Scientific Research Publishing

World Journal of Cardiovascular Diseases, 2019, 9, 511-523
http://www.scirp.org/journal/wjcd
ISSN Online: 2164-5337
ISSN Print: 2164-5329

Epidemiological Profile of Obesity among Health Staff at the Yaoundé Central Hospital and at the Yaoundé University Teaching Hospital

Sylvie Ndongo Amougou[1,2,3*], Liliane Linda Yangou Tchangoum[3], Marie Ntep Gweth[3,4], Dieudonné Danwe[1], Camille Mba Maadjjhou[1,4], Samuel Kingue[1,4], Jean Claude Mbanya[1,4]

[1]Faculty of Medicine and Biomedical Sciences, University of Yaoundé I, Yaoundé, Cameroon
[2]Yaoundé University Teaching Hospital, Yaoundé, Cameroon
[3]Higher Institute of Medical Technology, Yaoundé, Cameroon
[4]Yaoundé Central Hospital, Yaoundé, Cameroon
Email: *ndongoamougou@yahoo.fr

How to cite this paper: Amougou, S.N., Tchangoum, L.L.Y., Gweth, M.N., Danwe, D., Maadjjhou, C.M., Kingue, S. and Mbanya, J.C. (2019) Epidemiological Profile of Obesity among Health Staff at the Yaoundé Central Hospital and at the Yaoundé University Teaching Hospital. *World Journal of Cardiovascular Diseases*, **9**, 511-523.
https://doi.org/10.4236/wjcd.2019.98044

Received: July 1, 2019
Accepted: August 6, 2019
Published: August 9, 2019

Abstract

Background: Obesity is a real pandemic and with ever increasing prevalence. Health professionals play a vital role in the fight against this condition. They are also affected by obesity and could be even more affected than the general population. These health workers sometimes have a wrong perception of their own weight which interferes with their ability to counsel their patients. The purpose of this study was to determine the prevalence and factors associated with obesity among health care workers and increase their awareness of the problem. **Methodology**: This was a cross-sectional study conducted at the Yaoundé Central Hospital (YCH) and the Yaoundé University Teaching Hospital (YUTH) during a 6 months period. The data were collected through a questionnaire structured according to WHO STEP wise approach to chronic disease risk factor surveillance (STEPS). We measured weight, height, waist circumference, and blood pressure according to the WHO STEPS procedure. The Chi square test and logistic regression were used to measure the association between the qualitative variables. A p value < 0.05 was considered statistically significant. **Results**: A total of 350 health personnel participated in this study. The prevalence of obesity was 30.3%. That of abdominal obesity was 46.9%. The factors independently associated to overall obesity were age > 40 years [OR = 2.22 95% CI (1.28 - 3.87)], nursing assistant profession [OR = 2.31 95% IC (1.21 - 4.41)] and high blood pressure [OR = 3.38 95% CI (1.16 - 9.84)] and to abdominal obesity, age > 40 years [OR = 3.35 95% CI (1.96 - 5.71)], female gender [OR = 5.47 95% CI (2.95 - 10.14)], marriage [OR = 1.84

95% CI (1.08 - 3.14)], and High blood pressure [OR = 3.76 95% CI (1.01 - 13.94)]. **Conclusion:** Obesity is very common among YCH and YUTH staff. Staff awareness and the introduction of proper lifestyle promotion programs are more than ever needed to win the fight against obesity.

Keywords

Epidemiological Profile, Obesity, Health Personnel, Yaoundé

1. Introduction

Obesity is defined by the World Health Organization (WHO) as an excessive and abnormal accumulation of body fat that can be harmful to health [1]. Though it is perceived by Africans as a sign of prosperity and health [2] [3], it is considered by the WHO as a true pandemic with an ever-increasing prevalence. It is a predisposing factor for chronic diseases, including cardiovascular diseases, which are the leading cause of death in the world [4]. It is also responsible for musculoskeletal disorders and certain cancers, leading to a decline in quality of life, serious complications and early deaths [5]. Indeed, WHO estimates that at least 3.4 million people die each year worldwide because of overweight and obesity [6].

