SciencePG
Science Publishing Group

The Effect of Personality Trait on Obesity in the Bamenda Municipality, Cameroon

Kinga Bertila Mayin[1, 2], Fuein Vera Kum[3], Sundjo Fabien[3, 5], Njohyim Herita Ngefor[4]

[1]Department of Health Economics and Policy Management, Catholic University of Cameroon (CATUC), Bamenda, Cameroon

[2]Health Economics Association of Cameroon, Bamenda, Cameroon

[3]Department of Economic, The University of Bamenda, Bamenda, Cameroon

[4]Department of Psychology, The University of Yaounde I, Yaounde, Cameroon

[5]Department of Business and Public Policy, Saint Monica University Higher Institute, Buea, Cameroon

Email address:
bertsking@yahoo.com (K. B. Mayin), fkvera@gmail.com (F. V. Kum), sundjofabien@rockmail.com (S. Fabien),
ngohyimngefor@gmail.com (N. H. Ngefor)

Abstract: Many researchers have established the link between genes and obesity. Some other researchers, in an attempt to find out why people with the same genetical setup have different body mass indexes, have amongst other factors linked it to differences in socioeconomic status, differences to dieting pattern and physical activities. A new school of thought has come up to establish the fact that differences in personalities also accounts for differences in body mass index. According to Sutin et al. (2011), personality traits contribute to health outcomes. They found a link between personality and body mass index. This study was out to investigate the effect of personality trait on obesity. We administered 1052 personality test randomly to individuals aged 20 and above in the Bamenda Municipality. The model was estimated using the regression; ANOVA and Correlation analysis. From the analysis, it was realized that there exist a positive and statistically significant relationship between personality trait and obesity. Sanguine and choleric personalities were less likely to be obese compared to melancholic and phlegmatic. The study concluded that, introverts are more likely to be obese than extroverts. It was recommended that individuals who have the melancholic and phlegmatic personality (introverts) should be more actively involved in dieting and exercising. Lastly, it was also recommended that the government of Cameroon should institute one compulsory day of the week for workers sports. All workers should have Saturday as a compulsory sporting day as done in Kenya.

Keywords: Effect, Personality, Trait, Obesity, Bamenda, Cameroon

1. Introduction

In Africa, though obesity figures show comparatively lower rates compared to those of developed countries, some African countries like South Africa 27.7% and Egypt 26.6% also had high prevalent rates of adult obesity in 2012 [19]. For other African countries, the adult prevalent rate of obesity for 2014 stood at 16.8% for Namibia, 15.8 for Gabon, 10.9 for Ghana, 9.7% for Nigeria and 8.3% for Senegal. Figures show an increase in South Africa's obesity rate from 27.7% in 2012 to 31.3% in 2014, a clear indication that obesity rate is on the rise and hence a source for concern at the African level [20] Looking at the rising rate of obesity, thousands of researches on obesity have been aimed at identifying the cause and consequences of obesity so as to better manage the situation. Many researchers have established the link between genes and obesity. Some other researchers, in an attempt to find out why people with the same genetical setup have different body mass indexes, have amongst other factors linked it to differences in socioeconomic status [6] differences to dieting pattern [2] and physical activities [12]. A new school of thought has come up to establish the fact that differences in personalities also accounts for differences in body mass index. According

to Sutin et al. personality traits contribute to health outcomes [14]. They found a link between personality and body mass index. To investigate this prediction, this work thus sets out to find the effect of Personality traits on obesity in the Bamenda Municipality.

2. Concepts and Literature Review

Obesity is defined as an excessive amount of body fat [15]. A study on the measures of fatness and obesity in a social science research by Cawley et al. defined obesity as a person's body mass index (BMI) to quantify obesity [3]. BMI indicates weight in kilograms divided by height in meters squared. If an individual's BMI is greater than 25 but less than 30, he or she can be classified as overweight. BMI provides the most useful population-level measure of overweight and obesity as it is the same for both sexes and for all ages of adults. However, to them, BMI should be considered a rough guide because it may not correspond to the same degree of fatness in different individuals.

