

Associated Factors of Overweight among Public Service Officials within the City of Porto-Novo in 2019

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Abstract Introduction: Globally, there is an increasing concern about obesity as a public health issue. It has emerged as one of the world's non-infectious pandemics. The aim of the present study was to determine the factors associated with overweight among public officials in the city of Porto-Novo, Benin, in 2019. **Methods:** This cross-sectional and analytical study was carried out from January to February 2019. It covered all public officials in 13 utilities chosen by simple random selection from the 26 in the city of Porto-Novo. Data collected by observation and administration of a questionnaire were analyzed using STATA 14 software. Overweight (overweight and obesity) was the dependent variable, defined as a body mass index greater than or equal to 25kg/m². Associated factors were identified by bivariate and multivariate analysis, at a 5% threshold of significance. **Results:** A total of 230 officials were surveyed, with a male/female sex ratio of 1.55. Out of these, 45.65% were of normal weight and 3.94% lean; 28.26% were overweight and 22.15% obese (i.e., 13.48%, 5.65% and 3.04% moderate, severe and morbid obesity respectively). The prevalence of overweight was therefore 50.41%. Associated factors were gender, age and lunchtime. **Conclusion:** Notwithstanding the biological factors identified, efforts to combat overweight among public officials are essential. This will involve awareness-raising with a view to changing behavior on unidentified modifiable factors to which workers are exposed.

Keywords Overweight, Obesity, Public Services, Porto-Novo

1. Introduction

Non-communicable diseases, including overweight and obesity, kill 41 million people every year, accounting for 71% of deaths worldwide [1].

Once considered a problem in high-income countries, obesity and overweight are now increasing dramatically in low- and middle-income countries [2]. Obesity is a major public health concern worldwide. It is a well-known risk factor for a range of chronic health issues such as cardiovascular disease, type 2 diabetes and some cancers [3]. Not only do these diseases result in a reduced quality of life due to their chronic nature, but they also lead to serious complications and premature death [4].

According to the World Health Organization (WHO), from 1975 to 2016, the prevalence of obesity almost tripled worldwide, with more than 1.9 billion adults over the age of 18 overweight and over 650 million obese. WHO estimates that in 2016, around 39% of the world's adult population (39% of men and 40% of women) were overweight and 13% (11% of men and 15% of women) were obese [5].

Based on the 2015 STEPS survey in Benin, 23.2% of people were overweight and 7.4% obese. Within the county of Ouémé there was a prevalence of 30.8% for overweight and 5.9% for obesity [6].

Obesity in professional settings is just as worrying. Indeed, Koffi et al. found a prevalence of 38.1% among workers at the Autonomous Port of Abidjan [7], while in Cameroon, Etoundi Ngoa et al. reported 37.0% in hotel environments, including 57% among kitchen workers [8].

The prevalence of overweight is increasing in both high-income and low- and middle-income countries. Numerous factors are involved, and data differ by measuring tools. Several studies carried out worldwide reveal that overweight is associated with factors such as gender, age, educational level, consumption of sugary foods and alcoholic beverages, snacking, stress, lack of regular exercise, air conditioning, and family history of obesity [9].

In Benin, Ministry of Health interventions in the fight against non-communicable diseases remain very weak, apart from the STEPS surveys recommended by the WHO, carried out periodically. As the situation remains alarming, efforts are needed to reduce the prevalence of Noncommunicable diseases (NCDs) [10].

Almost no information is available on the extent of overweight and obesity among office workers, which puts them at risk of becoming sedentary, and on the factors that can influence their weight status in Benin. Such information needs to be gathered in order to combat this disease effectively. What is the prevalence of overweight among public officials in Porto-Novo? What are the associated factors? This research was initiated to answer these questions. The aim was to study the factors associated with being overweight among public service officials in the city of Porto-Novo, Benin in 2019.

2. Materials and Methods

2.1. Study Framework

The study took place within the public services of the city of Porto-Novo, the administrative capital, located in the south of Benin. Its population, predominantly female (52.54%), is estimated at 2,643,717, of which 90.46% are aged 0-49 and 9.54% over 50. The main income-generating activities in Porto-Novo are trading, agriculture, transport and the provision of services (the civil service) [11].

The city of Porto-Novo is home to all the decentralized services of the public administration, as well as those of the Departmental Directorates of the main ministries, for a total of 26 utilities [11].

2.2. Type of Study

This cross-sectional, descriptive, and analytical study was performed from January 21 to February 28, 2019.