The main determinants of obesity are high-calorie diets and low physical activity [7] [8]. Female gender and level of education may also influence the prevalence of obesity.

The prevalence of obesity has doubled in the world between 1980 and 2014 [6]. According to the results of a study conducted by the Non-Communicable Disease Risk Factor Collaboration (RCD-RisC) more than half of the global increase in prevalence obesity comes from rural areas, mainly in low and middle income countries, in contrary to what was previously thought [9]. They commented that in these countries, the urbanization of rural life would be the main driver of this growth with the reduction of physical activities, the mechanization of agriculture, the improvement of road infrastructure and access to larger amounts of food that accompany economic growth. In sub-Saharan Africa, on the other hand, there is still a gradient between the prevalence of obesity between rural and urban areas [9]. In these countries, health professionals are an essential link in the fight against this epidemic. They are unfortunately part of the social groups most affected by obesity. Gu *et al.* in the United States of America had found that medical staff was the most affected by obesity with nearly half of them affected [10]. Similarly, Dovonou *et al.* in Benin found that about a quarter of the staff of Borgou Regional University Teaching Hospital were obese [11]. This high proportion of obesity and the wrong perception that these health workers have of their weight in Africa [12] interfere with their ability to adopt healthy attitudes and habits and advise their patients to do the same.

We did this study to determine the prevalence of obesity and associated fac-

tors among health staff in two reference hospitals in the city of Yaoundé and to raise their awareness of the importance of the issue of obesity.

2. Objectives

Our main objective was to describe the epidemiological profile of obesity among the medical staff of two reference hospitals in the city of Yaounde. Specifically, this was to determine the prevalence of overall obesity, determine the prevalence of abdominal obesity, and look for factors associated with overall and abdominal obesity.

3. Methodology

Design and study site: We carried out a cross-sectional study from January to June 2018 at the Yaoundé Central Hospital (YCH) and the Yaoundé University Teaching Hospital (YUTH). These are two reference hospitals in the city of Yaounde, the political capital of Cameroon.

Study population: We included in the study anyone aged at least 21 years old, working in these hospitals and who had given an informed consent. Pregnant women were excluded from the study as well as those which questionnaires were incomplete. The sampling method was the probabilistic cluster method. The various clusters were made up of medical doctors, nurses, nursing assistants, midwives, laboratory assistants, laboratory technicians and other administrative and technical staff. In order for each occupational category to be representative in our sample, the proportion of medical doctors was 13%, that of nurses 29%, 17% of nursing assistant, 2% of laboratory assistants, 6% of laboratory technicians, 1% of midwifes and 32% of other administrative and technical staff.

Variables and measurements made: we used a questionnaire structured according to WHO STEPS 1 and 2. After completing the questionnaire, we performed the physical examination which consisted of measuring weight, height, waist circumference and blood pressure.

The weight measurement was done using a KINLEE® brand scale. The subject was standing without shoes and no objects in his pockets; we asked them not to move, to look straight ahead and to keep their arms along their body.

The height was measured in using a wooden stadiometer graduated in centimeters. The participant was standing barefoot and bareheaded; gathered heels, occiput, shoulders, calves and heels against the vertical axis of the stadiometer; arms hanging freely along the body.

Body mass index (BMI) was calculated by weight-to-height ratio.

Waist circumference was measured in centimeters with a tape in a standing position, with feet together and arms along the body, at equidistance between the lowest ribs and the iliac crest on each side, and at the end of normal expiration.

The blood pressure was measured using a CITIZEN® electronic blood pressure monitor with a cuff of appropriate size for the arm circumference. After a

period rest of 5 to 10 minutes in a sitting position, the blood pressure was measured twice at intervals of 3 to 5 minutes. Subjects with an average systolic blood pressure ≥ 140 mmHg and/or an average diastolic blood pressure ≥ 90 mmHg were considered hypertensive.

The operational terms used were defined as follows:

Obesity: body mass index (BMI) ≥ 30 kg/m^2. It was classified as class I when the BMI was between 30 and 34.9 kg/m^2, class II when the BMI was between 35 and 40 kg/m^2, and class III when the BMI was greater than 40 kg/m^2.