Personality trait refers to a person's set of characteristics, that is the totality of a person's attitudes, interest, behavioral patterns, emotional responses, social roles, and other individual traits that endure over a long period of time [13]. Personality is deeply ingrained and relatively enduring patterns of thought, feeling, and behaviour. It usually refers to that, which is unique about a person, the characteristics that distinguish him or her from other people [13]. The Big Five theory of personality trait classified personality as Extraversion, Agreeableness, Conscientiousness, Neuroticism and Openness to Experience which are a set of five broad, bipolar trait dimensions that constitute the most widely used model of personality structure. This work adopts the definition of Soto who defined personality trait as a characteristic pattern of thinking, feeling, or behaving that tends to be consistent over time and across relevant situations. It however used the categorization of personality according to Hippocrates. The personality types are sanguine, choleric, melancholic and phlegmatic.

This work is backed by many theories. Amongst them are the Fat-Stat Theory. According to this theory by Bennett people are programmed to accumulate a certain amount of body fat and eat enough to maintain the level of fat [1]. This theory assumes that this level of fat is determined by a hypothetical "set point" mechanism. The set point is set by certain genetic and environmental influences. This theory is incompatible with the overeating hypothesis because it suggests that in the long run, the body focuses on fat stores, not food intake. It is potentially compatible with some pica theories, but it also explains how normal weight is maintained by people who give no thought to how much they eat. Treatment of obesity, using this theory, focuses on environmental influences that might affect the level of the set point mechanism, such as physical activity, high fat content in the diet, etc. This theory is credited for bringing in an environmental factor in obesity however, it's being criticized for failing to explain in detail how these environmental factors will or not provoke obesity.

To capture personality, we used the four temperament theory. This theory by Kant has its roots in the ancient four humors theory of the Greek Historian Hippocrates (460-370 BC), it is related to the classical elements of air, water, earth, and fire; as sanguine, phlegmatic, melancholic, and choleric, respectively [10]. This four temperaments type has been used in this work to capture the different personality types.

Another personality theory is the Big Five Personality Traits theory by Soto [16]. Each of the Big Five represents a broad set of related behavioral characteristics. They categorized personality in 5 main groups. The extraversion, agreeableness, conscientiousness, neuroticism and openness. Looking at the characteristics of the above personality type theory, unlike other studies this work will use the four categories of personality type. That is sanguine, choleric, melancholic and phlegmatic. This is because it is more comprehensive and has an easy standardize test. From the theory, it can be seen that the first two (sanguine and choleric) are extroverts while the last two (melancholic and phlegmatic) are introverts. Introverts are generally more active than extrovert thus one will expect that they expend more energy in their daily activities thus should be generally prone to less weight than the introverts who are calm and stable. In addition, introverts are emotional and are more prone to satisfy their low emotion by over eating thus still keeping them more prone to obesity than the extroverts. Looking at this theory, two factors that affect obesity clearly comes out (Dieting and physical activities). Thus this work will investigate if these traits in their different personalities make them more or less prone to obesity. Empirically, a number of researchers have investigated the link between personality trait and obesity. Amongst them are the work of Provencher who assessed the extent to which personality traits are related to BMI and eating behaviors in overweight and obese women ($N = 154$; mean body mass index (BMI) of 30.5 ± 3.0 kg/m^2) [13]. Their results show a positive relationship between personality trait and obesity. Sutin et al. found out that greater weight gain among impulsive people; those who enjoy taking risks; and those who are antagonistic – especially those who are cynical, competitive and aggressive [17]. "Previous research has found that impulsive individuals are prone to binge eating and alcohol consumption," Sutin et al. said. "These behavioral patterns may contribute to weight gain over time." José and López worked on personality profiles between obese and control subjects assessed with five standardized personality scales and examined 55 obese subjects (mean BMI=43kg/m) and 66 controls (mean BMI =21.7kg/m) [9]. Their results showed significant differences between groups. Obese subjects showed different personality profiles than control subjects. Claes et al. in a pre-bariatric psychological assessment of 102 morbidly obese women identified two personality subtypes: a resilient/high functioning subtype with a normal personality profile and an emotional dysregulated under controlled subtype, characterized by high neuroticism and low extraversion/conscientiousness [4]. Emotional dysregulated/under controlled patients showed more concerns about eating/weight/shape, more being eating driven by emotions and external triggers, more psychological complaints (such as depression and anxiety) and more avoidance and

depressive coping reactions than resilient/high functioning patients.

