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The Correlation Between Unemployment Rate, GDP Per Capita, and Adult Obesity Prevalence in Developed Economies. Evidence from OECD Member Countries.

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2020

Abstract

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Doctoral Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Public Health

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Abstract

Adult obesity continues to be endemic in developed countries; at least 1 in every 5 people in developed economies is obese. In line with the theory of social suffering, socioeconomic factors may be correlated with the increasing prevalence of adult obesity. The purpose of this study was to investigate the correlation between socioeconomic factors and adult obesity prevalence rate in developed countries using Organization for Economic Co-operation and Development (OECD) member countries as a case study. In this study, the correlation between 2 independent variables - unemployment rate and Gross Domestic Product (GDP) per capita - and the dependent variable - adult obesity prevalence rate - were investigated. The variables were retrieved from the Central Intelligence Agency (CIA) website and tested for association. The type, strength, and significance of the association between the variables were all utilized to draw inferences. The findings of this study reveal that a positive correlation exists between unemployment rate and adult obesity prevalence rate, albeit weak and statistically nonsignificant and that a negative correlation exists between GDP per capita and adult obesity prevalence rate, albeit weak and statistically nonsignificant. This means that a lower unemployment rate, improved GDP per capita and, by extension, a better economy and less suffering in the society can, to an extent, assist in the reduction of the adult obesity prevalence rate in developed countries. The extent to which these factors can assist largely depends on how minimal the significant risk factors of adult obesity are in the population. In other words, while improved economy can act as leverage in the reduction of the adult obesity prevalence rate in developed economies, focus should be on modifying the significant risk factors of adult obesity, such as eating habit and a physical lifestyle.

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Dedication

I dedicate this academic piece of work to Almighty God who made Heaven and Earth for making this academic journey a possibility. I also dedicate this academic piece of work to my family: my lovely kids, Uche Jnr and Olivia Adaeze, and their Mom, Juliet O'Martins, for their emotional support throughout this academic journey. Lastly, I dedicate this academic piece of work to my parents, Sir and Mrs Chile and Anne O'Martins for laying a strong foundation for my academic pursuits.

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Section 1: Foundation of the Study and Literature Review

Introduction

Adult obesity continues to be endemic in developed economies. At least 1 in every 5 adults in most developed countries is obese (CIA, 2018b). In the United States, for instance, obesity is the major cause of preventable life years lost among U.S. citizens, surpassing tobacco use, high blood pressure, and high cholesterol (United Health Foundation, 2018b). The treatment of obesity and obesity-related ailments in the United States costs billions of dollars annually, and this has a cumulative toll on the U.S. economy. In 2010, the overall estimated cost of obesity was $315.8 billion in the United States (United Health Foundation, 2018b).

Hruby and Hu, (2015) noted that economic development, industrialization, innovative transportation system, increasing sedentary lifestyle, and a nutritional shift to processed foods and high calorie meals over the last 3 decades have had many countries witness an alarming increase in the prevalence of adult obesity in their citizens. The increasing prevalence of obesity predicts an overwhelming burden of disease in individuals and healthcare systems in years to come (Hruby et al. 2015), signaling that obesity is now a public health issue of significant importance that requires multisectoral policy interventions (Ricci, De Vuono, Scavizzi, Gentili, & Lupattelli, 2016). The findings of this study can contribute to the formulation and enactment of appropriate programs and policies aimed at decreasing adult obesity prevalence in developed economies.

While unemployment has been found to be associated with obesity in certain individuals, such as nonsmokers (Hughes & Kumari, 2017), the correlation between unemployment rate, gross domestic product (GDP) per capita, and adult obesity prevalence in developed economies, at the population level, is underresearched and uncertain. Therefore, the findings of this study can provide much-needed insights into the association between unemployment rate, GDP per capita, and the adult obesity prevalence rate in developed economies.

In view of the enormous public health consequences of obesity in developed nations, socioeconomic factors driving the high prevalence rate of adult obesity in developed countries need to be investigated with a view to putting in place timely, multisectoral interventions to contain the increasing adult obesity prevalence rate. In this study, I investigated the correlation between unemployment rate, GDP per capita, and the adult obesity prevalence rate in developed countries using the 36 Organization for Economic Co-Operation and Development (OECD) member countries as a case study. The debilitating health consequences and costs related to obesity emphasize the significance of investigating the risk factors of obesity that are modifiable through policy or public health interventions (Frankenfeld, Leslie, & Makara, 2015). In this study, I determined, at the population level, if socioeconomic conditions, such as unemployment rate and GDP per capita, are significant risk factors for developing obesity in adult age. The findings can, to a large extent, inform developed countries on the appropriate, multisectoral interventions to design that will help contain the prevalence of adult obesity in their respective countries.

In Section 1, I present the foundation of the study and a review of the literature. The section includes the problem statement, purpose of study, significance of the study, theoretical framework of the study, research questions and hypotheses, nature of the study, a literature review, assumptions, scope and delimitations, and a summary and conclusion. Section 2 includes the research design and rationale, methodology, threats to validity, and a summary. In Section 3, I discussed the data collection of secondary data set, results, and summary. In Section 4, I provided the study findings, the implications for social change, an interpretation of findings, the limitations of the study, and recommendations.

Problem Statement

Adult obesity is a public health issue of significant importance in developed countries. At least 1 in every 5 adults in most developed countries are obese (CIA, 2018b). In the United States, for instance, obesity is the major cause of preventable life years lost among U.S. citizens, surpassing tobacco use, high blood pressure, and high cholesterol (United Health Foundation, 2018b). The treatment of obesity and obesity-related ailments in the United States costs billions of dollars annually, and this has a cumulative toll on the U.S. economy. In 2010, the overall estimated cost of obesity was $315.8 billion in the United States (United Health Foundation, 2018b). Ricci et al. (2016) noted that the relevance of obesity can be seen when considering its significant association with decreased economic and social opportunities, decreased quality of life, and, above all, decreased life expectancy.

There is a high coincidence of adult obesity and chronic conditions, such as hypertension, stroke, heart attack, Type 2 diabetes, and certain types of cancer, to mention but a few (McKinnon, Wiedt, Hoffnagle, & Shrimplin, 2015). Some of these chronic conditions, such as heart disease and stroke, for example, are the leading and fifth leading causes of mortalities in the United States respectively (United Health Foundation, 2018a). A study carried out in the United States in 2011 estimated that medical costs for managing and treating obesity and its comorbidities will rise by $48 billion to $68 billion per year by the year 2030 because of the increasing prevalence rate of obesity in the country (United Health Foundation, 2018b). Furthermore, the health consequences of obesity are more difficult to manage in young adults due to minimal symptoms and lower probability to seek healthcare and adhere to therapy due to more pressing age-related life priorities (Cheng, Medlow, & Steinbeck, 2016). Incidentally, young adults are the most productive age group of every nation and, by extension, the integral part of every nation's economy (Cheng et al., 2016). These facts and more underscore the desperate need to contain the increasing prevalence of adult obesity in developed countries.

While the impacts of several health variables, such as eating habits and physical activities, on adult obesity prevalence rates of developed economies are well investigated and publicized, the association, at the population level, between unemployment rate, GDP per capita, and the adult obesity prevalence rates of developed economies is underresearched. From an extensive literature review, the closest research I could find on the association between unemployment and obesity was carried out by Hughes et al. (2017) in a longitudinal study; however, their study was conducted at the household

level, wherein only U.K. households were studied. As a cross-sectional study, I conducted this doctoral study to investigate the relationship between unemployment rate, GDP per capita, and the adult obesity prevalence rate across the 36 OECD member countries by analyzing the most recent data on the countries' unemployment rate, GDP per capita, and adult obesity prevalence rates. OECD member countries are predominantly developed countries. Figure 1 is a world map showing the OECD member countries.