Android obesity: waist circumference ≥ 88 centimeters in women and ≥102 centimeters in men [13].

Tobacco user: Anyone who smokes at least one cigarette or takes tobacco during a week.

Physical activity: activities such as leisure or recreation, travel (e.g. walking or cycling), professional activities (e.g. work), housework, play, sports or daily planned exercise as family or community. It consists of practicing at least 150 minutes a week of moderate intensity physical activity or at least 75 minutes weekly of sustained intensity physical activity or an equivalent combination of moderate to high intensity physical activity. Those who practiced less were defined as sedentary [14].

Consumption of fruit and vegetables was considered sufficient when the participant consumed at least 400 g of fruits and vegetables a day or 5 portions of fruits and vegetables a day [15].

Ethical considerations: We obtained an ethical clearance from the Institutional Ethics Committee for Human Health Research of the University of Douala (CEI-Udo). Research authorizations were obtained from the administrative authorities of the YCH and YUTH before the beginning of our study. The study was carried out in strict compliance with the basic principles of medical research.

Sample size and statistical analyzes: the minimum sample size was calculated from the formula described by Charan and Biswas [16] for the search for a qualitative variable with an estimated prevalence of obesity of 14.3% [17] and an accuracy of 5%. We obtained a minimum sample size of 189. We used a data entry application created using the CsPro version 7.1 software and exported the data to the IBM SPSS software version 23.0 for statistical analysis. The association between the qualitative variables was sought by the Chi square or the Fisher exact tests. The strength of the association between obesity and associated factors was assessed using the Odd Ratio. The averages were compared using Student's t-test. Logistic regression was used to determine factors independently associated with obesity. P-values less than 0.05 were considered statistically significant.

4. Results

Participants: We recruited 350 people for this study, 200 at the YCH and 150 at the YUTH. The sample consisted of 45 physicians, 102 nurses, 59 nursing as-

sistants, 4 midwives, 7 laboratory technicians, 21 laboratory technicians and 112 administrative staff. Table 1 presents the basic characteristics of the study population. Men were less represented than women with a sex ratio of 0.42. The average age of our study population was 41 ± 9 years. Of these, 53.1% were married, 36.9% single and the rest divorced, widowed, or cohabiting. Also, 51.4% reached high school and 44.6% university.

Main data: Obesity was present in 106 people, *i.e.* 30.3% (17.3% for men and 35.8% for women) of the study population. We had class I obesity in 71.7% of cases, class II in 20.8% of cases and class III in 7.5% of cases (Figure 1). Abdominal obesity was found in 46.9% (19.2% of men and 58.5% of women) of this population. With regard to habits and lifestyle, 99.1% a low consumption of fruits and vegetables, 24.6% a sedentary lifestyle and 54.6% said they nibble between

Table 1. Sociodemographic characteristics of the study population.

Features	Modalities	Number	Percentage (%)
Gender	Male	104	29.7
	Female	246	70.3
Age	<40 years old	155	44.3
	≥40 years old	195	55.7
Marital status	Married	186	53.0
	Not Married*	165	47.0
Level of education	Primary	14	4.0
	High school	180	51.4
	University	156	44.6
Monthly income (in FCFA)	≤100,000	155	44.3
	100,001 - 300,000	181	51.7
	300,001 - 500,000	12	3.4
	>500,000	2	0.6
Hypertension	Yes	22	6.3
	No	328	93.7
Diabetes	Yes	10	2.9
	No	340	97.1
Smoking	Yes	7	2.0
	No	343	98.0
Alcohol consumption	Yes	245	70.0
	No	105	30.0
Fruits and vegetables consumption	Low	347	99.1
	Sufficient	3	0.9
TOTAL		350	100

*Single, divorced, widowed or cohabiting.