2.3. Study Population

The study population was made up of public service officials in the city of Porto-Novo in 2019. Workers who were at least 18 years old and had given their consent were included in the study. Sick or convalescent workers, workers with oedema, and pregnant or breastfeeding women were not included.

2.4. Sampling

➤ *Selecting utilities*

By simple random sampling, half of the public services in the city of Porto-Novo were selected from the numbered list of 26 utilities obtained from the county prefecture of Ouémé

➤ *Selecting respondents*

The selection of respondents was exhaustive. In each of the 13 public services chosen, all eligible workers were enrolled.

2.5. Variables

Two types of variables were studied: the dependent variable and the independent variables.

The dependent variable was overweight, defined as a Body Mass Index (BMI) greater than or equal to 25kg/m².

The independent variables were grouped into several factors:

- ✓ Socio-demographic characteristics (gender, age, education, religion, marital status);
- ✓ Professional factors (profession, position held, job stress, type of contract);
- ✓ Socio-economic factors (monthly income);
- ✓ Family history (overweight parents, hypertensive parents, diabetic parents);
- ✓ Physical activity factors (physical activity, level of physical activity, type of physical activity, frequency of physical activity, gym or club membership);
- ✓ Behavioral factors (alcohol consumption, tobacco consumption, consumption of sweetened beverages);
- ✓ Eating habits (diet, consumption of canned food, use of bouillon cubes, use of salt, consumption of frozen food, consumption of fruit and vegetables, number of meals per day, dinnertime, snacking);
- ✓ Health-related factors (weight, height in meters, waist circumference in centimeters, blood pressure, stress, blood sugar levels);
- ✓ Attitudes (number of hours of sleep, air conditioning, fattening practices);
- ✓ Knowledge of overweight (causes, risks associated with overweight, perception of entourage regarding overweight).

2.6. Collection Tools and Techniques

Data were collected by questionnaire survey and

observation, using a form and an observation sheet respectively.

Height was measured in centimeters (cm) using a measuring tape.

Weight was measured in kilograms using a well-calibrated HANA personal scale, with the needle set to zero, the subject in a standing position, unclothed (no belt, scarf, etc.), and without shoes. To measure waist circumference in cm, a well-graduated tape measure was used. It was placed above the navel, at around 2 to 3 cm for women and 2 cm for men.

Blood pressure was taken twice at three-minute intervals on a bare arm using an OMRON electronic sphygmomanometer in a subject who had been seated at rest for at least five minutes. The second reading was considered.

2.7. Treatment and Data Analysis

Data were entered using Epi Data version 3.1 and analyzed using STATA 14.

The analysis was split into a descriptive and an analytical phase.

➤ *Descriptive phase*

In this phase, central tendency and dispersion parameters were used to describe the sample.

Body Mass Index (BMI), calculated as the ratio of weight (kg)/height² (m²), was classified into six modalities: underweight (less than 18.5); normal weight (18.5-24.9); overweight (25-29.9); moderate obesity (30-34.9); severe obesity (35-39.9); morbid obesity 40 and over.

Physical activity was classified into two modalities: low-intensity activity (less than 30 minutes per day); and vigorous-intensity activity (more than 30 minutes per day).

Tobacco consumption was defined as occasional or regular smoking.

Public officials with systolic blood pressure ≥ 140 mmHg and/or diastolic blood pressure ≥ 90 mmHg were considered hypertensive.

➤ *Analytical phase*

The dependent variable was overweight: BMI greater than or equal to 25kg/m², involving all modalities of overweight and obesity. Factors associated with overweight were investigated by bivariate and multivariate analysis.

For bivariate analysis, Pearson's Chi-2 or Fisher's exact test was used, depending on the conditions. The strength of the association between dependent and independent variables was measured by the odds ratio (OR) and its 95% confidence interval (95% CI), at a 5% significance level. Multivariate analysis consisted of top-down stepwise logistic regression. All variables with a p-value of less than 20% at the end of the bivariate analysis were included in the initial model. The adequacy of the final model was verified by Lemeshow's test at a p-value greater than 5%.

2.8. Ethical Concerns

Once the administrative managers had authorized data collection, the officials in each selected service were briefed on the study's objectives and procedures, their free choice to take part in the study, and the possibility of withdrawing without prejudice. All respondents gave verbal informed consent before being interviewed. Anonymity and confidentiality were assured during data collection and analysis.

3. Results

A total of 230 workers were surveyed, with an average age of 39.41 ± 10.38 years and a male/female sex ratio of 1.55.

