Work Stress and Obesity in the Bamenda Municipality, Cameroon

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Abstract: This study investigated the effect of work stress on obesity in the Bamenda Municipality. We administered work stress test to 1,052 individuals aged 20 and above resident in the Bamenda Municipality. The model was estimated using the multiple regression analysis while the ANOVA and Correlation analysis were used to confirm the findings. From the analysis, it was realized that work stress level had a negative and statistical significant influence on obesity. It was thus concluded that, work stress statistically significantly influenced obesity in the Bamenda Municipality. From this finding, workers especially those who sit while working were advised to make out time for physical exercises and use standing desks when and where possible. Workers were also advised to make sure that, their work schedules did not leave them eating junk food especially at the wrong time. The wrong time here referred to eating while working and/or eating heavy meals late at night because they did not eat all day. Many small meals were found to be healthier than one heavy meal worse of all eating it late at night. Eating late gave individuals no time to be able to use the energy gotten from the food before sleeping. This thus forced their body to convert the food to fat and store thus adding their body weight in the long term. Lastly, we recommended that, the government of Cameroon should institute one compulsory day of the week for workers sports.

Keywords: Work, Stress, Effect, Health and Obesity

1. Introduction

Statistics show that obesity figures for most of the African war pruned countries are comparatively very low. For example, Rwanda obesity rate for 2014 stood at 3.3%, Uganda at 3.9% and Ethiopia at 3.3% and Burundi at 2.1% ([1, 2]). The low figures in war zones are probably due to lack of food since literature has attributed obesity in many countries to food and lack of physical activities. According to WHO (2014), the fundamental cause of obesity and overweight in high prevalence obese countries is an energy imbalance between calories consumed and calories expended. Globally, there has been an increased intake of energy-dense foods and an increase in physical inactivity due to the increasingly sedentary nature of many forms of work, changing modes of transportation, and increasing urbanization.

Results of Tanya et al. [3] research stipulate that the high rate of obesity in Cameroon is due to the fact that Cameroonians feel obesity is a sign of good living. Looking at the positive attributes given to obesity and the negative attributes given to being skinny, one could also quickly attribute the high obesity rate to Cameroonian to perception and mentality issues. Hosie [4] conducted a systematic review of researches that had been published in recent years

on the relationships between work stress with eating behavior and obesity. They found out that 50% of the consulted papers reported a positive correlation between job stress and body mass index. To reaffirm the aforementioned findings, Foss and Dyrstad [5] empirically studied stress and obesity and concluded that stress is a cause of obesity. A new school of thought has come up to establish the fact that differences in stress also accounts for differences in body mass index. Specifically, Anthony et al. [6] found a link between depression and obesity. To confirm such findings, this study thus sets out to investigate the effect of work stress on obesity in the Bamenda Municipality.

2. Concepts and Literature Review

The Centre for Disease Control and Prevention [7] defined obesity as weight that is higher than the normal weight. They also used Body Mass Index (BMI) to measure obesity. In the medical dictionary obesity is defined as "an abnormal accumulation of body fat, usually 20% or more over an individual's ideal body weight". The medical dictionary associates obesity with increased risk of illness, disability and death. Webster [8] dictionary defines obesity as a state of being well above one's normal weight. Obesity has also been defined by the National Institutes of Health (NIH) [9] as a BMI of 30 and above.

Work stress can be defined as strain felt by an individual [10]. It is the mental, emotional, or physical strain caused by overwork [10]. Work stress is defined as "the harmful physical and emotional responses that occur when the requirements of a job do not match the capabilities, resources, or needs of the worker [11].

This work is backed by a number of theories. Amongst them is The three- bear theory by Bennett [12] which states that there are several cognitive and emotional influences that causes people to eat either too much, too little or just the right amount of food. This theory assumes that people eat too much because they like to eat. Some eat to compensate for loneliness, anxiety, emotional conflicts and past or present deprivation. This theory can thus be connected to this work by the fact that stress can make people eat so much as to become obese. This theory is however criticized for failing to explain how people of normal weight gauge the "right" amount to eat, since tiny caloric errors in eating can cause large weight gains or losses over the years.

