

# Knowledge of Diabetes Mellitus in the Population of Upscale Neighbourhoods of Abidjan and Their Lifestyle in a Context of Epidemiological Transition, Côte d'Ivoire, 2019

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**Abstract:** As in other parts of the world, the frequency of diabetes in tropical areas is steadily increasing, and primarily concerns type 2 diabetes. The prevalence is expected to increase from 1.1% in 1995 for the sub-Saharan African population to 1.3% in 2025. It seemed appropriate to us to carry out this study to assess the level of knowledge of diabetes by the heads of household living in the posh cities of the commune of Cocody. We conducted a cross-sectional study that took place in 5 posh cities of the commune of Cocody in Abidjan from December 2018 to March 2019, i.e. a period of 04 months. During the 4 months of data collection, 145 person agreed to participate in the study. The 28-35 age group was the most represented (33,8%) with a male predominance (sex ratio = 1.3), a predominantly higher level of education (82.8%). They had three or fewer children (84,0%). The subjects regularly consumed alcohol (45.5%) or soda (76.6%) and were not physically active (58%), observed no dietary restriction (77.2%), and had tested their blood sugar at least once (44.4%). A correct definition of diabetes was reported (95,1%). They knew of diabetes: at least one sign in 34.7% of cases, at least one complication in 23.6% of cases and at least one risk factor in 31.3% of cases. Adults were the most at risk (49.4%). The respondents' good knowledge of signs, complications and risk factors contrasted with their risky lifestyle habits.

**Keywords:** Knowledge, Diabetes, Cocody

## 1. Introduction

Non-communicable diseases (NCDs) are making an epidemiological breakthrough around the world.

Increasingly, these diseases tend to take hold in developing countries [1, 2]. In Côte d'Ivoire, 31% of deaths that occur are attributable to non-communicable diseases and are mainly related to poor diagnosis and treatment. There are high prevalences and incidences of NCDs and their risk

factors with 30.9% for hypertension, 14.6% for smoking, 5.19% for diabetes, 7.9% for obesity [millogo]. These high prevalences and risk factors are most often linked to insufficient preventive and promotional actions [3]. Diabetes mellitus, one of the non-communicable diseases, is, according to the International Diabetes Federation (IDF/IDF) [4] and the World Health Organization (WHO) [5], a major public health problem due to its morbidity and mortality, especially in the active population [6]. The medical, social and human costs are significant, hence the urgent need to implement appropriate and coordinated diabetes mellitus care and prevention strategies in health programmes [7]. The prevalence of diabetes mellitus in Côte d'Ivoire was estimated at 5.7% in 1979 [8]. Alone or associated with other vascular risk factors (age, obesity, sedentary lifestyle, dyslipidaemia...) [9], the epidemic progression of diabetes, particularly in developing countries, makes it urgent to put in place adapted prevention strategies. A reliable inventory is essential to guide such prevention, screening and care actions, especially as we are in an epidemiological transition [10]. The issue of diabetes has been the subject of numerous studies and publications [7, 11]. However, the general population's knowledge of this phenomenon is not sufficiently addressed. It therefore seemed appropriate to us to look at this aspect of the subject through a study. The study involved people from affluent backgrounds, known to be at the highest risk of diabetes [2]. We set ourselves the objective of assessing the knowledge of residents of the upscale cities of Abidjan about diabetes in order to contribute to the reduction of the incidence of this disease.

## 2. Methods

We conducted a cross-sectional study from December 2018 to March 2019 in the commune of Cocody. This commune is located in Abidjan, the economic capital and most populous city of Cote d'Ivoire with an estimated population in 2014 of 4395243 inhabitants according to the general census of the population and housing [12]. This study took place in five posh housing estates in the commune of Cocody, chosen for convenience. We did so because the residents of the towns of Cocody have practically the same standard of living. The selected cities were: ATCI, Génie 2000, Laurier 9, ORIBAT and SIR.

The sample size to be investigated was calculated from the Schwartz formula:

$$n = z^2 pq / i^2$$

$n$  = sample size.

$p$  = proportion of subjects with an average level of knowledge about diabetes in the 2016 Ethiopia study by Kassahaun T and col=20,1% [13].

$q = 1 - p = 1 - 0,2 = 0,8$

$z = 1.96$  for an  $\alpha$ -error risk of 0.5.

$i$  = statistical precision set at 0.05.

Thus,  $n = 1.96^2 \times 0.2 \times 0.8 / 0.05^2 = 246$ .