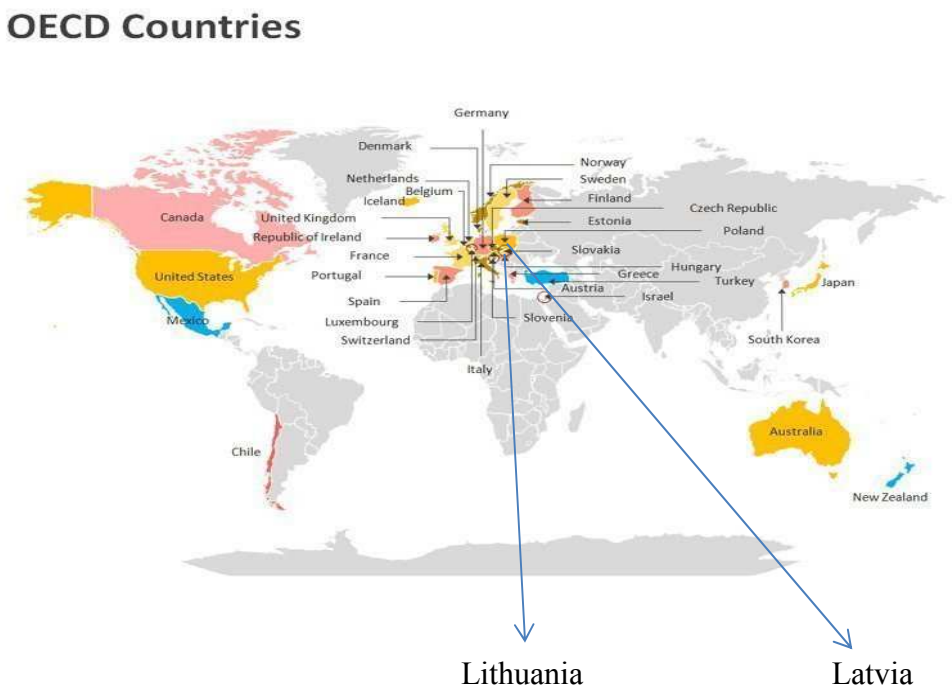

Figure 1. World map showing the 36 OECD member countries. Retrieved from https://www.24point0.com/ppt-shop/oecd-map-powerpoint/

The results of this study fill a gap in understanding the correlation between unemployment rate, GDP per capita, and adult obesity in developed countries. Obesity prevention has defied clinical actions and public health exhortations, necessitating policy responses (Kersh, 2009); hence, studies should be carried out to investigate all possible

factors fueling the adult obesity prevalence rate in developed countries with a view to coming up with appropriate, multisectoral programs and policies that will help contain the increasing rate of adult obesity.

Purpose of the Study

The purpose of this study was to investigate the correlation between unemployment rate, GDP per capita, and the adult obesity prevalence rate in developed economies using the 36-member OECD countries as a case study. OECD member countries are predominantly developed countries. Adult obesity is a modifiable risk factor for many chronic conditions that are leading causes of mortalities in developed countries (United Health Foundation, 2018b).

In view of the enormous consequences of obesity, all factors suspected to be driving the prevalence of adult obesity in developed economies should be investigated. The unemployed are significantly less active and spend less time in moderate to high intensity physical activity than those who are employed (Kwak et al., 2016). Van Domelen et al. (2011) also posited that full-time employment, even in sedentary jobs, is positively correlated with physical activity compared to not being employed. Increased TV viewing, increased computer use, increased sitting, and increased sleeping are common forms of sedentary lifestyle associated with unemployment (Konevic, Martinovic, & Djonovic, 2015). Sedentary lifestyle and physical inactivity are known modifiable risk factors for obesity (Petri, 2016; Pietiläinen et al., 2008). There is a high coincidence of sedentary lifestyle and obesity (Van Domelen et al., 2011).

However, Ruhm (2003) challenged the hypothesis that there is a strong positive correlation between unemployment rate and adult obesity prevalence rate by postulating that an increase in unemployment rate, in fact, predicts decline in the prevalence of medical conditions, reductions in severe morbidities and bed-days, as well as decreases in ischemic heart disease and intervertebral disk disorder. Ruhm (2000) also posited that economic downturns, often characterized by a high unemployment rate, give people more time to exercise as well as more time to prepare healthy meals and, therefore, they would be more likely to maintain healthy bodyweights.

In a longitudinal study, Hughes et al. (2017) investigated the relationships between unemployment, being underweight, and obesity; however, only U.K. households were studied. Q. Zhang, Lamichhane, and Wang (2014) investigated the association between U.S. adult obesity and the economic conditions of states and counties in the recession; however, their study population was only composed of U.S. men and women. Building on these single country studies, I conducted this study to investigate the relationship between unemployment rate in percentage, GDP per capita in dollars, and adult obesity prevalence rates in percentage across developed countries. Because there are conflicting lists of developed countries, I choose to use the 36 OECD member countries, which are predominantly developed countries, as the units of analysis for this doctoral study. In view of these uncertainties and the conflicting findings of previous researchers, I carried out this doctoral study to fill an important gap concerning the correlation between unemployment rate, GDP per capita, and the adult obesity prevalence rates in developed countries.

Theoretical Framework

The theoretical framework for this study was the theory of social suffering. This theory posits that socioeconomic and sociopolitical forces can in some cases cause diseases (Kleinman, 2010). Kleinman (2010) noted that it was abject poverty that created the conditions for tuberculosis and similar diseases to proliferate. That is to say, there is a strong positive correlation between poverty and communicable diseases like tuberculosis. However, since tuberculosis is a communicable disease, my application of the theory of social suffering in this study determined if this theory is also applicable to noncommunicable diseases such as adult obesity. I conducted this study to find out, at a population level, if unemployment rate and GDP per capita, two socioeconomic forces, are correlated with adult obesity in developed economies. At the end, I determined if the study findings were consistent with the theory of social suffering.

Furthermore, the theory of social suffering collapses the ancient distinction between what is a health problem and what is a social problem (Kleinman, 2010) and, by extension, collapses the distinction between health policies and social policies. This theory frames conditions that are both health and social problems, thereby framing conditions that require both health and social policy interventions (Kleinman, 2010). This means that efforts to address social problems often address certain health problems. Wilkinson and Pickett (2010) noted that greater equality makes societies healthier, which is consistent with the theory of social suffering that posits that health and socioeconomic problems are largely intermingled and can be addressed with common programs and policies. In other words, this doctoral study was conducted to investigate if

unemployment, a socioeconomic problem, is intermingled with obesity, a health problem, at the population level. A significant correlation between unemployment rate, GDP per capita, and adult obesity prevalence rate would further validate that socioeconomic problems can indeed trigger health problems.

Research Questions and Hypotheses

RQ1: What is the relationship between unemployment rate in percentage and adult obesity prevalence rate in percentage in OECD member countries?

$H_0$1: There is no statistically significant relationship between unemployment rate in percentage and adult obesity prevalence rate in percentage in OECD member countries.

H_a1: There is a statistically significant relationship between unemployment rate in percentage and adult prevalence rate in percentage in OECD member countries.

RQ2: What is the relationship between GDP per capita in dollars and adult obesity prevalence rate in percentage in OECD member countries?

$H_0$2: There is no statistically significant relationship between GDP per capita in dollars and adult obesity prevalence rate in percentage in OECD member countries.

H_a2: There is a statistically significant relationship between GDP per capita in dollars and adult prevalence rate in OECD member countries.