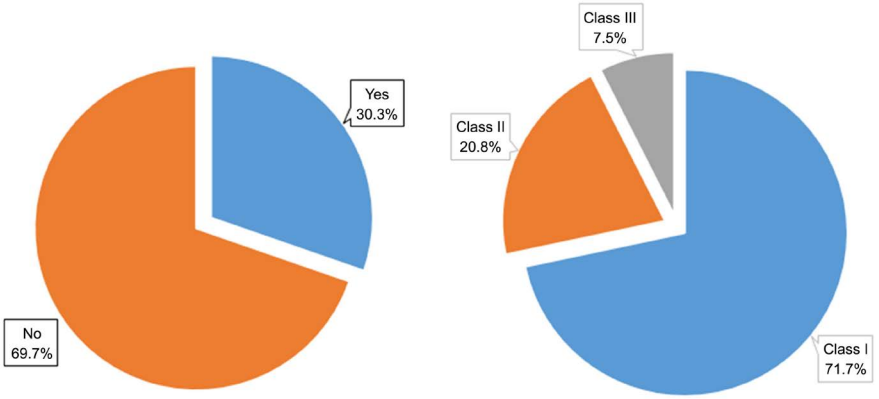

Figure 1. Prevalence and rates of obesity in YCH and YUTH staff.

meals. The factors independently associated with obesity were age > 40 years [OR = 2.22 95% CI (1.28 - 3.87)], the nursing assistant profession [OR = 2.31 CI 95 % (1.21 - 4.41)] and arterial hypertension [OR = 3.38 95% CI (1.16 - 9.84)] (**Table 2**). After adjusting the level of physical activity, eating habits, occupation and income level, abdominal obesity was independently associated with age > 40 years [OR = 3.35 95% CI (1.96 - 5.71)], the female gender [OR = 5.47 95% CI (2.95 - 10.14)], marriage [OR = 1.84 95% CI (1.08 - 3.14)] and arterial hypertension [OR = 3.76 95% CI (1.01 - 13.94)] (**Table 3**).

5. Discussion

Our study shows that obesity is common among medical staff of the two reference hospitals of Yaounde and it is related to several factors as age, gender, marital status, profession and arterial hypertension. Medical staff is an essential link in fighting the obesity pandemic that leads to a cohort of non-communicable diseases. They have to preach by giving the good example. Instead, not only they are not spared by this global plague, they appear to be the most affected professionals. The reason may be the fact that most of them, having false perception of their own weight [12], do not change their lifestyle to a healthy one, and one thing leading to another, they are less likely to counsel their patients to do the same.

We carried out this study to describe the epidemiological profile of obesity among the staff of the two reference hospitals of Yaounde, the political Capital of Cameroon. Our population for this study was mostly made of women with 70.3% against 29.7% for men. These results are closer to what Amougou *et al.* obtained in 2018 during a study of the prevalence, awareness and control of hypertension on medical staff of the YCH and YUTH [18].

We have found a prevalence of obesity of 30.3% higher than the one of the general population of Cameroon which was estimated at 23.5% in 2015 by Kingue *et al.* [19]. This result corroborates the 35.2% prevalence obtained among medical staff of the YUTH in 2017, in a study of the prevalence of cardiovascular risks factors [20]. In Ghana, Kasu *et al.* also found the highest prevalence of obesity

Table 2. Factors independently associated with obesity.

	OR (IC to 95%)	p Value
Age > 40 years old	**2.22 (1.28 - 3.87)**	**0.005**
Female gender	0.53 (0.27 - 1.01)	0.055
Nursing assistant	**2.31 (1.21 - 4.41)**	**0.011**
Hypertension	**3.38 (1.16 - 9.84)**	**0.026**
Diabetes	3.42 (0.73 - 16.00)	0.118
Family diabetes history	1.60 (0.92 - 2.78)	0.094

Table 3. Factors independently associated with abdominal obesity.

