEREST

The authors have no conflicts of interest to declare.

## REFERENCES

I. Agence Ivoirienne de Presse de Côte d'Ivoire, 2022. Leader de l'information de proximité de Côte d'Ivoire [WWW Document]. Agence Ivoirienne de Presse de Côte d'Ivoire. URL https://www.aip.ci/ (accessed 11.20.22).

II. Assal, J.-P., Jacquemet, S., Morel, Y., 1997. The added value of therapy in diabetes: The education of patients for self-management of their disease. Metabolism 46, 61–64. https://doi.org/10.1016/S0026-0495(97)90320-6

III. Bahru, Y., Abdulkadir, J., 1993. Assessment of Diabetes Education in the Teaching Hospital, Addis Ababa, Ethiopia. Diabetic Medicine 10, 870–873. https://doi.org/10.1111/j.1464-5491.1993.tb00183.x

IV. ben Abdel Aziz, A., Thabet, H., Soltane, I., Gaha, K., Gaha, R., Tlili, H., Ghannem, H., 2007. Knowledge of patients with type 2 diabetes about their condition in Sousse, Tunisia. EMHJ-Eastern Mediterranean Health Journal, 13 (3), 505-514, 2007.

V. Brown, S.A., 1988. Effects of educational interventions in diabetes care: a meta-analysis of findings. Nurs Res 37, 223–30.

VI. Hamdi, S., Kammoun, I., Haouat, E., Kandara, H., ben Salem, L., ben Slama, C., 2016. Évaluation des connaissances sur le diabète chez des patients diabétiques déséquilibrés. Ann Endocrinol (Paris) 77, 512–513. https://doi.org/10.1016/j.ando.2016.07.793

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VII. International Diabetes Federation., 2021. IDF Diabetes Atlas., 9th ed. International Diabetes Federation, Brussels, Belgium.

VIII. Jeppesen, K.M., Hull, B.P., Raines, M., Miser, W.F., 2012. A Validation Study of the Spoken Knowledge in Low Literacy in Diabetes Scale (SKILLD). J Gen Intern Med 27, 207–212. https://doi.org/10.1007/s11606-011-1900-9

IX. Kouakou, A.Y.F., Kamagaté, A., Yapo, A.P., 2016. Complications du Diabète en Côte d'Ivoire chez les Patients Diagnostiques Tardivement. European Scientific Journal, ESJ 12, 250. https://doi.org/10.19044/esj.2016.v12n27p250

X. Leneuf, C., 2017. Connaissances sur le diabète des patients diabétiques de type 2 consultant en médecine générale à Paris (These). Université Paris Descartes, Paris.

XI. Meadows, K.A., Fromson, B., Gillespie, C., Brewer, A., Carter, C., Lockington, T., Clark, G., Wise, P.H., 1988. Development, Validation and Application of Computer-linked Knowledge Questionnaires in Diabetes Education. Diabetic Medicine 5, 61–67. https://doi.org/10.1111/j.1464-5491.1988.tb00943.x

XII. Monabeka, H.G., Moyen, G., 1999. Aspects épidémiologiques et évolutifs du diabète sucré de l'enfant et l'adolescent au Congo. Med Afr Noire 46, 359–361.

XIII. Moodley, L., Rambiritch, V., 2007. An assessment of the level of knowledge about diabetes mellitus among diabetic patients in a primary healthcare setting. South African Family Practice 49, 16–16d. https://doi.org/10.1080/20786204.2007.10873652

XIV. Mosnier Pudar, H., Gaillard, É., Portal, S., Rozier, F., Besson, V., Jean, D., Boutet, C., Waterlot, C., 2011. Diabète Éducation de Langue Française, in: Journal du DELF (Ed.), SANTE EDUCATION.

XV. Sahli, A., Chadli, A., el Aziz, S., Farouqi, A., 2014. Évaluation des connaissances des patients diabétiques sur leurs diabètes à propos de 200 cas. Ann Endocrinol (Paris) 75, 383. https://doi.org/10.1016/j.ando.2014.07.378

XVI. Sunsoa, H., 2015. Statements to Assess Diabetes Knowledge (SADK) Questionnaire Used for Non-South-Asian Patients with Type 2 Diabetes - 'Can one Shoe fit all'? J Diabetes Metab Disord Control 2. https://doi.org/10.15406/jdmdc.2015.02.00055

XVII. Warsi, A., Wang, P.S., LaValley, M.P., Avorn, J., Solomon, D.H., 2004. Self-management Education Programs in Chronic Disease. Arch Intern Med 164, 1641. https://doi.org/10.1001/archinte.164.15.1641