Variables

In this study, I tested three variables for correlation: Unemployment rate in percentage and GDP per capita were the two independent variables, while the adult obesity prevalence rate in percentage was the dependent variable. Controlling for other factors, I investigated if adult obesity prevalence rate is significantly correlated to unemployment rate and GDP per capita across OECD member countries in this study. A statistically significant association between the two independent and the single dependent variables was tested using correlation analysis.

Nature of Study

In this cross-sectional study, I investigated the correlation between unemployment rate, GDP per capita, and the adult obesity prevalence rate in developed economies. A correlation analysis was run on the most recent available data for the three variables: adult obesity prevalence rate, GDP per capita, and unemployment rate. Mediating variables were not investigated. The most recent adult obesity prevalence rates, the most recent GDP per capita, and the most recent unemployment rates of the 36 OECD member countries were analyzed to determine if there is a correlation between the three variables.

I retrieved the relevant data from the CIA 2018 database. Finding a positive correlation between the unemployment rate and adult obesity prevalence rate and a negative correlation between GDP per capita and adult obesity prevalence rate in developed economies would be consistent with the theory of social suffering, which posits that the more social problems in a population, the more the health problems in the same population (see Kleinman, 2010). The unit of analysis for this study was each of

the 36 OECD member countries. The unemployment rates and adult obesity rates of the 36 OECD member countries were in percentages, while the GDP per capita was in dollars.

Literature Search Strategy

The aim of this literature review was to identify peer-reviewed articles that discussed the subject of adult obesity in developed countries and the correlation between unemployment rate and adult obesity prevalence in developed economies with a view to synthesizing knowledge and identifying gaps. I conducted my literature search in several databases, namely: PubMed, CINAHL Plus with Full Text, MEDLINE with Full Text, Cochrane Database of Systematic Reviews, Dissertations and Theses at Walden University, Science Journals, Science Direct, ProQuest, and ProQuest Central. I also searched Google Scholar as well as the World Health Organization (WHO), CIA, and OECD websites.

There was limited peer-reviewed literature published within the past 5 years discussing the dependent variable of interest, adult obesity, in relation to the independent variable of interest, unemployment rate; however, I overcame this by including a few, relevant, peer-reviewed sources that were published longer than 5 years ago and judiciously utilizing all the literature retrieved.

I employed the following keyword search terms to locate literature: *obesity, adult obesity, unemployment, economic recession, gross domestic product, employment, physical inactivity, health and well-being, developed countries,* and *OECD member countries.*

While my search for relevant literature was open, emphasis was placed on peer-reviewed sources that were published in the last 5 years. In other words, peer-reviewed articles that were published between the year 2013 and the current year of 2019 were mostly reviewed. Types of articles that were considered included research papers, editorials, systematic reviews, dissertations, and opinion papers. I reviewed these articles for purpose, theoretical foundation, research method, design method, population, sample size, and findings.

Literature Review Related to Key Variables and Concepts

Unemployment has been found to be closely associated with several morbidities, such as prediabetes and Type 2 diabetes (Varanka-Ruuska et al., 2018), depression, and other mental health disorders (Gajewski & Zhukovska, 2017). In several cases, loss of health insurance (Ahn & Song, 2017), loss of identity, stress, and malaise (Pignault & Houssemand, 2018) are also direct consequences of unemployment. The true consequences of unemployment on adult obesity prevalence are still being argued by social scientists.

Previous studies have focused on the effect of unemployment and other economic conditions, such as socioeconomic status and household income, on the adult obesity prevalence at the individual and household level in single countries. Most of these previous studies focused on the correlation between socioeconomic status and the adult obesity prevalence rate; however, only a few studies focused on the correlation between unemployment rate, GDP per capita, and the adult obesity prevalence rate, and those few studies focused on the individual, household, county, state, and national levels.

In their separate research findings, Marques, Peralta, Naia, Loureiro, and de Matos, (2018) and Sung and Etemadifar (2019) noted that people with low socioeconomic status were more likely to have a higher body mass index. However, there has been conflicting findings on the association between unemployment and adult obesity. While Ruhm (2000) noted that unemployment affords individuals the opportunity to prepare healthy meals and exercise more frequently, thereby being more likely to maintain healthy bodyweights, Marques et al. (2018) reported that individuals who are unemployed are more likely to have a higher body mass index. More recently, Q. Zhang et al. (2014) also reported that the last economic recession in the United States, characterized by a high unemployment rate, did not trigger the risk factors of obesity and, by extension, did not trigger an increase in the adult obesity prevalence rate in the United States. The subjects of the aforementioned studies were residents of developed countries.

Sung et al. (2019) also noted that most of the researchers investigating the correlation between socio-economic conditions, such as unemployment rate, and adult obesity prevalence conducted their analyses at the individual, household, and county levels and called on fellow researchers to investigate the association between socioeconomic conditions and adult obesity prevalence at the regional, national, and multinational levels. Sung et al. took the lead by conducting a multilevel analysis of socio-demographic disparities in adult obesity across the United States geographic regions. Notable among their findings was that, across the entire regions, individuals with low socioeconomic status were more likely to have a higher body mass index; no region was an exception to the trend. A multinational analysis of the association between

socioeconomic conditions, such as unemployment rate and GDP per capita, on adult obesity prevalence is imperative. This would give a deeper insight on the correlation between unemployment, GDP per capita and adult obesity in developed economies.

Hughes et al. (2017) investigated the relationship between unemployment and obesity in a longitudinal study at the individual and household level. Their study population comprised U.K. subjects involving 40,000 households. Hughes et al. concluded that unemployment was positively associated with obesity in the nonsmoking population. This finding was consistent with the expectation that unemployment would naturally trigger a sedentary lifestyle and physical inactivity in the individual which, in turn, would lead to weight gain and, in the long run, obesity. A sedentary lifestyle and physical inactivity are known modifiable risk factors for obesity (Petri, 2016; Pietiläinen et al., 2008).

Ruhm (2003), however, challenged Hughes et al. (2017) findings that unemployment triggers the development of adult obesity by positing that an increase in unemployment rate actually predicts a decline in the prevalence of medical conditions, reductions in severe morbidities and bed-days, as well as decreases in ischemic heart disease and intervertebral disk disorder. Obesity is a major trigger of several severe morbidities including ischemic heart disease and intervertebral disk disorder (United Health Foundation, 2018). Ruhm (2000) also noted that economic downturns often characterized by high unemployment rate afforded people more time to exercise as well as more time to prepare healthy meals, so they would be more likely to achieve and maintain healthy bodyweights.

These postulations of Ruhm (2000, 2003) are somewhat consistent with the findings of Zhang et al. (2014). Zhang et al. (2014) in their research investigated the relationship between adult obesity prevalence and the economic conditions in the United States' states and counties during the latest economic recession. While Q. Zhang et al. (2014) were not categorical in their conclusion, they noted that the last recession in the United States, characterized by significantly increased unemployment rate, did not lead to a significant increase in adult obesity risks across employment groups. Their findings imply that although there was an increase in adult obesity risks across employment groups in the last recession in the United States, characterized by a significant increase in the nation's unemployment rate, the increase was not significant.

Contrary to the postulations of Ruhm (2000, 2003) and Q. Zhang et al. (2014), Vågerö and Garcy (2016) noted that unemployment worsens people's health and well-being and further called for the abolishment of unemployment. Vagero and Garcy concluded that mass unemployment should be avoided at all costs if economic policy makers, like doctors, were committed to the ethical principle of "to do no harm." While a population's health and well-being is not an exact reflection of the adult obesity prevalence rate in the population, obesity is a major trigger of several chronic conditions; hence, the prevalence of obesity in a population is a major determinant of the population's health and well-being (see United Health Foundation, 2018b).