Sachin, Predeep and Joshi assessed the Chakra personality types in normal and overweight/obese individuals [14]. They determined the association between chakra personality types and obesity using observational cross sectional study with one hundred and fifty enrolled participants. Using the Chakra personality test, their results showed strong association between chakra personality type and overweight/obesity (P-value of <0.01). This study suggests that Tamsik chakra personality type may predispose to overeating behaviour and physical inactivity leading to obesity. In the same year, Gueren carried out a study on obesity and personality trait and reported that when people gain weight; they probably blame it on the workouts they skipped or the junk food they have been eating [8]. Gerlach, Herpertz and Loeber found out that Personality traits play an important role both as risk as well as protective factors in the development of overweight and obesity [7]. While 'neuroticism', 'impulsivity' and 'sensitivity to reward' appear as risk factors, 'conscientiousness' and 'self-control' have been shown to have a protective function in relation to weight gain. Walters ask the question "Are some types of people more prone to gain weight than others"? According to a new personality study published by the American Psychological Association in 2016, the answer was yes [18]. People with personality traits of high neuroticism, are more likely to be obese compared to others without those traits, and weight tends to increase gradually as people age. Looking at the above studies and other literatures we came

across, little or no work was seen on personality trait and obesity as a whole talk less of in Cameroon and the Bamenda Municipality. In addition, none of the works reviewed above used the four temperament types (sanguine, choleric, melancholic and phlegmatic) to test personality thus making this work not only find its place in filling in the missing gaps in literature on this topic but also trying to see if the results are same with those carried elsewhere using different personality tests.

3. Methodology

To effectively carry out this work, we implore the primary data (stress test and questionnaires). To investigate the influence of personality trait on obesity, we administered 1057 personality test by Tim LaHaye to individuals in the Bamenda Municipality. The test was corrected to determine the personality types of the individuals. The decision to use primary data was due to lack of secondary data on these variables for the Bamenda Municipality. To investigating the influence of personality trait on obesity, we used the multiple regression analysis. In addition, correlation and ANOVA test have been used to confirm our regression results. The ANOVA test was used to establish if there is a difference or not in the body mass index of the different personality type while the correlation test was used to investigate if there exist a relationship between personality trait and obesity.

The Multiple Regression Model is specified as:

$$Y= (x_i\, x_2\ldots,x_k) + \sum = x_{\,i}\,\beta_{\,1} + x_2\beta_2 + \ldots\ldots + x_k\beta_K + \sum \tag{1}$$

Where y= dependent variable and x_i = independent variables
Applying this model to our work, our model can be specified as

$$BMI= b_o + b_1\,PT + b_2\,WS + b_3\,age + b_4\,sex + u \tag{2}$$

The logit model is specified thus:
Logit model

$$Prob\ (y=1/x) = f(x,\beta);\ Prob\ (y=0/x) = 1\text{-}F(x,\beta)$$

Where the set of parameters, β reflects the impact of changes in x on the probability.
In a familiar linear regression

$$(x_1\beta) = x^1\beta \text{ since } \sum (y/x) = f(x_1\,\beta),\ Y= \sum (y/x) + (y\text{-}E\,(y - E\,(y/x) = x^1\,\beta + \sum \tag{3}$$

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

Variable	Meaning	Description
OBS	Obesity	Obesity is continues here
PT	Personality Trait	Sanguine=1, choleric=2, melancholic =3, phlegmatic=4
AG	Age	Age of the individual in years
S	Sex	Male=1, Female= 2

Source: Computed by author.

Justification for Inclusion of Variables in the Model
Obesity and Personality trait
Elfhag and Morey theory described eating behavior (Dutch Eating Behaviour Questionnaire) in terms of the Big Five personality traits (NEO Personality Inventory-Revised) in obesity patients [5]. Their theory stipulates

emotional eating was strongly positively associated to Neuroticism, in particular impulsiveness and depression, and further linked to lower Conscientiousness mainly seen in lower self-discipline, and lower extraversion. External eating was likewise mainly associated to the facets impulsiveness and lower self-discipline.

Restrained eating was on the other hand related to higher conscientiousness, extraversion and openness, and lower neuroticism. This theory gives a good link to justify why some personality types are prone to obesity. According to the above theory, some personality types eat more and do less physical activities.