	OR (IC to 95%)	p Value
Age > 40 years old	**3.35 (1.96 - 5.71)**	**< 0.001**
Female gender	**5.4 (2.95 - 10.14)**	**< 0.001**
Sedentary lifestyle	1.22 (0.69 - 2.15)	0.492
Hypertension	**3.76 (1.01 - 13.94)**	**0.048**
Nibbling	1.67 (0.99 - 2.79)	0.052
Nursing assistant	1.49 (0.77 - 2.88)	0.242
Married	**1.84 (1.08 - 3.14)**	**0.025**
Revenue < 100,000 FCFA	1.07 (0.57 - 2.03)	0.825

among medical staff of a district hospital [21]. The prevalence of our study is above the 14.3% found by Dionadji *et al.* at the National Reference Hospital of N'djamena in 2016, 24.1% at University Teaching Hospital of Parakou in Benin, 25.5% at the University of Benin Teaching Hospital of Benin city in Nigeria and 25.1% in nurses in England [11] [17] [22] [23]. Various genetic constitutions and different eating habits may explain the different results obtained.

Hypertension was the only comorbidity independently associated to obesity, both overall and abdominal obesity. This result is consistent with the literature since obesity is a well-established risk factor of the hypertension. Diabetes was also associated to obesity but did not reach statistical significance. This is probably due to the low proportion of people having diabetes in our sample which did not permit us to obtain a difference statistically significant. Age over 40 year and female gender was significantly associated to obesity in our study. This correlates the results obtained in other countries [11] [24] and would be linked to the fact that with age, we observe a regain of adiposity, the subject is less active physically and there is a decrease of lean body mass in favor of fatty tissue. Female gender was significantly associated with obesity. Most African authors obtained the same result [11] [17] [24] [25]. This is explained by the fact that women have the tendency to be less active physically compared to men according to Kasu *et al.* findings in Ghana in 2015 [21]. Abdominal obesity was much stronger among married staff. Dankyau *et al.* have equally made the same observation in Nigeria in 2016 [25]. The explanation to this is uncertain. Nursing assistants in our study had the tendency of being much obese than other medical professions. The fact

that they have more night shifts than the other professionals, and the adverse psychological and medical consequences of those night shifts described by Isah *et al.* [26] may explain these findings. We found no relevant link between the level of income and obesity in contrary to Iwuala *et al.* in Nigeria in 2015, who found that health professionals earning less than 200,000 Naira per month have about three times more risk to being obese than those earning more [24]. Differences in the constitution of our samples composition may explain these divergent results.

Concerning lifestyle, we found that a most of the healthcare professionals had bad eating habit and one quarter had sedentary lifestyle. This is obviously what justifies these high rates of obesity. Moreover, even if they are aware of the adverse effects of obesity, they seem not to react. Simfukwe *et al.* showed it in a study on including some health professionals in South Africa. They also found that barriers to adopting a healthy lifestyle included institutional as well as attitudinal factors [2]. Similarly, Jonsdottir *et al.* in Sweden reached to the conclusion that health professionals were less engaged in institutional programs aiming at promoting a better lifestyle [27].

6. Limitations of the Study

- Eating habits and the level of physical exercise have been assessed in a biased manner. This could have an impact on reliability of results.
- Also, existence of hypertension or diabetes has been determined only on the basis of medical history or punctual measurement of blood pressure.
- The study was carried out in urban area. The results cannot be generalized to the whole country, including health facilities in rural area.

7. Conclusion

Obesity is very common among the YCH and YUTH staff. It is associated with age, female gender, nursing assistant profession and marital status. Habits and lifestyle of this staff are not the best. More sensitization of healthcare workers and implementation of programs promoting a healthy lifestyle are necessary in order to win the fight against obesity.

Authors' Contribution

Sylvie Ndongo Amougou, Liliane Linda Yangou Tchangoum, Marie Ntep Gweth and Samuel Kingue conceived the study protocol, Liliane Linda Yangou Tchangoum collected the data, Liliane Linda Yangou Tchangoum and Dieudonné Danwe analyzed data, Dieudonne Danwe, Camille Mba Maadjhou and Sylvie Ndongo Amougou wrote this paper, Samuel Kingue did the general supervision. All contributors have read and approved the final version of this paper.

Acknowledgements

We thank the staff of the Yaoundé Central Hospital and the Yaoundé University

Teaching Hospital for their participation to this study.

Conflicts of Interest

Authors declare having no conflict of interest in this topic.