Whether obesity is a product of poverty or affluence is a question that is yet to be answered by social scientists. Many schools of thought have posited that obesity is a product of poverty because it is believed that the consumption of low quality and, by

extension, low cost foods, such as junk foods, is a major risk factor for developing obesity (see Frankenfeld et al. 2015). Third-world countries, which are developing economies such as Nigeria and Ghana, with a GDP per capita of only $5,900 and $4,700, respectively (CIA, 2018a), have adult obesity prevalence rate of 8.9% and 10.9%, respectively (CIA, 2018b). The United States and the United Kingdom, with a GDP per capita of $59,800 and $44,300, respectively (CIA, 2018a), have adult obesity prevalence rates of 36.2% and 27.80%, respectively (CIA, 2018b). Ghana and Nigeria, which are poorer nations, have lower prevalence of adult obesity, while the United Kingdom and the United States, which are unarguably richer countries, have a higher prevalence rate of adult obesity. This may prove that obesity is, in fact, not a medical condition for the poor.

It is noteworthy that the high prevalence rate of adult obesity in developed countries has nothing to do with population differential. The United Kingdom, for instance, has a population of approximately 65 million (CIA, 2018c) and an adult obesity prevalence rate of 27.8% (CIA, 2018b), while Nigeria, the new world's poverty capital (CNN, 2018), and one of the world's most populous countries, has a population of approximately 203 million (CIA, 2018c) with an adult obesity prevalence rate of only 8.9% (CIA, 2018b). In view of this evidence, the adult obesity prevalence rate is expected to be lower in poorer communities of developed economies, such as the United States and United Kingdom, the same way the adult obesity prevalence rate is lower in poorer economies, such as Nigeria and Ghana, another developing economy.

Frankenfeld et al. (2015), however, noted that obesity is more common in U.S. men and women of low socioeconomic status. They noted that areas of lower

socioeconomic status and higher material deprivation, naturally characterized by a higher unemployment rate, have ample convenience stores and fast food establishments with limited grocery stores and reported that such areas have higher obesity prevalence rates. Frankenfeld et al. further argued that areas with residents of high socioeconomic status are more likely to have greater access to grocery stores and that residents of these areas have been found to have lower body mass index (BMI) and, by extension, lower probability of developing obesity, thereby insinuating that obesity could, in fact, be a medical condition for the poor.

The association between GDP and adult obesity prevalence rate has also been studied by several experts. In a study carried out to determine the influence of urbanization level and GDP on the prevalence of adolescent obesity in Poland, an OECD member country, Zienkiewicz et al. (2014) reported that there is a significant positive association between the prevalence of obesity and GDP per capita of each examined region. This finding, again, somewhat contradicts the findings of Frankenfeld et al. (2015) who reported that adult obesity was more prevalent in areas of low socioeconomic status than areas of high socioeconomic status. Zienkiewicz et al., however, conducted their study on adolescents and young adults only.

A country's GDP may not be an exact reflection of the country's unemployment rate; however, there is a high coincidence of low GDP and high unemployment rate in a country. In the latest economic recession, Q. Zhang et al. (2014) noted that the U.S. economy was at its worst level in 26 years and was characterized by a high unemployment rate that reached 9.3% in 2009, an increase of 60.3% from the previous

year. The more buoyant a country's economy is, the higher the GDP and the lower the unemployment rate (see Zhang et al. 2014). Similarly, while socioeconomic status is not an exact reflection of employment status, it is believed that people from the low socio-economic strata significantly consist of the chronically unemployed and the underemployed, while people from the high socio-economic strata are predominantly the employed and the self-employed.

Marques et al. (2018) investigated the prevalence of adult overweight and obesity in 20 European countries in 2014. These 20 European countries are OECD member countries and developed countries. Marques et al. noted that Europe, made up of mainly developed countries, has a prevalence of obesity of around 16% and a prevalence of overweight of about 50%. A thin line demarcates overweight and obesity. Marques et al. stratified their study population into different characteristics including employment status. They noted that there is a relationship between the prevalence of overweight and indeed obesity and socio-economic status. They reported that there was higher prevalence of adult obesity in people from Eastern European countries. Eastern European countries, being less economically advantaged than Western and Central European countries, have a higher population of people with low socio-economic status, thereby they inferred that there is a higher prevalence of obesity in people with low socio-economic status. From their findings, 16.2% of the obese participants in the study were unemployed, while only 13.7% of the obese study participants were employed. Similarly, 19.3% of the obese study participants were from low-income households, while 15.6% are from the mid-income household and only 12.8% are from the high-income household.

Their findings demonstrate that the higher the household income, the less likely to be obese and the lower the household income, the more likely to be obese. Marques et al. (2018) further noted that people from low household income, most likely made up of a significant number of the unemployed, had greater challenges in maintaining healthy dietary habits and in affording exercise facilities etc. Marques et al. concluded, among other findings, that an individual from these 20 European countries is more likely to be obese when the individual is unemployed than when the individual is employed as well as when the individual comes from a low-income household than when the individual comes from a high-income household. Their conclusion is somewhat consistent with the findings of Frankenfeld et al. (2015) and Vågerö et al. (2016) but inconsistent with the findings of Ruhm (2000, 2003) who noted that unemployment afford people more time to exercise daily and prepare healthy meals thereby maintaining a healthy bodyweight.

These divergent views of the correlation between unemployment, GDP per capita, household income, socioeconomic status and adult obesity prevalence rate have created a roadmap for further research on the correlation between the following factors – unemployment rate, GDP per capita, household income and socioeconomic status - and adult obesity prevalence rates, particularly in developed economies where obesity has proved, beyond all reasonable doubts, to be a menace. This study investigated only the unemployment rate and GDP per capita as the independent variables.

Definition of Key Terms Related to the Study

Adult obesity: Adult obesity is a medical condition where an adult has a body mass index of 30 or greater (Centre for Disease Control and Prevention, 2016). It is an

increase in body fat sufficient enough to trigger adverse health consequences (Feng et al., 2019).

Adult obesity prevalence rate: This is the number of existing cases of adult obesity in a population and often expressed as a percentage. It shows the percent of a country's population considered to be obese (CIA, 2018a).

*Body mass index: B*ody Mass Index, abbreviated as BMI, is a measure of the body fat in the body. It is an anthropometric measurement used for the confirmation or diagnosis of obesity (Feng et al., 2019). It is calculated as follows; height in feet and inches divided by weight in pounds. An individual who is 5 feet and 11 inches tall with a body weight of 225 pounds has a BMI of 31.4 and can be referred to as obese.

Developed economies: Developed economies are characterized by a high GDP per capita and steady economic growth (da Cunha, Soja, Themistocleous, & da Silva, 2017) except in times of global recession which occurs sparingly. They are economically advanced countries. OECD member countries are predominantly developed economies.

Economic recession: An economic recession is when the economy of a country significantly declines for over 6 months or more and it is often characterized by a drop in five economic indicators namely real GDP, income, employment rate, manufacturing and retail sales (the balance, 2018). The first sign of economic recession is a negative change in the country's GDP (Remeikiene, Startiene, & Dumciuviene, 2015).

Gross domestic product (GDP): GDP defines how buoyant a country's economy is hence a country with a relatively high GDP has a buoyant economy while a country with a relatively low GDP has a less buoyant economy. It is an indicator of how rich or

poor a country is and, by extension, how rich or poor the majority of the citizens of the country are. GDP per capita measures the country's economic output in relation to the country's population. Higgs (2015) described GDP as a measure of economic welfare.

OECD: OECD is an abbreviation for Organization for Economic Co-operation and Development. It is made up of 36-member countries namely Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Latvia, Lithuania, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom and lastly the United States (OECD, 2018a). OECD member countries are predominantly developed countries and the aim of the organization is to advocate for policies that will better the economic and social well-being of people around the globe (OECD, 2018a).