MacMillan [13] published the "17 Ways Your Job Is Making You Fat" theory. Here, he specified 17 ways that work stress can be related to obesity. According to him, workers gain weight due to long hours of sitting: long hours of driving: little or no sleep: lack of exercise, unhealthy eating habits: frequent use of elevators, too many business parties and trips; distracted and eating. The above theory thus specifies that people who have work stress are force to eat junk food or sleep late leading to obesity. This theory is criticized base on the fact that its postulations are not always true since some people work just for few hours but still have work stress. The work may take a toll on them not only because they work all day but also because they get involve in jobs which they do not like. This is the case of Cameroon where people get into any job as long as the job is available and paid for. Many people get into the teaching field profession for example just for the sake of the "Matricule". Thus they have stress just by thinking that they will have to teach the following day. This type of work stress will therefore not lead the person to be obese as specified in [13]. Any job that is not so engaging will make the people to be obese especially when they eat junk food and have no time for physical exercise because of the job.

Dallman et al. [14] worked on stress and obesity and found out that chronic stress induces either increased comfort food intake and body weight gain or decreased intake and body weight loss. Schulte [15] also studied "Work, Obesity, and Occupational Safety and Health. They concluded that employed adults spend a quarter of their lives at work, and the pressure and demands of work may affect their eating habits and activity patterns, which may lead to overweight and obesity. Kresser [16] findings showed that chronic stress also led to obesity. Heraclides [10] also investigated work stress, obesity and the risk of type 2 diabetes. Their findings show that overall, work stress was associated with obesity among women but not among men. Sylvia [17] studied the effect of psychosocial stress on obesity in a cross-sectional study. Results show a proportion increased from 15.7% in 40,831 individuals with no stress to 20.5% in 7,720 individuals with permanent stress. Scott [15] also studied the effect of stress as one determinant of obesity. They concluded that stress tends to alter the pattern of food consumption, and promotes craving of nutrient-dense "comfort foods." thus increase in obesity. Marchand et al. [18] aimed at evaluating the contribution of work, non-work and individual factors to obesity. Their results show that being married, having children, psychotropic drug use, hypertension, being physically inactive and low psychological distress were obesity risk factors.

In a more recent study, Santana-Cardenas [19] was interested in finding out if stress and obesity were related. According to him, the main causes of obesity were high food intake, lack of adequate exercise and genetic susceptibility. In another study, Hosie [4] worked on relationship between work stress (with eating behaviour) and obesity. He found out that 50% of the consulted papers report a positive correlation between job stress and body mass index. LaMotte [20] compared stress levels and body weight. He found levels of cortisol in the hair to be positively and significantly correlated to larger waist circumference and higher body mass index or BMI". To add, Koski and Naukkarinen [21] used psychiatric methods to examine the relationship between stress and obesity. They identified stress factors that affect the development of obesity. Austin [22] researched on "work stress equal to obesity". He found out that men exposed to stress for at least half their working lives were 25 per cent more likely to die from a heart attack, while the odds of a fatal stroke increase by almost half. Alison of the British Heart Foundation as cited in [22], said: "It's important to recognize job stress and manage it. Janet [23] traced the contribution of

weight stigma to stress. She described a vicious cycle of stress to obesity. That is stress leading to obesity and obesity leading to stress too due to stigma. Marianna et al. [24] examined the relation between long working hours and change in body mass index (BMI). They found out a higher risk of overweight among the healthy weight people who work long hours. Yonghua et al. [25] also investigated the relationship between academic stress and overweight and obesity. Their results showed that academic stress was associated with increased risk of overweight and obesity among all students.

Looking at the above assertions and findings, it can be noted that no work have been done on the link between work stress and obesity in Cameroon talk less of the Bamenda Municipality. Thus there is the need to test the validity of the results obtained from the various studies in the Bamenda Municipality.

3. Methodology

This work implores both the primary data (test and questionnaires) to establish the effect of work stress on obesity and secondary data. To investigate the influence of work stress on obesity, we administered stress test by Counseling Team International to 1,057 individuals in the Bamenda Municipality. The test was corrected to determine the stress level of the individuals. We used the multiple regression analysis to validate our hypothesis. In addition, correlation and ANOVA test have been used to confirm our regression results.