3.1. Sample Description

➤ *Socio-demographic characteristics*

The socio-demographic characteristics of the sample are shown in Table 1 below.

Table 1. Socio-demographic characteristics of public service officials in the city of Porto-Novo in 2019 (n=230)

Variables	Frequency	%
Sex		
Male	140	60.87
Female	90	39.13
Age		
Under 30	43	18.7
[30 - 40]years	67	29.13
[40-50] years old	78	33.91
Over 50 years old	42	18.26
Education level		
Primary	12	5.22
Secondary	60	26.09
University	158	68.70
Religion		
Christianity	188	81.74
Islam	20	8.70
Traditional	8	3.48
Other	14	6.09
Marital status		
Married	143	62.17
Cohabiting	40	17.39
Single	44	19.13
Divorced/Widowed	3	1.30

The sample is mostly married, male, 40-50 years old, Christian.

➤ **Health and lifestyle characteristics**

These characteristics are summarized in Table 2. None of the respondents smoked.

Sweetened beverage consumption habits are summarized in Figure 1, from which it emerges that around four out of ten respondents consume sweetened beverages, even during meals.

Table 2. Distribution of public service officials by health and lifestyle characteristics, Porto-Novo, 2019 (n=230)

Variables	Frequency	%
Hypertension		
No	178	77.39
Yes	52	22.61
Waist circumference		
Normal	156	67.83
Abdominal obesity	74	32.17
Family history of overweight		
Yes	76	33.04
No	135	58.70
Don't know	19	8.26
Family history of hypertension		
Yes	115	50.00
No	100	43.48
Don't know	15	6.52
Family history of diabetes		
Yes	52	22.61
No	170	73.91
Don't know	8	3.48
Consumption of alcoholic beverages		
Yes	149	64.80
No	81	35.20
Physical activity		
Yes	220	95.65
No	10	4.35
Intensity of physical activity		
Low	64	27.73
Sustained	166	72.27
Daily consumption of fruit and vegetables		
No fruits and vegetables	45	19.57
Less than five fruits and vegetables	160	69.57
More than five fruits and vegetables	5	10.87

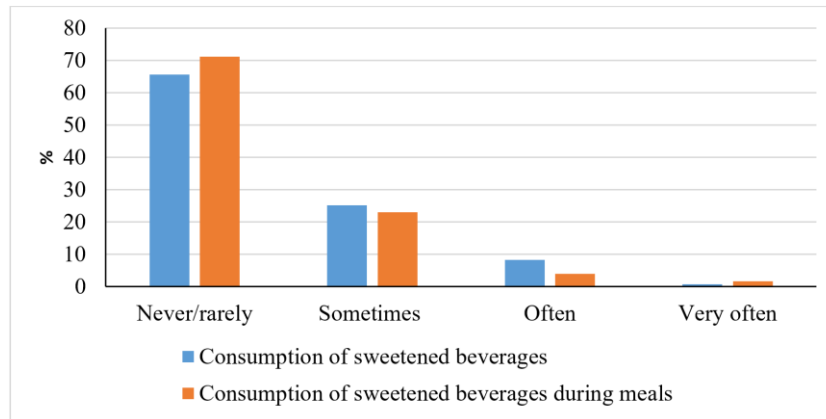


Figure 1. Distribution of public service officials by consumption of sweetened beverages, Porto-Novo, 2019 (n=230)

3.2. Knowledge of the Causes and Risks of Obesity

This is shown in Figure 2 below.

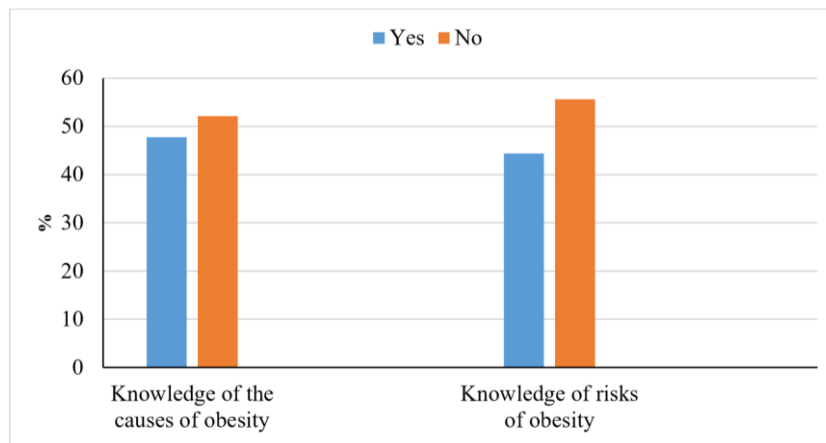


Figure 2. Distribution of public service officials according to their knowledge of the causes and risks of obesity, Porto-Novo, 2019 (n=230)

This figure shows that less than half of respondents know the causes of obesity and its risks.