Socioeconomic status: Socioeconomic status is a quantifiable reflection of individuals' income, education and occupation and has the ability to change rapidly if the individuals' income, education or occupation changes (Cook, & Lawson, 2016). It is an individual's social cum economic stratification. People with low socioeconomic status are people living on or below the poverty line. High socioeconomic status is made up of the rich, the wealthy and the affluent. While the middle socioeconomic status is made up of people who are in between the low and high socioeconomic status.

Unemployment: A situation where an individual does not have a job that provides him or her with an income. Unemployment affects the economic activity of a nation and the socio-economic structure of the people (Sahoo & Sahoo, 2019).

Unemployment rate: This is the number of unemployed people in a given population and it is often expressed in percentage. It compares the percent of the labor force that is without jobs (CIA, 2018c).

Assumptions

The following assumptions were made in this study;

1. It was assumed that variables mediating between the independent variables – unemployment rate and GDP per capita – and the dependent variable – adult obesity rate – are constant. This is a cross-sectional study hence mediating variables were not investigated.
2. The data analyzed were secondary data. It was assumed that the data were collected accurately and properly in line with data collection best practices.
3. In the wake of an era where governments alter their data and statistics to favor their intentions, it was assumed that the governments of the OECD member countries did not alter the relevant data (unemployment rate, GDP per capita and adult obesity prevalence rate) that will be analyzed. An incumbent West African president was once accused of instructing his country's National Bureau of Statistics to falsify the country's unemployment rate that was published in the wake of numerous job losses due to his gross mismanagement of the nation's economy. This trend, however, is believed to be more common in developing countries. OECD member countries are predominantly developed countries.

Limitations

1. This is a cross-sectional study hence mediating variables were not investigated in this study. There may be variables mediating between the independent and dependent variables. In other words, there may be variables influencing how unemployment rates and GDP per capita correlates with adult obesity rates in OECD member countries however these variables were not investigated in this study.
2. The data analyzed are secondary data. Primary data often offers a higher degree of accuracy.

Delimitations

1. Secondary data were used and this is more convenient. I saved enormous resources – financial and human resources – that are often expended during primary data collection.
2. As a cross-sectional study, mediating variables were not investigated hence I retrieved and analyzed fewer data. Furthermore, the study has neither control nor treatment group.

Summary and Conclusion

In this section, I outlined the problem statement, purpose of the study, the significance, theoretical framework, the research question and hypothesis, the variables, nature of study, and the literature search strategy. This section also contains a detailed review of literatures related to key variables and concepts,

definitions of terminologies, assumptions made pertaining the study, as well as limitations and delimitations of the study.

In Section 2, I outlined the methodology that was used for this doctoral research, the source of data that were analyzed, the population, explanation of the variables and the data analysis plan. Data management processes, ethical issues and threats to validity were also explained in Section 2.

Section 2: Research Design and Data Collection

Introduction

In this study, I investigated the correlation between unemployment rate, GDP per capita, and adult obesity prevalence rate in developed economies using the 36 OECD member countries as a case study. There are conflicting lists of developed countries; hence, I settled for the 36 OECD member countries, which are predominantly developed countries. There are divergent views regarding the correlation between unemployment rate, GDP per capita, and adult obesity prevalence rate both at the individual level and population level.

In this section, I provide a detailed description of the study methodology, including the research design and rationale, study population, ethical procedures, data search and retrieval procedures, data analysis plan, and threats to validity of the study findings.

Research Design and Rationale

I used a quantitative, cross-sectional research design in this study. To determine the relationship between unemployment rate, GDP per capita, and the adult obesity prevalence rate in the 36 OECD member states, I retrieved, reviewed and analyzed quantitative data obtained from the CIA database. I chose the unemployment rate, GDP per capita, and the adult obesity prevalence rate as my variables because the unemployment rate of each of the 36 OECD member countries, measured in percentage, is the most reliable indicator of the unemployment situation in the country, while the adult obesity prevalence rate also measured in percentage, similarly, is the most reliable

indicator of the adult obesity prevalence in the 36 OECD member countries. The GDP per capita was also chosen because it is a reliable indicator of a country's economic state.

The CIA is an independent agency of the United States funded by the U.S. Government and reputable for intelligence reporting (CIA, 2018e). The agency provides national security intelligence to high ranking policymakers of the United States (CIA, 2018e). It hosts several databases that provide intelligence information on several issues for over 150 countries (CIA, 2018e).

I conducted a research question-driven secondary analysis of existing data in this study. Secondary analysis of existing data is not only cost-effective but also increases the overall efficiency of research efforts (Cheng et al., 2014). The collection and analysis of existing data, otherwise known as secondary data, has been repeatedly shown to be faster than collecting and analyzing primary data (see Cheng et al., 2014). The collection and analysis of existing data, if available, avoids duplication of efforts, saves time, and reduces cost (Cheng et al., 2014). This research approach also reduces ethical issues that are associated with primary data collection and analysis and better guarantees the privacy and confidentiality of the respondents of the original study (Cheng et al., 2014).

Methodology

Study Population

The aim of this doctoral study was to investigate the correlation between unemployment rate, GDP per capita, and adult obesity prevalence rate in developed countries. However, there were conflicting lists of developed countries, so I settled for

the 36 OECD member countries, which are predominantly developed countries. In other words, the OECD member countries were the study population for this study.

Sample Size

The entire 36 OECD member countries were included in this study; hence, there was no sample size in this study because the entire population was included in the study. The 36 OECD member countries are Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Latvia, Lithuania, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom, and the United States (OECD, 2018a). OECD member countries are predominantly developed countries (OECD, 2018a). Because OECD member countries are only 36 in number, all 36 countries were included in the sample; therefore, there was no sampling bias in this study. This is called total population sampling.

Data Analysis Plan

The purpose of this study was to investigate the relationship between unemployment rate, GDP per capita, and the adult obesity prevalence rate in developed economies. I calculated the descriptive statistics of the relevant variables. A correlation analysis of the three variables was also performed to determine the relationship between the three variables. In view of this purpose, the following research question and hypothesis were formulated.

Research Questions and Hypotheses

I developed the following research questions and hypotheses to examine the correlation between unemployment rate in percentage, GDP per capita in dollars, and adult obesity prevalence rate in percentage:

RQ1: What is the relationship between unemployment rate and adult obesity prevalence rate in OECD member countries?

$H_0$1: There is no statistically significant relationship between unemployment rate and adult obesity prevalence rate in OECD member countries.

H_a1: There is a statistically significant relationship between unemployment rate and adult prevalence rate in OECD member countries.

RQ2: What is the relationship between GDP per capita and adult obesity prevalence rate in OECD member countries?

$H_0$2: There is no statistically significant relationship between GDP per capita and adult obesity prevalence rate in OECD member countries.

H_a2: There is a statistically significant relationship between GDP per capita and adult prevalence rate in OECD member countries.

Key Variables

In this study, I tested three variables for correlation: one dependent variable and two independent variables. Unemployment rates and the GDP per capita of the 36 OECD member countries measured in percentage and dollars, respectively, were the independent variables, while the adult obesity prevalence rates of the 36 OECD member countries

measured in percentage was the dependent variable. In their databases, the CIA provided the unemployment rates and GDP per capita of the 36 OECD member countries as well as the countries' adult obesity prevalence rates. There were no requirements to retrieve the relevant data of interest from the above mentioned databases.

I calculated the descriptive statistics of the aforementioned variables of interest first and foremost to showcase the descriptive statistics of the relevant data. Statistical Package for Social Science (SPSS), Version 25 was used to perform the descriptive statistics. The variables of unemployment rates, GDP per capita, and adult obesity prevalence rates were all continuous variables. I performed a correlation analysis on the three variables for the 36 OECD member countries to determine the relationship between the variables. The same statistical software, SPSS Version 25, was used to perform the descriptive statistics and the correlation analysis.