The Multiple Regression Model is specified as:

$$Y=(xi \ x_2....., xk) + \sum =xi\beta_1 + x_2\beta_2 + ... + xk\beta K + \sum \quad (1)$$

Where Y=dependent variable and xi=independent variables

Table 1. Description of variables used in the estimation in work stress model.

Variable	Meaning	Description
OBS	Obesity	Obesity is continues measured using BMI
WS	Work Stress	Scores from stress test on 75
AG	Age	Age of the individual in years
S	Sex	Male=1, Female=2

Source: Computed by authors

4. Results and Discussion

From table 2 above, the mean Body Mass Index of the Bamenda municipality is 27.46 which are in the overweight rage. This means that on an average people in the Bamenda municipality are overweight. The mean stress, level is 40.31.

The standard deviation of the stress level is very high. This is due to the high range that exists between the minimum and the maximum stress level, thus making it highly dispersed resulting to a high standard deviation.

Table 2. Descriptive Statistics on Work stress on Obesity.

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Gender	1057	1	2	1.63	.483	-.544	.075	-1.707	.150
Age	1057	1	4	1.52	.715	1.287	.075	1.176	.150
Body Mass Index	1057	15	53	27.46	4.935	.888	.075	1.680	.150
Stress	1057	14.00	75.00	40.3056	17.25533	.430	.075	-.755	.150
	1057								

Source: Computed by authors using SPSS 17

From the results on table 2, it can be seen that apart from gender, all our variables are positively skewed. This means that most of the data set falls in the upper limit. The result for gender is negatively skewed indicating that more women than men were in our sample. Our kurtosis result tells us about the height and the shape of the central peak relative to the standard bell curve. Since both our skewness and kurtosis figures are close to zero, we say the assumption of normality have been met in our analysis thus, the OLS can be an appropriate tool of analysis for this work.

Table 3 presents, the chi-square results for Obesity and Work Stress variables. The results shows that being obese statistically depended on age (p-value=0.00) and gender (p-value=0.00). It also showed that being obese was statistically independent of work stress level (p-value=0.74). Table 3 also provides valid frequencies and percentages of obesity and different independent variables.

Table 3. Chi Square Table for Obesity and Work Stress.

Variable	NOT OBESE	OBESE	Totals
GENDER			
MALE	315 (29.8%)	75 (7.1%)	390 (36.9%)
FEMALE	454 (43.0%)	213 (20.2%)	667 (63.1%)
Prob. X^2			0.000
Age			
20-35	506 (47.9%)	122 (11.5%)	628 (59.4%)
36-50	207 (19.6%)	120 (11.4%)	327 (30.9%)
51-65	45 (4.3%)	39 (3.7%)	84 (7.9%)
>65	11 (1.0%)	7 (0.7%)	18 (1.7%)
Prob X^2			0.000
WORK STRESS			
LOW	334 (31.6%)	132 (12.5%)	466 (41.1%)
MEDIUM	236 (22.2%)	82 (7.8%)	317 (30%)
HIGH	200 (18.9%)	74 (7.0%)	274 (25.9%)
Prob X^2			0.74
Total	769 (72.8%)	288 (27.2%)	

Source: computed by authors using SPSS 17

The stress level for non-obese is generally higher than that for the obese. The obese have higher percentage of low stress level 132 (12.5%) than high stress level 74 (7.0%). The chi square results, of 0.74, are statistically insignificant.

Table 4 presents the multiple regression results which shows that gender is positive, implying that females suffer more from obesity than male by 141.0%. This result is statistically significant by 5%. Age was also positive meaning that, as people age, the more likely they were to be obsess. One year increased in age lead to a 1.756 unit increase in body mass index. The results further showed that the level of stress had a negative (-0.0163) and statistical significant influence obesity level. This means that increase in stress level by 100% lead to a fall in obesity level by 1.63%. This result was statistically significant at 1% level of significant. The constant term was also positive and significant. This indicates that, in the absent of other variables specified in the model, obesity level will be positively affected by the intercept. One unit increase will lead to 22.60 unit increase in body mass index.