References

[1] OMS (2017) 10 faits sur l'obésité. https://www.who.int/features/factfiles/obesity/fr

[2] Simfukwe, P., Van Wyk, B. and Swart, C. (2017) Perceptions, Attitudes and Challenges about Obesity and Adopting a Healthy Lifestyle among Health Workers in Pietermaritzburg, KwaZulu-Natal Province. *African Journal of Primary Health Care & Family Medicine*, **9**, a1276. https://doi.org/10.4102/phcfm.v9i1.1276

[3] Ettarh, R., Van de Vijver, S., Oti, S. and Kyobutungi, C. (2013) Overweight, Obesity, and Perception of Body Image among Slum Residents in Nairobi, Kenya, 2008-2009. *Preventing Chronic Disease*, **10**, E212. https://doi.org/10.5888/pcd10.130198

[4] OMS (2018) Les 10 principales causes de mortalité. https://www.who.int/fr/news-room/fact-sheets/detail/the-top-10-causes-of-death

[5] Correia, J., Pataky, Z. and Golay, A. (2014) Comprendre l'obésité en Afrique: Poids du développement et des représentations. *Revue Médicale Suisse*, **10**, 712-716.

[6] World Health Organization (2015) Global Status Report on Noncommunicable Diseases: 2014.

[7] Sartorius, B., Veerman, L.J., Manyema, M., Chola, L. and Hofman, K. (2015) Determinants of Obesity and Associated Population Attributability, South Africa: Empirical Evidence from a National Panel Survey, 2008-2012. *PLOS ONE*, **10**, e0130218. https://doi.org/10.1371/journal.pone.0130218

[8] Lakerveld, J. and Mackenbach, J. (2017) The Upstream Determinants of Adult Obesity. *Obesity Facts*, **10**, 216-222. https://doi.org/10.1159/000471489

[9] NCD Risk Factor Collaboration (NCD-RisC) (2019) Rising Rural Body-Mass Index Is the Main Driver of the Global Obesity Epidemic in Adults. *Nature*, **569**, 260-264. https://doi.org/10.1038/s41586-019-1171-x

[10] Gu, J.K., Charles, L.E., Bang, K.M., Ma, C.C., Andrew, M.E., Violanti, J.M., *et al.* (2014) Prevalence of Obesity by Occupation among US Workers: The National Health Interview Survey 2004-2011. *Journal of Occupational and Environmental Medicine*, **56**, 516-528. https://doi.org/10.1097/JOM.0000000000000133

[11] Dovonou, C., Gounongbe, F., Hinson, A., Alassani, C., Attinsounon, C., Tognon, F., *et al.* (2016) Etude Des Facteurs De Risque De L'obésité Chez Le Personnel Du CHUD/Borgou à Parakou (Bénin) en 2013. *European Scientific Journal*, **12**, 384-393. https://doi.org/10.19044/esj.2016.v12n15p384

[12] Phetla, M.C. and Skaal, L. (2017) Perceptions of Healthcare Professionals Regarding Their Own Body Weight in Selected Public Hospitals in Mpumalanga Province, South Africa. *South African Medical Journal*, **107**, 338-341. https://doi.org/10.7196/SAMJ.2017.v107i4.12174

[13] World Health Organization (2011) Waist Circumference and Waist-Hip Ratio: Report of a WHO Expert Consultation, Geneva, 8-11 December 2008. World Health Organization, Geneva, 20.

[14] WHO (2011) Global Recommendations on Physical Activity for Heath 18-64 Years Old. https://www.who.int/dietphysicalactivity/publications/recommendations18_64yearsold/en

[15] Expert Consultation on Diet, Nutrition, and the Prevention of Chronic Diseases, WHO, FAO (2003) Diet, Nutrition, and the Prevention of Chronic Diseases: Report of a WHO-FAO Expert Consultation. Joint WHO-FAO Expert Consultation on Diet, Nutrition, and the Prevention of Chronic Diseases, 2002, Geneva, Switzerland. World Health Organization, Geneva, 81-94.