The figure obtained by the calculation was increased by

5% to take account of non-respondents, giving a size of 258 persons. Thus, a minimum of 258 people should be surveyed. For the determination of the persons to be surveyed, a two-stage sample design was used, including:

*First stage:* selection of households to be surveyed.

From the main entrance to each housing estate, we selected 26 households on the right and 26 households on the left. The first household found on both sides was considered the number 1 household. The remaining households were selected by contiguity.

*Seconde stage:* selection of person to be surveyed.

In the households, heads of households were interviewed according to the following criteria:

*inclusion criteria:* any head of household who gave free and informed consent to participate in the survey.

*non-inclusion criteria:* any health worker or known diabetic person.

The data was collected with a questionnaire. The data collected was entered and processed using SPSS.20 software. Quantitative variables were expressed as position parameters and qualitative variables as proportions.

*Ethical considerations*

We obtained verbal informed consent from the heads of households. Confidentiality was maintained by assigning an anonymity number to each survey form. The favourable opinion of the various directors of trustees of the selected cities allowed us to start our activity.

## 3. Results

Of the 145 heads of households interviewed, the majority were male (57.9%), i.e a sex ratio (M/F) of 1,38. The 28-35 age group was the most represented (33,8%). Most of them had a higher educational level (82%) and 71% of them worked in the private sector. Monthly income was not reported in 73.1% of cases. Our respondents were of Christian faith (81.4%), were married in 47.6% of cases and they had three or fewer children (84,0%) (table 1). Of the respondents, 99.3% had heard of diabetes.

The channel of information was: audiovisual media (27.0%), relatives or friends (25.8%), health workers (20.0%), numeric social networks (15.0%) and the written press (12.2%). Almost all respondents were able to define diabetes well (95%). Diabetes was considered a serious disease for most (93.0%) and was hereditary (40%). Less than half of the subjects surveyed had tested their blood sugar once (44.0%). Also, the signs of diabetes (65.3%), complications (76.4%) and risk factors (66.0%) were well known. The disease is not curable (43%) and affected all social classes (90,3%). However, adults and the elderly were at risk of developing diabetes mellitus (72.3%). The majority of respondents stated that diabetes was not linked to any fate (76.0%) and had people with diabetes in their family circle (57.0%). (Table 2). The respondents did not use tobacco in 96% of cases, but 45.5% used alcohol and 76.6% consumed soda regularly, i.e. 1 to 5 times a day in 77.5% of cases. In our study, the majority of household heads did not observe dietary

restrictions (77,2%). Our respondents were active in sports in (68,9%) (Table 3).  
42% of cases with a frequency of less than 3 times a week

**Table 1.** Socio-demographic characteristics.

|                                   | number | percentage (%) |
|-----------------------------------|--------|----------------|
| Sex (n=145)                       |        |                |
| Female                            | 61     | 42,1           |
| Male                              | 84     | 57,9           |
| Age group (years old)(n=145)      |        |                |
| 28 à 35                           | 49     | 33,8           |
| 36 à 40                           | 30     | 20,7           |
| 41 à 54                           | 35     | 24,1           |
| 55 à 75                           | 31     | 21,4           |
| Profession (n=145)                |        |                |
| Public servant                    | 42     | 29,0           |
| Private/liberal                   | 103    | 71,0           |
| Level of school education (n=145) |        |                |
| Primary                           | 7      | 4,8            |
| Secondary                         | 18     | 12,4           |
| Superior                          | 120    | 82,8           |
| Religious confession (n=145)      |        |                |
| Christian                         | 118    | 81,4           |
| Muslim                            | 23     | 15,9           |
| Others                            | 4      | 2,7            |
| Marital status (n=145)            |        |                |
| Married                           | 69     | 47,6           |
| Concubinage                       | 45     | 31,0           |
| Single                            | 25     | 17,2           |
| Others                            | 6      | 4,2            |
| Monthly income (n=145)(CFAF)      |        |                |
| 422.000 to 1.000.000              | 23     | 15,9           |
| 1.000.000 to 2.000.000            | 10     | 6,9            |
| 2.000.000 to 5.000.000            | 06     | 4,1            |
| Not filled in                     | 106    | 73,1           |
| Number of children (n=131)        |        |                |
| 0 to 3                            | 110    | 84,0           |
| 4 to 8                            | 21     | 16,0           |