To determine the empirical relationship between three continuous variables, a correlation analysis is often recommended (Hazra & Gotgay, 2016). When a correlation analysis of the first independent variable of unemployment rate and the dependent variable of adult obesity prevalence rate was performed, a correlation coefficient of +1 indicates a perfect positive linear relationship between the two variables, while a correlation coefficient of -1 indicates a perfect negative linear relationship between the two variables. A correlation coefficient of 0 indicates a no relationship between the two variables, while a correlation coefficient closer to 0 than +1 or –1 would have indicates a weak relationship. This was also applicable in the correlation analysis of the second

independent variable of GDP per capita and the dependent variable of the adult obesity prevalence rate.

If the *p* value for the correlational analysis between unemployment rate and adult obesity prevalence rate was less than 0.05, that is $p < 0.05$, then the null hypothesis would be rejected and the alternative hypothesis, which posits that there is a statistically significant relationship between unemployment rate and adult obesity prevalence rate in OECD member countries, would fail to be rejected. Similarly, if the *p* value for the correlational analysis between GDP per capita and adult obesity prevalence rate is less than 0.05, that is $p < 0.05$, then the null hypothesis would be rejected and the alternative hypothesis, which posits that there is a statistically significant relationship between GDP per capita and adult obesity prevalence rate in OECD member countries, would fail to be rejected. If this was the case, an additional statistical test, such as a regression analysis, would have been performed. Regression analysis is performed when two variables are significantly correlated (Hazra & Gotgay, 2016).

Table 1

Operational Description of Variables

Variable	Short Description	Variable Range	Variable Type
Adult obesity prevalence rate	Adult obesity prevalence rate gives the percent of a country's population considered to be obese.	0% - 100%	Continuous
Unemployment rate	Unemployment rate compares the percent of the labor force that is without jobs.	0% - 100%	Continuous
GDP per capita	GDP - per capita (PPP) compares GDP on a purchasing power parity basis divided by population as of 1 July for the same year.	$0 - $150,000	Continuous

Threats to Validity

As a secondary data analysis study, a known threat to the validity of this study was unaccounted errors in data collection. Unaccounted errors in data collection, if any, have potentials to cause inherent bias. Another perceived threat to the validity of this study was the possible manipulation of data by the government officials who published the data of interest: the adult obesity prevalence rate, GDP per capita, and unemployment rates of their countries. I believed that the CIA did not collect these data directly but only collated what the various OECD member governments published on their websites.

In view of this fact, there may be possible threats to validity caused by underreporting of unemployment rates as well as underreporting of adult obesity prevalence rates. The effect of this threat is likened to the effect caused by reliance on self-reported measurements. However, in this study, this threat was highly minimal because exaggeration of employment rate, underreporting of unemployment and adult obesity prevalence rates, and the manipulation of the country's health and socio-economic indicators in general are more common in developing countries and this study focused on OECD member countries, which are predominantly developed countries.

Selection bias was not a threat to the validity of this study because all of the 36 OECD member countries were included in the study population for analysis. This approach is known as the total population sampling. One advantage of total population sampling is that it is a type of nonprobability sampling. There is no threat caused by the

failure to obtain representative sample. Total population sampling eliminates random sampling and, by extension, eliminates selection bias.

Some of the OECD member countries, such as Mexico and Turkey, are classified as developing countries by some agencies, such as the United Nations, and this could have affected the reliability of the study findings. However, this threat was minimized because only a negligible fraction, four countries precisely, of the OECD member countries are classified as developing countries by the United Nations.

Ethical Procedures

This study indirectly involved research with human subjects. Only the GDP per capita, the unemployment rate, and the adult obesity prevalence rate of the 36 countries of interest were retrieved and analyzed. The relevant data of interest were available on the CIA website for public consumption without any stipulated requirements for use. Nevertheless, I applied for and received ethical approvals from the Walden University Institutional Review Board before I commenced data retrieval and analysis. None of the data retrieved from the CIA website can lead to the identification of any particular individual.

One ethical obligation that I observed in this study was properly acknowledging the source of the retrieved data; the source of the data was the CIA. While the data are available for public consumption, it is the intellectual property of the CIA, and this will be acknowledged in all publications. The CIA staff that collected the data of interest must have also followed stipulated ethical procedures while collecting the data. It was not

stated on the CIA website if the data were collected directly from the field or collated from the various government websites of the 36 OECD member countries.

Summary

In Section 2 of this study, I discussed the research design and rationale, the methodology, the study population, and how the sample size was decided. The data analysis plan and the possible threats to validity were also presented. In this section, I reiterated the research question and the key variables of interest. Operational descriptions of variables were displayed using a table. Lastly, I also discussed the relevant ethical procedures. In the next section, I presented the results and findings of the analysis.

Section 3: Presentation of the Results and Findings

Introduction

The primary purpose of this quantitative doctoral study was to investigate the correlation between the unemployment rate, GDP per capita, and the adult obesity prevalence rate in developed economies. As there are conflicting lists of developed countries, I used the 36 OECD member countries, which are predominantly developed countries, as a case study. In view of the damage caused by the increasing prevalence of adult obesity in developed economies, understanding all the factors fueling or correlated with its increasing rate in developed countries is imperative. In this doctoral study, I used a cross-sectional design and analyzed the most recent data on the unemployment rates, GDP per capita, and the adult obesity prevalence rates as published by the CIA.

In Section 1, I presented the foundation of the study and a literature review. That section included the problem statement, purpose of study, significance of the study, theoretical framework of the study, research questions and hypotheses, nature of the study, literature review, assumptions, scope and delimitations, and a summary and conclusion. In Section 2, I outlined the research design and rationale, research methodology, sample size, operational description of variables, threats to validity, ethical procedures, and a summary. In this section, I discuss the data collection of secondary data set, illustrate the descriptive statistics of the secondary data, present and discuss the analysis of the secondary data, report my results and findings, and summarize the section.

I used SPSS Version 25 to perform the descriptive statistics and a correlation analysis of the relevant data to address the following research questions and hypotheses:

RQ1: What is the relationship between unemployment rate and adult obesity prevalence rate in OECD member countries?

$H_0$1: There is no statistically significant relationship between unemployment rate and adult obesity prevalence rate in OECD member countries.

H_a1: There is a statistically significant relationship between unemployment rate and adult prevalence rate in OECD member countries.

RQ2: What is the relationship between GDP per capita and adult obesity prevalence rate in OECD member countries?

$H_0$2: There is no statistically significant relationship between GDP per capita and adult obesity prevalence rate in OECD member countries.

H_a2: There is a statistically significant relationship between GDP per capita and adult prevalence rate in OECD member countries.

Data Collection of Secondary Data Set

The secondary data set I analyzed in this study was collected by the CIA. It was not stated if the CIA collected the data directly or retrieved the data from the government websites of the 36 OECD member countries; however, the CIA is a reliable agency with a long-standing, high reputation for intelligence report. I retrieved the relevant data of interest for analysis from the CIA website. There was no data user agreement in place by the CIA for the retrieval and utilization of the data of interest; however, I did received approval from the Walden University Institutional Review Board before I retrieved the relevant data of interest from the CIA website.

Time Frame for Data Collection and Discrepancies of the Secondary Data Set

The CIA collected the relevant data of interest on adult obesity prevalence rates, unemployment rates, and GDP per capita of the 36 OECD member countries between the years 2016 to 2018. The adult obesity prevalence rate is provided in percentage, the unemployment rate is in percentage as well, while GDP per capita is in dollars. Because the entire population of the OECD member countries was being studied in this research, there was no sampling ($N = 36$). This is known as total population sampling. Including the entire study population enhances both the internal and external validity of this study. There were no discrepancies in the secondary data set or was there any missing data. The absence of missing data and discrepancies is beneficial for the avoidance of biases and enhances the validity of the study.