Table 4. *Multiple Regression, Correlation and ANOVA Results for personality trait, work stress and obesity.*

	Multiple Regression	Correlation	ANOVA
Variable	Coefficient (Standard error)	(Significant level one -tail)	(Significant level)
Gender	1.410** (0.0291)	0.137*** (0.000)	20.080*** (0.000)
Age^2	1.756 (0.211)	0.247*** (0.000)	26.369*** (0.000)
Stress	-0.0163*** (0.00837)	-0.034* (0.083)	1.740*** (0.002)
Constant	22.60 (0.679)		
F (4, 1052)=25.63	Prob.> F=0.0000		
Number of observations	1,057		
R-squared	0.089		
Adjusted R-squared	0.080		

Computed by authors using STATA 14. ***=1% sign, **=5% sign and *=10% Sign level

The correlation and ANOVA results in column 3 and 4 of table 4 are in line with the regression results. It shows a statistical significant result between stress level and obesity in the Bamenda Municipality.

Discussion of Results of Work Stress and obesity results

Contrary to other findings that predicted a positive influence of work stress on obesity, this result shows a negative and statistical significant influence of work stress on obesity. This result is not in line with the work of Hosie [4] who found out that there exist a positive relationship between work stress with eating behavior and obesity. Koski and Naukkarinen [21] examined the relationship between stress and obesity and identified stress factors that affect the development of obesity. The differences in the results can be accounted for by the fact that the above studies were carried out in developed countries and this one in a developing country. In the developed country, many people have more than one job and thus when they say they have work stress they really mean it. However, in our context our working style is generally too loose to experience difficulties like eating of junk food and not having time for exercise or even trekking because of work. In addition, the data for this work was collected from 2017 to 2018 which falls within the period of the current socio-political crisis where there has been a lot of allowance for indoor days (ghost towns) thus work stress might not really get the person eating junk. Many people did not have enough food. Thus instead of work stress making people to grow fat as predicted by literature, it instead made them to grow slim in our context. This is because unlike in the developed world where the other studies were carried out, in the Bamenda Municipality, workers are able to blend work with good diet and exercise. The negative relationship between stress and obesity in the Bamenda Municipality can also be justified by the fact that once employees get promoted they become very inactive and get service provider to do every strenuous work for them, increasing their inactivity level and thus increasing their obesity level.

5. Conclusion and Policy Implementation

This study was out to investigate the effect of work stress on obesity. From the analysis, it was realized that work stress level had a negative and statistical significant influence on obesity. The study concluded that, work stress has a negative and statistical significant influence on obesity in the Bamenda Municipality. From this finding, it was recommended that all workers especially those who sit while working should be able to make out time for physical exercise and use standing desks where possible. Workers are advised to make sure that their work schedule does not leave them eating junk food especially at the wrong time. The wrong time here refers to eating while working and/or eating heavy meals late at night because they did not eat all day. Many small meals are healthier than one heavy meal worse of all eating it late. Eating late gives individuals no time to be able to use the energy gotten from the food before sleeping. This thus forces ones' body to convert the food to fat and store it thus adding our body weight. Lastly, it was also recommended that the government of Cameroon should institute one compulsory day of the week for workers sports as the case in Kenya where Saturday has been instituted as a compulsory sporting day for all workers.

References

[1] WHO. (2012). Facts and Figures of obesity and overweight. www.who.int.

[2] WHO. (2014). Obesity facts and figures. www.who.int, 311.

[3] Tanya ANK., Lantum D. A. and Tanya VN. (2011). Nutrition and Public Health in Cameroon: Combating the Crisis. Cameroon Academy of Sciences, Yaoundé, Cameroon.

[4] Hosie R. (2017). How do your eating habits change when you're stressed?. US National Library of Medicine, PMC2858344.

[5] Foss B. and Dyrstad SM. (2011). Stress in obesity: Cause or consequence? *Medical Hypotheses*. 77 (1); 7-10.