3.3. Prevalence of Overweight

Figure 3 below shows the distribution of respondents according to their BMI.

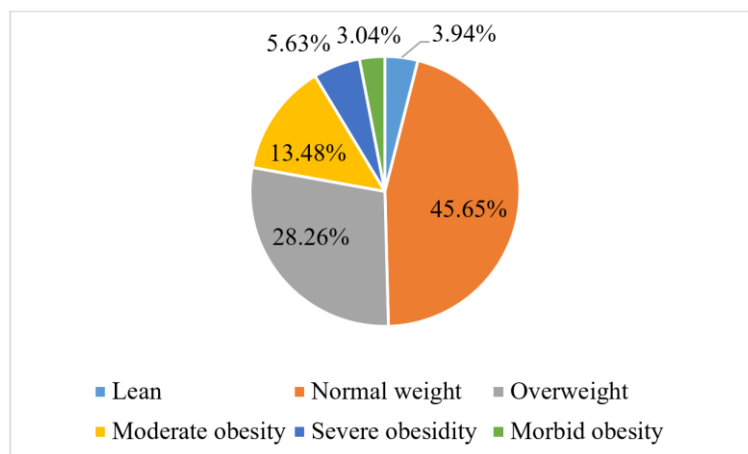


Figure 3. Distribution of public service officials in the city of Porto-Novo according to Body Mass Index (BMI), 2019 (n=230)

This figure shows that 45.65% of respondents had a normal weight, 3.94% of respondents were lean, 28.26% overweight and 22.15% obese (moderate, severe, and morbid obesity). The prevalence of overweight was therefore 50.41%.

3.4. Associated Factors to Overweight

➤ *Bivariate analysis*

Table 3 below shows the factors associated with being overweight, following the bi-variate analysis.

Table 3. Factors associated with overweight among public service officials according to bivariate analysis, Porto-Novo, 2019 (n=230)

Variables	Overweight		P-value
	Yes n (%)	No n (%)	
Socio-demographic characteristics			
Sex			
Male	56 (48.28)	84 (73.68)	< 0.001
Female	60 (51.72)	30 (26.32)	
Age			
Under 30	15 (12.93)	28 (24.56)	0.030
[30 - 40]years	30 (25.86)	37 (32.46)	
[40-50] Years	47 (40.52)	31 (27.19)	
Over 50 years old	24 (20.69)	18 (15.79)	
Transport used to go to work			
Bus / car	38 (32.76)	24 (21.05)	0.040
Motorcycle	76 (65.52)	83 (72.81)	
On foot	2 (1.72)	7 (6.14)	
Office air conditioning			
Yes	69 (59.48)	50 (43.86)	0.020
No	47 (40.52)	64 (56.14)	
Satisfaction with the current form			
Yes	39 (33.62)	75 (65.79)	<0.001
No	77 (66.38)	39 (34.21)	
Desire to lose or gain weight (n=116)			
Lose weight	113 (97.40)	58 (51.28)	<0.001
Gain weight	3 (2.60)	56 (48.72)	
Snacking on sweet foods			
Yes	97 (83.61)	108 (94.44)	0.040
No	19 (16.29)	6 (5.56)	
Dinner time			
6-7:30 p.m.	7 (6.03)	11 (9.65)	0.002
8-10 p.m.	85 (73.28)	97 (85.09)	
After 10 p.m.	24 (20.69)	6 (5.26)	

➤ *Multivariate analysis*

The final logistic regression model is presented in Table 4 below.

Table 4. Factors associated with overweight among public service officials; final logistic regression model, Porto-Novo, 2019 (n=230)

	OR adjusted	IC at 95 %	P-value
Sex			
Male	1		
Female	3.34	[1.79; 6.23]	< 0.001
Age			
Under 30	1		
[30 – 40] years	2.08	[0.87; 4.99]	0.10
[40-50] Years	4.25	[1.79; 10.09]	0.001
Over 50 years old	3.45	[1.31; 9.07]	0.012
Dinner time			
6-7:30 p.m.	1		
8-10 p.m.	1.19	[0.41; 3.41]	0.748
After 10 p.m.	4.00	[1.00; 15.96]	0.049

4. Discussion

4.1. Overweight

Our results corroborate those of Dionadji et al [12] among health professionals at the National Reference General Hospital in Djamena (overweight 28.80%) and Bita Fouda et al [13], among workers in small and medium-sized enterprises in the city of Douala (obesity 23.40%). But this comparison would be more objective if it took into account certain characteristics of the populations compared.