I opted to retrieve the relevant data of interest from the CIA website as opposed to retrieving the data from the websites of the 36 OECD member countries because some governments underreport or inflate certain figures for reasons best known to them, which might include, but is not limited to, creating an impression of good governance and excellent performance. Furthermore, different websites of the OECD member countries' governments may have different data user agreements; hence, I settled for a single website, the CIA's, which had all the data needed for this study.

Baseline Descriptive and Demographic Characteristics of the Sample

The study population consisted of all 36 OECD member countries. These countries are predominantly highly developed countries with the exception of few countries that are not as highly developed, such as Mexico and Turkey. These countries

are distributed across different continents ranging from Europe, North America, Asia, to South America; hence, while the OECD member countries are all developed countries, the cultures and lifestyles of their populations may largely differ across continents. The 36 OECD member countries are Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Latvia, Lithuania, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, the United Kingdom, and the United States (OECD, 2018a).. Figure 2 displays a world map showing the distribution of OECD member countries across continents.

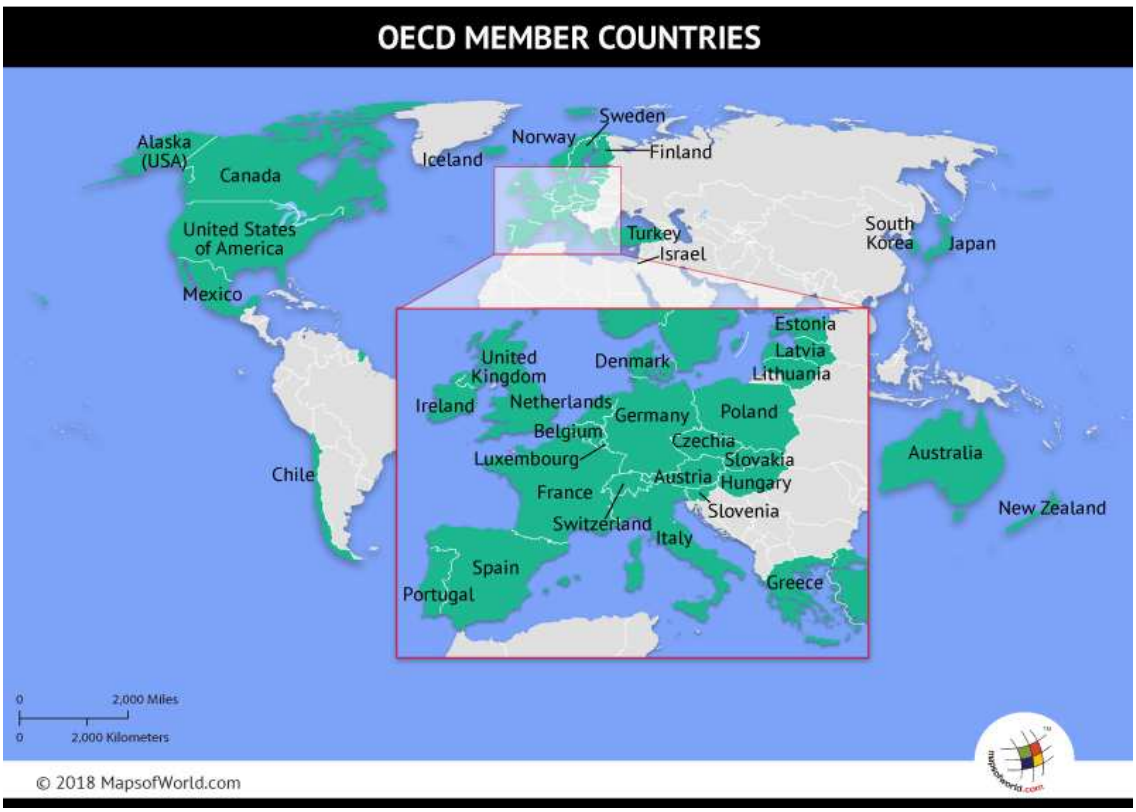

Figure 2. World map showing the distribution of the 36 OECD member countries across continents. Retrieved from https://www.mapsofworld.com/oecd-member-countries.htm

Results of the Study

Summary Descriptive Statistics that Characterize the Sample

I collected data on the most recent adult obesity prevalence rates, the most recent unemployment rates, and the most recent GDP per capita of the 36 OECD member countries for analysis. The following tables and graphs provide descriptive insights into the data collected and analyzed.

Table 2 shows that the OECD member countries have an average adult obesity prevalence rate of 23.2%, with the United States having the highest adult obesity prevalence rate at 36.2%, while Japan and South Korea, two Asian countries, have the lowest and second lowest adult obesity prevalence rates of OECD member nations at 4.3% and 4.7%, respectively. The U.S. adult obesity prevalence rate is more than eightfold that of Japan. Similarly, Table 3 illustrates that the average unemployment rate of the OECD member countries is 6.63%, with Greece and Spain topping the list with unemployment rates of 21.5% and 17.2%, respectively. Iceland has the lowest unemployment rate among the OECD member nations at 2.8%. Table 4 depicts the GDP per capita of the OECD member nations with Luxembourg topping the list with a GDP per capita of $105,100, which is more than double $43,808, the average GDP per capita of the OECD member countries. Mexico has the lowest GDP per capita of $19,900, followed by Turkey at $27,000.

Table 2

Descriptive Statistics of the Adult Obesity Prevalence Rates of the 36 OECD Member Countries

Country	Adult Obesity Prevalence Rate (%)
Australia	29
Austria	20.1
Belgium	22.1
Canada	29.4
Chile	28
Czech Republic	26
Denmark	19.7
Estonia	21.2
Finland	22.2
France	21.6
Germany	22.3
Greece	24.9
Hungary	26.4
Iceland	21.9
Ireland	25.3
Israel	26.1
Italy	19.9
Japan	4.3
South Korea	4.7
Latvia	23.6
Lithuania	26.3
Luxembourg	22.6
Mexico	28.9
Netherlands	20.4
New Zealand	30.8
Norway	23.1
Poland	23.1
Portugal	20.8
Slovak Republic	20.5
Slovenia	20.2
Spain	23.8
Sweden	20.6
Switzerland	19.5
Turkey	32.1
United Kingdom	27.8
United States	36.2
Mean	23.20555556
Median	22.85
Mode	23.1
Standard Deviation	6.077731929