[6] Anthony N., Fabricatore D. and Thomas AW. (2003). Psychological Functioning of Obese Individuals. Diabetes Spectrum. 34 (4); 747-64.

[7] Centre for disease control and prevention. (2016). *https://www.who.int/vaccine_safety/initiative/communication/network/nip/en*

[8] Webster EK, Robinson LE, Whitt-Glover M, Ceaser TG, Alhassan S. (1828) Effectiveness of preschool and school-based obesity prevention interventions in African American youth: a literature review. *Obes Rev* 2014; 15. (4); 5– 25.

[9] National institute of public health Quebec. (2014). The economic impact of obesity and overweight. https://www.inspq.qc.ca/.

[10] Heraclides A. (2011). Work Stress, Obesity and the Risk of Type 2 Diabetes: Gender-Specific Bidirectional Effect in the Whitehall II Study. PubMed, DOI: 10.1038/oby.2011.95.

[11] Schulte PA. (2007). Work, Obesity, and Occupational Safety and Health. Am J Public Health. 97. (3); 428–436. doi, 10.2105/AJPH.2006.086900.PMCID: PMC1805035.

[12] Bennett P H., Howard B V., Bogardus C., Ravussin E., Foley JE., Lillioja S., Mott D M. and Knowler WC.(1991). Studies of the etiology of obesity in Pima Indians, The American Journal of Clinical Nutrition. 53. (6); 1577S-1585S, https://doi.org/10.1093/ajcn/53.6.1577S.

[13] MacMillan A. (2015). 17 Ways Your Job Is Making You Fat. Harvard health publishing.

[14] Dallman MF., Norman P. and Sotara M. (2003). Chronic stress and obesity: A new view of "comfort food".www.pnas.org *The Rockefeller University*, New York, NY.

[15] Scott DG. (2010). Socio-demographic Characteristics of Families of Children with Down Syndrome and the Economic Impacts of Child Disability on Families. International Review of Research in Mental Retardation.

[16] Kresser C. (2010). 10 ways stress makes you fat and diabetic. https:chriskresser.com.

[17] Sylvia R. (2012). Of Mind and Matter: Psychological Dimensions in Obesity. American Journal of Psychotherapy. 66 (2).

[18] Marchand L L., Leo Q. J. N., Ollberding N. J., Wilkens L. R. (2014). Obesity and non-Hodgkin lymphoma survival in an ethnically diverse population: the Multiethnic Cohort study. Cancer Causes Control 25, 1449–1459. https://doi.org/10.1007/s10552-014-0447-6.

[19] Santana-Cárdenas S. (2016). Relationship of work stress with eating behavior and obesity: Theoretical and empirical considerations. Revista Med.

[20] LaMotte S. (2017). Long-term stress might make you fat, study. CNN Health. https://edition.cnn.com.

[21] Koski M. and Naukkarinen H. (2017). The Relationship between Stress and Severe Obesity: A Case-Control Study. Biomed Hub. (2); 458771.

[22] Austin S. (2017). Work stress equal to obesity. Journals of nursing administration. 20.(11); 488-95.

[23] Janet A Tomiyama (*2019)* Stress and Obesity. *Annu Rev Psychol*. 2019. 2019 Jan 4; 70: 703-718.

[24] Marianna V., Markus J., Tea L., Linda M. H., Jaana P., Solja T. N., Lars A., G. David B., Annalisa C., Els C., Dirk D., Jenni E., Eleonor F., Jaana I. H., Jenny H., France K., Anders K., Constanze L., Maria N., Tuula O., Olli P., Ossi R., Paula S., Archana S., Sari S., Sakari B. S., Töres T., Jussi V. *(*2020*),* Long working hours and change in body weight: analysis of individual-participant data from 19 cohort studies. *International Journal of Obesity* (2020) 44: 1368–1375.

[25] Yonghua C., Xi L., Ni Y., Wanru J., Yahui F., Hong Y., Lu M., and Le M. (2020). Higher Academic Stress Was Associated with Increased Risk of Overweight and Obesity among College Students in China. Int. J. Environ. *Res. Public Health* 2020, 17, 5559.