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Prevalence of Diabetes and Other Cardiovascular Risk Factors in Patients Received at the COVID-19 Screening Center of Donka University Hospital, Guinea

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Abstract

The aim of this study was to determine the prevalence of diabetes and other cardiovascular risk factors (smoking, obesity and high blood pressure) and to evaluate the WHO Global Cardiovascular Risk Score in the population of people suspected of COVID-19 infection aged 40 years or older. Material and Methods: This was a descriptive cross-sectional study conducted at the Donka University Hospital from June 1 to July 4, 2020 on subjects received for COVID-19 screening. Results: The prevalence of diabetes in patients suspected of COVID-19 was 7.8% comprising 1.2% of known diabetics and 6.8% of new cases. The prevalence of active smoking was 14.0%. That of sedentary lifestyle and obesity were 10.6% and 17.2% respectively. We found a prevalence of hypertension estimated at 45%, it was unknown in 76.47% of cases. In this series, 33.2% of patients had a high and very high cardiovascular risk (WHO scores). Conclusion: This study reveals a fairly high prevalence of diabetes and other cardiovascular risk factors in the population of people suspected of COVID-19. This observation should lead to the implementation of effective strategies for the prevention of non-communicable diseases in Guinea.

Keywords

Diabetes, Risk Factors, COVID-19, Cardiovascular Risk Score

1. Introduction

Diabetes mellitus is a major global health problem that causes serious morbidity and mortality. The International Diabetes Federation has projected that the number of diabetic patients will reach 380 million by 2025, eventually reaching 439 million by 2030 [1]. In Guinea, diabetes and other NCDs are major public health problems that are growing over the years. Estimates of the prevalence of diabetes were 5.2% among subjects aged 25 to 64 years in 2009 according to the STEPS survey conducted in Conakry and Lower Guinea. During the same survey it appeared that 74.3% of diabetes cases were not diagnosed and among known cases of diabetes, the majority were not treated. 50 to 70% of patients are unaware that they have diabetes [2]. Diabetes and high blood pressure are diseases that have become common in Guinea with very high admission rates in existing care structures: health centers, prefectural hospitals, Donka and Ignace Deen University Hospitals. The prevalence of hypertension was 62.5% in the 44 to 64 age group in the Steps survey in 2009. In this study, 75.8% of hypertensive participants were not detected before the survey and only 34.9% of those known to be receiving treatment with 16.3% who were at target control levels [3] Smoking, alcoholism, a sedentary lifestyle and excessive salt consumption are the contributing factors to these diseases.

Despite this increasing prevalence of diabetes and hypertension in Guinea, the provision of care is mainly at the tertiary level (university hospitals and national hospitals) and partially in insufficient quality at the secondary level. Outlines of units to combat these diseases have been set up in regions with few qualified human resources. A field survey carried out in the structures showed that these diseases affect all age groups and cause high mortality in hospitals linked to the difficulty of management (diagnosis and treatment). It also showed that on average 13% of hospital activities (consultation, hospitalization and referrals) are linked to non communicable diseases (NCDs), one in four cases of consultations for NCDs is referred to the secondary and/or tertiary levels and 17% of these diagnosed NCDs die before the age of 60 [4]. Decentralization of NCD care provision by strengthening capacities at primary and secondary levels is necessary.

Diabetes mellitus has been shown to be associated with an increased risk of hospitalization for infectious diseases [5]. Most people who develop COVID-19 have a mild, non-severe illness. However, about 20% of patients develop severe COVID-19 requiring hospitalization, including 5% who are admitted to the intensive care unit (ICU) [6]. Based on available data, diabetes may not increase the risk of SARS-CoV-2 infection [6]. Nevertheless, diabetes mellitus is an independent predictor of

admission to intensive care unit or invasive ventilation or death from COVID-19 [7]. It is also recognized that viral infections as environmental factors can play a role in the onset, maintenance, or exacerbation of metabolic disorders observed during diabetes [8].

Considering With the increase in COVID-19 cases in Guinea, with more and more infected people presenting comorbidities such as hypertension and diabetes, it is crucial to identify people likely to develop a severe form of COVID-19 and who could require hospitalization, particularly in intensive care [9].

The lack of data on diabetes and cardiovascular risk factors in the population of subjects suspected or confirmed to be infected by COVID-19 in our country and the concern to contribute for sure to improve and optimize the management of cases of COVID-19 or even improve their prognosis motivated the present research with the following objectives: to determine the prevalence of diabetes and other cardiovascular risk factors (smoking, obesity and high blood pressure) in the population of people suspected of COVID-19 infection at the COVID screening center of Donka University Hospital and to evaluate the WHO Global Cardiovascular Risk Score in the population suspected of COVID-19 aged 40 years or older.

2. Materials and Methods

This was a descriptive cross-sectional study conducted at Donka University Hospital from June 1 to July 4, 2020 on subjects received for COVID-19 screening. We collected data on a consecutive population of men and women received for consultation at the study site. Information regarding the reason for the study with informed consent was required for each patient. Data were collected at the study site by a local investigator trained for this purpose. Sociodemographic data, reason for admission, personal and family history, lifestyle, cardiovascular risk factors, clinical parameters, COVID-19 test results and outcome of COVID-19 treatment were sought and analyzed. The diagnosis of diabetes mellitus was based on the diagnostic criteria of the International Diabetes Federation.