**Table 2.** Household heads' knowledge of diabetes.

|  | Number | percentage (%) |
|--|--------|----------------|
| <i>Heard about diabetes (n=145)</i>                      |        |                |
| Yes  | 144    | 99,3           |
| No   | 1      | 0,7            |
| <i>Information channel (n=145)</i>                       |        |                |
| Audio/visual media                                       | 106    | 27,0           |
| Relative/friend  | 101    | 25,8           |
| Health worker  | 78     | 20,0           |
| Digital social networks                                  | 59     | 15,0           |
| Written press  | 48     | 12,2           |
| <i>Definition of diabetes (n=144)</i>                    |        |                |
| Good definition  | 137    | 95,1           |
| Incorrect definition                                     | 7      | 4,9            |
| <i>Blood glucose testing (n=144)</i>                     |        |                |
| Yes  | 64     | 44,4           |
| No   | 80     | 55,6           |
| <i>Knowledge of people with diabetes (n=144)</i>         |        |                |
| Yes  | 100    | 69,4           |
| No   | 44     | 30,6           |
| <i>Relationship to the known diabetic person (n=100)</i> |        |                |
| Yes  | 57     | 57,0           |
| No   | 43     | 43,0           |
| <i>Diabetes is a serious disease (n=144)</i>             |        |                |
| Yes  | 134    | 93,0           |
| No   | 10     | 7,0            |
| <i>Diabetes is a hereditary disease (n=144)</i>          |        |                |
| Yes  | 57     | 40,0           |

|  | Number | percentage (%) |
|--|--------|----------------|
| No   | 36     | 25,0           |
| No idea  | 51     | 35,0           |
| <i>Signs of diabetes (n=144)</i>                   |        |                |
| Good knowledge                                     | 94     | 65,3           |
| Insufficient knowledge                             | 50     | 34,7           |
| <i>Complications of diabetes (n=144)</i>           |        |                |
| Good knowledge                                     | 110    | 76,4           |
| Insufficient knowledge                             | 34     | 23,6           |
| <i>Risk factors for diabetes (n=144)</i>           |        |                |
| Good knowledge                                     | 95     | 66,0           |
| Insufficient knowledge                             | 49     | 34,0           |
| <i>Diabetes is a curable disease (n=144)</i>       |        |                |
| Yes  | 41     | 28,0           |
| No   | 62     | 43,0           |
| No idea  | 41     | 28,0           |
| <i>Diabetes is a spell-related disease (n=144)</i> |        |                |
| Yes  | 4      | 3,0            |
| No   | 109    | 75,0           |
| No idea  | 31     | 22,0           |
| <i>People at risk for diabetes (n=144)</i>         |        |                |
| Children   | 3      | 2,0            |
| Young people                                       | 8      | 5,6            |
| Adults   | 71     | 49,4           |
| Elderly people                                     | 33     | 22,9           |
| No idea  | 29     | 20,1           |
| <i>Social strata at risk of diabetes (n=144)</i>   |        |                |
| Comfortable class                                  | 13     | 9,0            |
| Non-affluent class                                 | 1      | 0,7            |
| Both classes                                       | 130    | 90,3           |

Table 3. Lifestyle.

|  | Number | Percentage (%) |
|--|--------|----------------|
| <i>Alcohol consumption (n=145)</i>                 |        |                |
| Yes  | 66     | 45,5           |
| No   | 79     | 54,5           |
| <i>Tobacco consumption (n=145)</i>                 |        |                |
| Yes  | 6      | 4,0            |
| No   | 139    | 96,0           |
| <i>Soda consumption (n=145)</i>                    |        |                |
| Yes  | 111    | 76,6           |
| No   | 34     | 23,4           |
| <i>Daily frequency of soda consumption (n=111)</i> |        |                |
| 1 à 5  | 86     | 77,5           |
| 6 à 10   | 18     | 16,2           |
| >10  | 02     | 1,8            |
| <i>Dietary restrictions (n=145)</i>                |        |                |
| Yes  | 33     | 22,8           |
| No   | 112    | 77,2           |
| <i>Sports practice (n=145)</i>                     |        |                |
| Yes  | 61     | 42,0           |
| No   | 84     | 58,0           |
| <i>Frequency of physical activity practice</i>     |        |                |
| Less than 3 times per week                         | 42     | 68,9           |
| More than 3 times per week                         | 10     | 16,4           |
| 3 times per week                                   | 08     | 13,1           |
| Do not remember                                    | 01     | 1,6            |

## 4. Discussion

### 4.1. Difficulties in Collecting Data and Limitations of the Study

We announced 258 people as the sample size. After regular visits to the various selected housing estates over a

period of four months (December 2018 to March 2019) to collect the questionnaires, we were indeed able to exploit 145 of them. The people we met regularly turned us down. Therefore, of the 145 usable forms, not all items were always properly filled in. It is not excluded that some people are prevaricating on certain issues to embellish their image.