[16] Charan, J. and Biswas, T. (2013) How to Calculate Sample Size for Different Study Designs in Medical Research? *Indian Journal of Psychological Medicine*, **35**, 121-126. https://doi.org/10.4103/0253-7176.116232

[17] Dionadji, M., Choua, O., Voussia, L., Abas, O. and Saleh, A. (2016) Prévalence de l'Obésité chez les Professionnels de la Santé de l'Hôpital Général de Référence Nationale à Ndjamena. *Health Sciences and Diseases*, **17**, 1-3.

[18] Amougou, S.N., Tchokote, K.K., Hamadou, B., Jingi, A.M., Nganou-Gnindjio, C.N., Ngwet, M.N., *et al.* (2018) Prevalence, Awareness, and Control of Hypertension in Health Workers of Two Teaching Hospitals of Yaounde-Cameroon: The Hypertension Awareness Initiative (THAI) Pilot Survey. *Open Access Library Journal*, **5**, 1-10. https://doi.org/10.4236/oalib.1104820

[19] Kingue, S., Ngoe, C.N., Menanga, A.P., Jingi, A.M., Noubiap, J.J.N., Fesuh, B., *et al.* (2015) Prevalence and Risk Factors of Hypertension in Urban Areas of Cameroon: A Nationwide Population-Based Cross-Sectional Study. *The Journal of Clinical Hypertension*, **17**, 819-824. https://doi.org/10.1111/jch.12604

[20] Amougou, S.N., Ebah Epok, L., Kuate Mfeukeu, L., Hamadou, B., Jingi Musa, A., Jemea, B., *et al.* (2017) Prevalence of Cardiovascular Risk Factors among the Employees of the Yaounde University Teaching Hospital. *Health Sciences and Diseases*, **18**, 40-44.

[21] Kasu, S.E., Ayim, A. and Tampouri, J. (2015) Prevalence of Obesity among Health Workers in Kadjebi District of Ghana. *Journal of Biology, Agriculture and Healthcare*, **5**, 155-166.

[22] Adaja, T.M. and Idemudia, O.J. (2018) Prevalence of Overweight and Obesity among Health-Care Workers in University of Benin Teaching Hospital, Benin City, Nigeria. *Annals of Tropical Pathology*, **9**, 150-154.

[23] Kyle, R.G., Wills, J., Mahoney, C., Hoyle, L., Kelly, M. and Atherton, I.M. (2017) Obesity Prevalence among Healthcare Professionals in England: A Cross-Sectional Study Using the Health Survey for England. *BMJ Open*, **7**, e018498. https://doi.org/10.1136/bmjopen-2017-018498

[24] Iwuala, S.O., Ayankogbe, O.O., Olatona, F., Olamoyegun, M.A., OkparaIgwe, U., Sabir, A.A., *et al.* (2015) Obesity among Health Service Providers in Nigeria: Danger to Long Term Health Worker Retention? *Pan African Medical Journal*, **22**, 1. https://doi.org/10.11604/pamj.2015.22.1.5586

[25] Dankyau, M., Shu'aibu, J., Oyebanji, A. and Mamven, O. (2016) Prevalence and Correlates of Obesity and Overweight in Healthcare Workers at a Tertiary Hospital. *Journal of Tropical Medicine*, **18**, 55-59. https://doi.org/10.4103/2276-7096.188533

[26] Isah, E.C., Iyamu, O.A. and Imoudu, G.O. (2008) Health Effects of Night Shift Duty on Nurses in a University Teaching Hospital in Benin City, Nigeria. *Nigerian Journal of Clinical Practice*, **11**, 144-148.