The data were analyzed using SPSS software in its version 22.0.

3. Results

3.1. Diagram of the Study

The diagram below shows the patient inclusion flow (**Figure 1**).

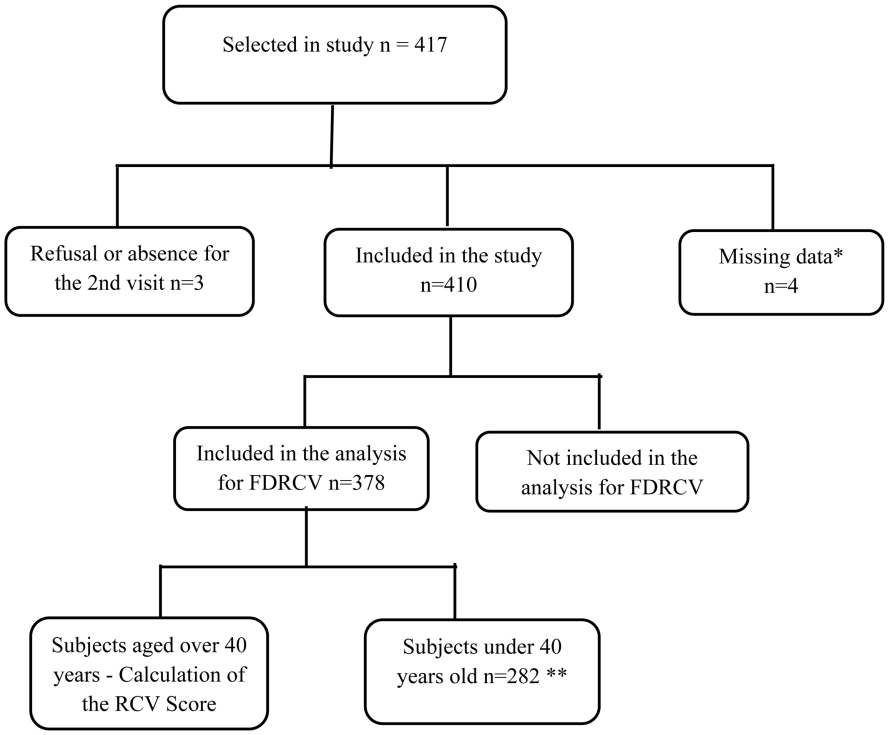
3.2. Description of the Population Studied

The average age of the patients was 33.38 ± 17.05. The male gender was the majority (66.6%) with a sex ratio of 1.98. The majority of patients came from the Conakry region with 85%.

3.3. Prevalence of Diabetes in the Population of People Suspected of COVID-19 Infection in Donka

The prevalence of diabetes increases with age. It was in the adult population (20 -

65 years old) of 7.8% compared to 13.04% in subjects aged over 65 years. The mean blood sugar level was 0.99 g/l (± 0.245). We referred three (3) cases of hyperglycemia of more than 2.5 g/l (one with a ketonuria cross) to the Diabetology department of the Donka University Hospital (Table 1).



*Several missing data including age (n = 2), blood sugar (n = 2) and COVID-19 test result (n = 3). **We did not calculate the cardiovascular risk score in those under 40 years of age, which is the minimum age considered by the WHO. This concerned 36 children and 282 adults under 40 years of age. FDRCV = Cardiovascular Risk Factors; RCV = Cardiovascular Risk.

Figure 1. Diagram of subjects included in the survey.

Table 1. Prevalence of diabetes by gender.

	Diabetes (%)	No diabetes (%)	Total (%)
Men	26 (6.3)	247 (60.3)	273 (66.6)
Women	6 (1.5)	131 (31.9)	137 (33.4)
Total	32 (7.8)	378 (92.2)	410 (100)

3.4. Prevalence of Cardiovascular Risk Factors (Smoking, Sedentary Lifestyle, Obesity and High Blood Pressure) in the Population of People Suspected of COVID-19 Infection in Donka

The prevalence of smoking, physical inactivity, obesity and high blood pressure was 14%; 10.6%; 17.2% and 45%, respectively.

3.5. Evaluation of the WHO Global Cardiovascular Risk Score in the COVID-19 Suspect Population

The overall cardiovascular risk in our series was low in 33.6% versus 34.4% who had an average risk. 33.2% of subjects were credited with a high and very high cardiovascular risk.

4. Discussion

The prevalence of type 2 diabetes is increasing sharply in all countries of the world, even taking on epidemic proportions in some developing countries. The results of this study reveal that the prevalence of diabetes in patients suspected of COVID-19 was 7.8% comprising 1.2% of known diabetics and 6.8% of new cases, there were 26 men and 06 women. The types of diabetes were not differentiated, but it was probably type 2 because of the presentation of symptoms, the age of onset, all cases were found in adults and the elderly. This rate is higher than the rates found during the WHO Steps survey in Guinea (2009) which was 5.4% in the general population (6). This could be explained by the galloping urbanization of our cities which evolves over the years which leads to changes in the lifestyle of the populations but also by the context of stress around the COVID-19 test during this epidemic.