The prevalence of overweight among officials working in public services of the city of Porto-Novo (50.41%) is higher than the 30.8% reported by the STEPS survey in 2015 for the county of Ou é to which the city of Porto-Novo belongs [6]. We believe this large difference is justified. The STEPS survey results represent a departmental average, taking into account a large sample size, different socio-professional categories, different sectors of activity, and several towns; whereas the present study concerns a single sector of activity predisposing to sedentariness, and therefore to overweight.

On the other hand, the difference may reflect the upward trend in overweight that is rampant in the pandemic. Indeed, worldwide, the prevalence of obesity rose from 8.7% in 2000 to 13.1% in 2016, and this increase spares no continent [14].

In Benin, according to the 2015 STEPS survey, 23.2% (men 19.1% and women 27.2%) of the population was overweight [6].

This is an alarming situation, given that being

overweight is a breeding ground for a number of chronic diseases (including cardiovascular disease, cancer, diabetes, endocrine and metabolic disorders). Moreover, obesity increases the risk of maternal complications (arterial hypertension, pregnancy, gestational diabetes) and fetal complications (malformations, macrosomia) [15]. However, the general public still seems to be unaware and unconcerned. In the present study, in which almost 95% had secondary or university education, less than half were aware of the causes and risks of obesity.

The cultural perception of being overweight in Africa may contribute to this misunderstanding. Being overweight is a symbol of family well-being, which is why overweight people are accorded a certain magnanimity because they eat well. This may explain why, in our sample, 33.62% of overweight workers were satisfied with their stature.

This lack of awareness leads to unhealthy lifestyles (diet, exercise) which are conducive to overweight, against a backdrop of sedentary lifestyles linked to the sector in which they work. The great majority of respondents said they were physically active, but only 23.18% practiced on a regular basis. The fight against being overweight must include a communication plan to change people's behavior.

4.2. Associated Factors to Overweight

The three factors (gender, age, and dinner time) selected as associated in the final model are consistent with data from several community surveys. Benin's STEPS survey in 2015 indicated 19.1% overweight in men versus 27.2% in women [6]. Furthermore, the 2017-2018 demographic and health survey objectified that the percentage of women aged 15-49 presenting an overweight or obese state increases with age, varying from 7% at 15-19 years to 42% at 40-49 years [16].

These results corroborate those of several studies, such as Fezeu et al in Cameroon [17], Koffi and al in Ivory Coast [7] Hamidou et al [18], Dovonou [19] and Bita Fouda et al [13].

Female gender as a risk factor for being overweight could be explained by the fact that women are more numerous in sectors of activity that tend to be sedentary (shopkeepers, manual workers, secretaries), and that they are also more prone to physical inactivity. But in the study of El Ghouddany in Maroc the age groups of 40-50 years and 50-60 years represent a maximum BMI [20].

Late lunchtime was tentatively associated with overweight in the present study. Perhaps with a larger waistline, there would be a clear association.

Beyond these factors retained for analysis, our sample presents the main characteristics favoring overweight, even if their association in the present study is not statistically significant.

In addition to biological and hereditary factors, the energy imbalance between calories consumed and expended plays an important role in obesity and overweight, because if the body takes in more than it expends, it stores

part of the intake in the form of fat in adipose tissue [21]. In our sample, 61.50% spent the working day without physical exertion, the majority (78.70%) ate two to three meals a day, 19.57% no fruit or vegetables, 57.83% snacked on sugary foods between meals, and 64.8% consumed alcoholic beverages. Snacking was identified as a factor associated with obesity among adolescents in Benin town in 2017 [22]. Given all these conditions, it's only natural that the prevalence of overweight is so high.

Like these workers, many others are probably in the same situation. As being overweight is a risk factor for several non-communicable diseases, reducing it is a major challenge for achieving Sustainable Development Goal.

5. Conclusions

Public service officials are overweight for several reasons: the sedentary nature of their work, biological factors, and, above all, modifiable behavioral factors. Communication-based interventions for behavior change on modifiable factors, based on dietary and lifestyle hygiene are required.

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