4. Results and Discussions

Presentation of Summary Statistics

Table 2. *Descriptive Statistics on Personality trait 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
Personality	1057	1.00	4.00	2.3832	1.19096	.130	.075	-1.507	.150
	1057								

Source: Computed by author using SPSS 17.

From table 2 above, the mean body mass index of the Bamenda municipality is 27.46 which is in the overweight rage. This means that on an average people in the Bamenda municipality are overweight. 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 Personality trait variables. The results show that being obese statistically depended on age (p-value=0.00), gender (p-value = 0.00) and personality (p-value=0.001). It also provides valid frequencies and percentages of obesity and different independent variables. These results have been represented on figure 1.

Table 3. *Chi Square Table for Obesity and Personality trait 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

Variable	NOT OBESE	OBESE	Totals
PERSONALITY			
SANGUINE	281 (26.6%)	75 (7.1%)	356 (33.7%)
CHOLERIC	158 (14.9%)	50 (4.7%)	208 (19.7%)
MELANCOLIC	149 (14.1%)	76 (7.2%)	225 (21.3%)
PLEGMATIC	181 (17.1%)	87 (8.2%)	268 (25.4%)
Prob X^2			0.001
total	769 (72.8%)	288 (27.2%)	

Source: computed by author using SPSS 17
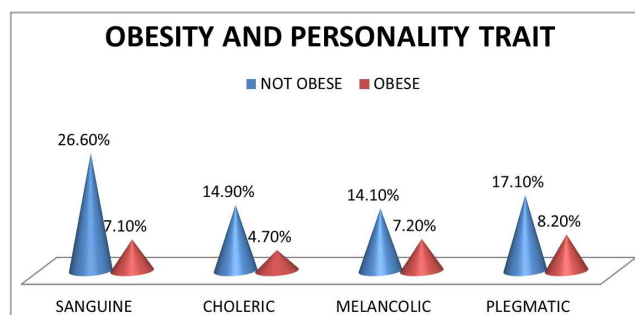
Source: Computer by author using SPSS 17

Figure 1. *Obesity and Personality Trait.*

From figure 1 more of phlegmatic 87 (8.2%) are obese follow by melancholic 76 (7.2%), the sanguine 75 (7.1%) and then choleric 50 (4.7%). The chi square value of this relationship is 0.001 implying a statistical significant relationship between obesity and personality trait in the Bamenda Municipality.

Presentation of Inferential Statistics Results

Table 4. *Multiple Regression, Correlation and ANOVA Results for personality trait 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)
Personality Trait	0.235 (0.123)	0.089***(0.002)	3.865***(0.009)
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 author using STATA 14. *** =1%sign, **= 5% sign and *= 10% Sign level

From column one on table 4, column two which have the multiple regression results 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, the older people get, the more their obesity rate increases. One year increase in age will lead to a 1.756 unit increase in body mass index. Other results showed that the coefficient of personality trait is positive indicating that phlegmatic suffer more from obesity by 23.5% compared to sanguine, choleric and melancholic. Both the results of age and personality trait are statistically insignificant. The constant term is also positive and significant. This indicates that, there are other variables not included in our model which positively affects the obesity level. One unit increase in these variables will lead to 22.60 unit increase in body mass index. The correlation and ANOVA results in column 3 and 4 of table 4 are contrary to the regression results. It shows a statistical significant result between personality trait and obesity in the Bamenda Municipality.

Discussion of Results of Personality Trait and obesity results

The result shows a positive and statistical significant relationship between personality trait and obesity. This result is in line with the work of José and López who worked on Personality profiles between obese and control subjects and found out significant differences between groups [9]. Claes et al. study also showed that personality trait is highly associated to obesity [4]. In this study, weights were attributed to the different personality traits according to their activity level. Lowest weights were assigned to more active personality like sanguine (1), followed by choleric (2), and melancholic (3) and then the least active phlegmatic (4). The significant results thus shows that less active (introverts) personalities of phlegmatic and melancholic are more prone to obesity than the more active (extrovert) personality of sanguine and choleric. This is justified by the fact that the introvert personalities (phlegmatic and melancholic) have low activity level and prefer to stay in their comfort zone than go around like the extrovert.