In Dakar, Mbaye A. *et al.* in 2017 reported a similar prevalence of diabetes of 7.2%. In their study diabetes was more common in men (9.2%) than in women (6.6%) without statistical difference ($p = 0.096$). This could be explained by the approximate similarities among African communities [10].

The prevalence of diabetes increases due to increasing age. The prevalence of diabetes in the adult population was 7.8% compared to 13.04% in the elderly. This prevalence was 12.5% in the COVID-19 population. There was no significant difference between this prevalence if the patient was positive for COVID-19 or not ($p = 0.972$). The presence of a COVID infection does not appear to increase the risk of diabetes [9].

The present study carried out several years after the Steps survey shows a prevalence of HBP estimated at 45%, higher than those reported in the WHO Steps survey in 2009 (29.9%) and slightly higher than the survey carried out in Foutah Djallon which found 43.6% of hypertensive [7] [11]. This is slightly lower than that found in Algeria (64.5%) in 2013 [12] and similar to that found by A. Mbaye in Senegal in 2017 (46.4%). This prevalence of hypertension was higher in men with 47.3%. It was unknown to the subjects in 76.47% of cases. This lack of awareness may be linked to the silent nature of the disease's progression and the tendency of our populations to only resort to health facilities in the presence of complications. 21.2% of subjects had age as a cardiovascular risk factor. This prevalence of age was associated in univariate and multivariate analysis with the occurrence of diabetes in our population ($p < 0.000$).

In our study, the prevalence of obesity was 17.2%. This high prevalence of obesity may be due to the westernization of the lifestyle of our communities. Marked by the change in the dietary lifestyle, the increase in sedentary behavior and the

low practice of physical activity. This prevalence was lower than that found by A. Yahia-Berrouiguet in Algeria who found 32.0% obesity [13]. It was more common in women ($p < 0.000$). This female predominance of obesity could be explained mainly by being overweight, which is seen as an aesthetic criterion or a sign of social success in our societies, as S. Pessinaba *et al.* point out in their study in St. Louis, Senegal in 2013: "Obesity and overweight are a sign of health and prosperity, particularly in women." [14].

The prevalence of active smoking was 14.0% in our study. This prevalence is higher than that found in the WHO Steps survey in Guinea in 2009 which found 11.3% smoking. It is more common in men (13.2%) than in women (0.8%) as shown by most studies in developing countries [15]. This low prevalence of active smoking could be explained by our socio-cultural context which prohibits the use of tobacco in general and particularly among women.

In our series the percentage of sedentary subjects was 10.6%. This physical inactivity affects more men without significant difference (7.9% vs. 2.6%; $p = 0.299$)

This study showed a high prevalence of cardiovascular risk factors, including hypertension, obesity, smoking and sedentary lifestyle, particularly in men. Hypertension (BP ≥ 140/90 mmhg) and obesity (BMI ≥ 30 kg/m^2) were associated in univariate analysis with the occurrence of diabetes respectively ($p < 0.006$ and $p < 0.009$). This suggests an increase in cardiovascular diseases in the coming decades. These data should prompt an urgent and imperative reconsideration of dietary habits and lifestyle in the hope of reducing the frequency of these morbid conditions and the risk of cardiovascular morbidity and mortality.

The tool The WHO global risk score assessment model was the one used in this study [13]. This model is recommended for countries that do not have models adapted to their population. We did not take systolic blood pressure for children which were taken into account for the assessment of the global cardiovascular risk score. By calculating total cardiovascular risk, we hope to give a better estimate of individual risk, and also a better reflection of the health service implications of cardiovascular risk factors [16]. We did not find a statistically significant difference not only between cardiovascular risk with gender ($p = 0.502$) but also with COVID-19 status ($p = 0.179$).

This assessment allowed primary prevention, which is generally reserved for potentially healthy subjects as in this study. The result of the assessment of this total risk was used to make treatment decisions or to carry out patient education. In terms of education, 68% of subjects received education on healthy eating, 62.8% on physical activity and 16% on smoking cessation. After this assessment, 5.3% of patients received a statin prescription and 5% received antiplatelet treatment.

The introduction of medical treatment for the management of risk factors such as high blood pressure, diabetes and high risk of cardiovascular events was part of the benefits of this study. Regarding high blood pressure, 8.29% benefited from calcium channel blockers, 7.6% from ACE inhibitors, 1.5% from ARAA2, 0.3% from beta blockers and 7.1% from a combination of antihypertensive.

5. Conclusion

Our study reveals a fairly high prevalence of diabetes and other cardiovascular risk factors in the population of people suspected of having COVID-19. This observation should lead to the implementation of effective strategies for the prevention of non-communicable diseases in Guinea. Through screening for diabetes and cardiovascular risk factors, combined with individual assessment of cardiovascular risk in the population and even more so in people at risk.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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