[27] Jonsdottir, I.H., Börjesson, M. and Ahlborg, G. (2011) Healthcare Workers' Participation in a Healthy-Lifestyle-Promotion Project in Western Sweden. *BMC Public Health*, **11**, 448. https://doi.org/10.1186/1471-2458-11-448

Appendix: Study Questionnaire

N°Q	QUESTIONS	ANSWER
01	Name of the healthcare facility: 1 = YCH 2 = YUTH	
	STEPS 1: SOCIODEMOGRAPHIC INFORMATION	
02	Gender: 1 = Male; 2 = Female	
03	Age (Years):	
04	région of origin: 1 = Centre 2 = West 3 = North-West 4 = South-West 5 = Est 6 = South 7 = Littoral 8 = Adamaoua 9 = North 10 = Far-North	
05	Marrital status: 1 = Single 2 = Married 3 = Divorced 4 = Widow 5 = Cohabiting	
06	Level of study:1 = Primary 2 = High school 3 = University	
07	To Which professional category do you belong? 1 = Physician 2 = Nurse 3 = Nurse assistant 4 = Midwife 5 = Laboratory assistant 6 = Laboratory technician 7 = Other	
08	If you are a physician, precise your specialty 1 = General Practitioner 2 = Specialist	
09	Including the previous years, what is your average monthly income? …….	
	Tobacco consumption	
10	Do you actually smoke products containing tobacco such as cigarette or smoking pipe? if no, jump to 14 1 = yes 2 = no	
11	Do you smoke every day? if no precise the frequency 1 = yes 2 = no fréquence: …….	
12	How many cigarettes do you smoke every day? ….....	
13	Since when do you smoke? (only one answer) In years …….. In month …… In weeks …….	
	Alcohol consumption	
14	Have you ever consumed alcohol like beer, wine or whisky during the past 12 months 1 = yes 2 = no if no jump to 16	
15	If yes, at which frequency? 1 = every day 2 = 5 - 6 days a week 3 = 3 - 4 days a week 4 = 1 - 2 days a week 5 = 1 - 3 days a month 6 = less than one time a month	
	Eating habits	
16	In one week, during how many days do you eat fruits? Number of days …….	
17	How many fruits do you consume during one of those days Number of fruits …….	
18	In one week, during how many days do you eat vegetables? Number of days ……	
19	How often do you add salt or salty sauce in your meal before eating it or while you are eating? 1 = always 2 = often 3 = sometimes 4 = rarely 5 = never	

Continued

20	How do you estimate your salt consumption? 1 = very heavy 2 = heavy 3 = normal 4 = low 5 = very low
21	What type of oil or fat do you use most for your meals? 1 = palm oil 2 = refined palm oil 3 = soy oil 4 = olive oil 5 = margarine
22	How often to you consume fatty products? 1 = always 2 = often 3 = sometimes 4 = rarely 5 = never
23	Do you nibble between meals 1 = yes 2 = no
	Physical activity
24	Do you practice physical activity at your workplace, during moment of leisure or sports that makes you sweat or breathe actively? 1 = yes 2 = no
25	If yes, for how many hours do you practice every day? …….
26	How many times a week? …….
	Personal past medical history
27	Are you hypertensive? 1 = yes 2 = no 3 = don't know
28	If yes, what treatment do you follow actually for hypertension? Lifestyle changes: 1 = yes 2 = no BP lowering drugs: 1 = yes 2 = no
29	If you are taking BP lowering drugs, please precise the classes ACE inhibitors: 1 = yes 2 = no ARBs: 1 = yes 2 = no Calcium channel inhibitor: 1 = yes 2 = no Thiazide diuretics: 1 = yes 2 = no Beta blocquer: 1 = yes 2 = no Others: 1 = yes 2 = no
30	Are you diabetic? 1 = yes 2 = no 3 = don't know
31	If yes, are you taking a treatment? 1 = yes 2 = no
32	If you are taking a treatment, please precise 1 = Oral antidiabetics 2 = insulin
	Family past medical history
34	Is there somebody with obesity in your family? 1 = yes 2 = no If yes, precise the relationship ……..
35	Is there somebody having hypertension in your family? 1 = yes 2 = no If yes, precise the relationship ……
36	Is there somebody having type 2 diabetes in your family? 1 = yes 2 = no If yes, precise the relationship……
	STEPS 2: PHYSICAL MEASURMENTS
37	Weight (Kg) …….

Continued

38	Height (cm) ……	
39	Are you pregnant? 1 = yes 2 = no	
39	Waist circumference (cm) ……	
40	Blood pressure 1 ……/……..mmHg	……pulse/min
41	Blood pressure 2 ……/……...mmHg	……pulse/min