#### 4.2. Sociodemographic Characteristics

The predominance of males (sex ratio =1.38M/F) among the heads of households in our study could be explained by the socio-cultural realities of African societies. Indeed, the role of head of household is traditionally assigned to men in such societies. Our study took place in the town of Cocody. This commune is the preferred place of residence of people holding high administrative, political and economic positions in Côte d'Ivoire. Since some positions require a higher level of education, it seems logical that the majority of people living in Cocody are of this level (82%). The geographical location of the commune of Cocody and the high level of education of the heads of households explain the predominance of Christians (81.4%). Indeed, the south of Côte d'Ivoire concentrates the highest proportion of Christians and educated people in the country. The 2013 demographic and health survey confirms the results of our study. The 2013 Demographic and Health Survey confirms the results of our study [14].

#### 4.3. Knowledge of Diabetes

Accessibility, large numbers, and affordable acquisition costs of audiovisual media make them the main information channels, especially in urban areas. It is therefore not surprising that these media deal with many issues, including diabetes. In India, Rathod B. *et al.* [15] reported that audiovisual media was the main source of information for the population (32%). Also, the high level of school education would have the advantage of sharpening the intellectual curiosity of the heads of household on many diseases. In Burkina Faso, Millogro *et al.* found that 96.3% of people had ever heard of diabetes. [3]. Unlike a condition like HIV, which always raises the issue of morals, society is more comfortable talking about diabetes. As the majority of householders have acquaintances with diabetes (69,4%), it seems logical that they should obtain information about the condition from them. In a study in Senegal, Dime, exposed all the communication around diabetes by the entourage [2].

The high educational level of household heads may explain their ability to give a correct definition of diabetes and to know the risk factors, signs and complications. This proportion of correct definition was comparable to that provided in the Alassani study (87%) [11]. Notwithstanding this correct definition of the disease, less than half of the respondents had tested their blood glucose once (44.0%). Indeed, although almost all of them have heard of diabetes, they would not feel directly concerned by this disease. Also, routine health check-ups are not common in African societies, especially since our subjects were probably in apparent good health. Rathod B [15] in India, in a similar study, reported a similar rate of blood glucose testing in the population. The Christian religious confession of the heads of household could explain their non-belief in the supranatural nature of diabetes (76.0%). Alassani [11] in his study in Benin reported that more than half of the people attributed the

occurrence of diabetes to witchcraft or bewitchment. Our respondents' view of the disease, that diabetes only affects adults and the elderly, needs to be improved as diabetes affects all ages as noted by International Diabetes Federation (IDF) in its ATLAS 2017 [4].

#### 4.4. Lifestyle

Information and awareness campaigns on the health hazards of tobacco consumption are fairly regular and multifaceted. This is not necessarily the case for alcohol and soda. A priori, the consequences of tobacco consumption seem to be better understood by heads of household who have a high level of education. This range of arguments could explain the low smoking rate among the heads of households surveyed (4%). The 2013 Demographic and Health Survey found that people living in urban areas, people with a high level of education, people with a high level of economic activity consumed less tobacco [14]. The high purchasing power generates gastronomic cravings marked by regular consumption of alcohol and soda. Yao [16], reported a rate of alcohol consumption substantially identical to ours. Maintaining a high standard of living makes demands that compromise regular physical activity. Indeed, the search for positive results in professional activities does not leave enough time for regular physical activity. Malathy *et al.* in India [10] and Adem *et al.* in Ethiopia [7] reported 47.8% and 66.4% respectively of diabetic patients participating in physical activities. In our study, most heads of household did not observe dietary restrictions. The regular consumption of alcohol and soda combined with a sedentary lifestyle marked by a lack of regular physical activity and the absence of dietary restrictions put heads of household at risk. These health risks are mainly increased by the possibility of overweight or even obesity [17] with its corollary diseases such as diabetes. Dime [2] and Millogro and *al* [3] noted this lifestyle in their studies. However, it must be acknowledged that the likely apparent good health of the heads of household interviewed could justify their lack of particular precautions in their lifestyle.

### 5. Conclusion

The residents of the posh housing estates of the Cocody commune, probably because of their higher level of education, had a fairly good knowledge of the signs of diabetes, the risk factors and its complications. However, they had lifestyle habits that put them at risk of developing the condition. This situation should be better explored to alleviate the burden of non-communicable diseases, with diabetes mellitus at the top of the list.

### Conflict of Interest

All the authors do not have any possible conflicts of interest.

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