5. Conclusion and Policy Implementations

This study was out to investigate the effect of personality trait on obesity. From the analysis, it was realized that there exist a positive and statistically significant relationship between personality trait and obesity. Sanguine and choleric were less likely to be obese compared to melancholic and phlegmatic. The study concluded that, personality trait has a positive and statistically significant influence on obesity. From the findings of the results of personality trait and obesity, it was recommended that individuals who have the melancholic and phlegmatic personality should be more actively involved in dieting and exercising. Lastly, it was also recommended that the government of Cameroon should institute one compulsory day of the week for workers sports. All workers should have Saturday as a compulsory sporting day as done in Kenya.

6. Proposals for Future Study

We propose that future study looks at the effect of personality trait on eating habits and the love for sports. This will go a long way to explain why people with certain personality traits are more prone to obesity than the others.

Acknowledgements

References

[1] 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

[2] Carter T., Long JA., Shannon R. and Grande D. (2013). Understanding why patients of low socioeconomic status prefer hospitals over ambulatory care. Health Affairs jounal.

[3] Cawley J., John AR. and Kara H. (2007). Occupation-specific Absenteeism costs Associated with obesity and Morbid obesity. Journal of Occupational and Environmental Medicine. 49.(12); 17-24.

[4] Claes L., Vanddereycken W., Vandeputte A., Braet C. (2013). Personality Subtypes in Female Pre-Bariatric Obese Patients: Do They Differ in Eating Disorder Symptoms, Psychological Complaints and Coping Behaviour? Eur Eat Disord Rev. pubmed.

[5] Elfhag K. and Morey LC. (2007). Personality traits and eating behavior in the obese: Poor self-control in emotional and external eating but personality assets in restrained eating. Obesity Unit, M73, Karolinska University Hospital, SE-141.

[6] Fezeu L., Minkoulou E. and Balkau B. (2006). Association between socioeconomic status and adiposity in urban Cameroon. Int J Epidemiol, 2006. (35); 105–11.

[7] Gerlach G., Herpertz S. and Loeber S. (2014). Personality traits and obesity. A systematic review. Obesity Review. 16. DOI: 10.1111/obr.12235.

[8] Gueren C. (2013). How Your Personality Impacts Your Weight. International Journal of Obesity. (27); 1534–1540. doi: 10.1038/sj.ijo.0802460.

[9]   José L. and López P. (2012). Personality profiles between obese and control subjects assessed with five standardized personality scales. Instituto de Psiquiatríay Salud Mental Hospital Clínico San Carlos Madrid, España.

[10] Kant, I. (2004). Personality trait theory. Standford encychlopedia of psychology. 1724–1804. https://plato.standford.edu.

[11] McCrae S., Costa R A. and Sullivan TJ. (2003). severe obesity and personality: a comparative controlled study of personality traits. Int J Obes. (27). 1534–1540. https://doi.org/10.1038/sj.ijo.0802460

[12] Mogre V., Mwinlenaa PP., Oladele J. and Amalba A. (2012). Impact of physical activity levels and diet on central obesity among civil servants in Tamale metropolis. Journal of Medical and Biomedical Sciences, 2.

[13] Provencher V. (2008). Personality traits in overweight and obese women: Associations with BMI and eating behaviors. Eating Behaviors. 9 (3); 294–302.

[14] Sachin MP., Predeep RJ. And Joshi LN. (2013). Association of Chakra Personality Type and Obesity. International Journal of Recent Trends in Science and Technology, ISSN 2277-2812 E-ISSN. 8. (2); 2249-8109.

[15] Sobal J. and Stunkard AJ. (1989). Socioeconomic Status and Obesity: A Review of the Literature. "Psychological Bulletin, 105.

[16] Soto CJ. (2018). Big Five personality traits. The SAGE encyclopedia of lifespan human development (pp. 240-241).

[17] Sutin AR., Ferrucci L., Zonderman AB. And Terracciano (2011). Personality and obesity across the adult life span:. Journal of Personality and Social Psychology. 101.(3); 579-592.

[18] Walters J. (2016). Is Your Personality Causing You to Gain Weight? Meredith Corporation.

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

[20] WHO. (2015). Report on 10 Facts of Obesity. www.who.int.