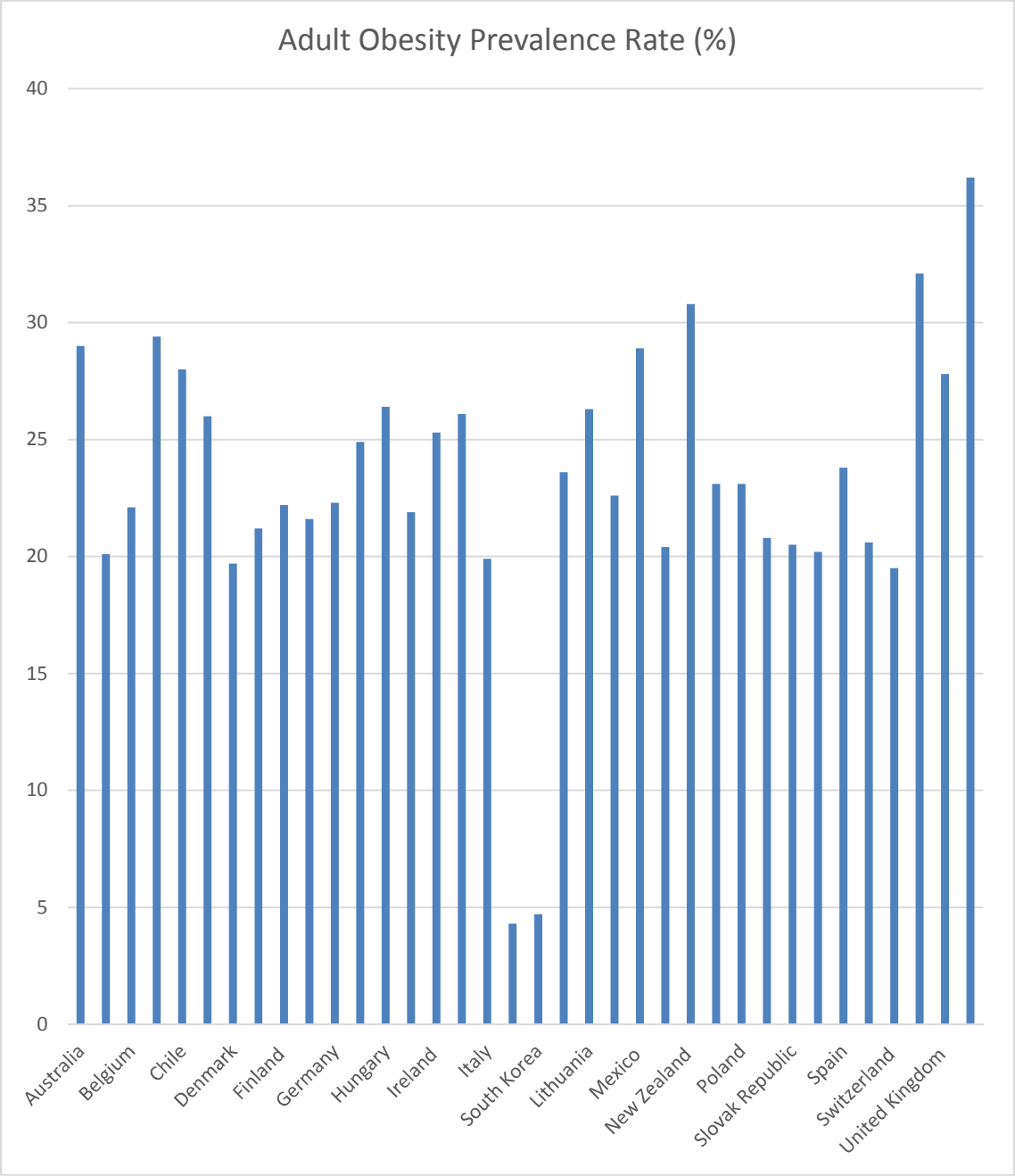

Figure 3. Bar chart showing the adult obesity prevalence rate of OECD member countries.

Table 3

Descriptive Statistics of the Unemployment Rates of the 36 OECD Member Countries

Country	Unemployment Rate (%)
Australia	5.6
Austria	5.5
Belgium	7.1
Canada	6.3
Chile	6.7
Czech Republic	2.9
Denmark	5.7
Estonia	5.8
Finland	8.5
France	9.4
Germany	3.8
Greece	21.5
Hungary	4.2
Iceland	2.8
Ireland	6.7
Israel	4.2
Italy	11.3
Japan	2.9
South Korea	3.7
Latvia	8.7
Lithuania	7.1
Luxembourg	5.8
Mexico	3.4
Netherlands	4.9
New Zealand	4.7
Norway	4.2
Poland	4.9
Portugal	8.9
Slovak Republic	8.1
Slovenia	6.6
Spain	17.2
Sweden	6.7
Switzerland	3.2
Turkey	10.9
United Kingdom	4.4
United States	4.4
Mean	6.630555556
Median	5.75
Mode	6.7
Standard Deviation	3.852481163

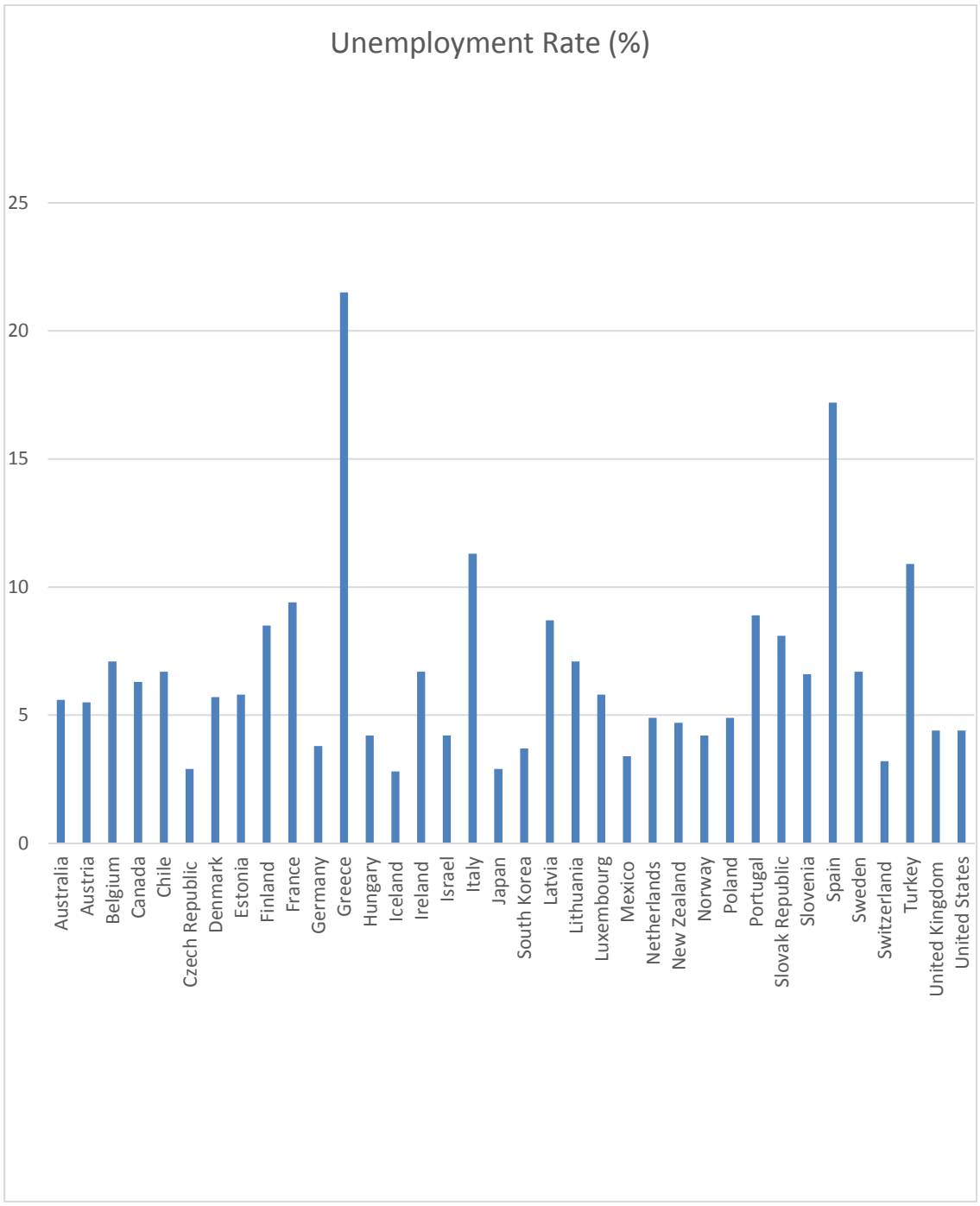

Figure 4. Bar chart showing the unemployment rate of OECD member countries.

Table 4

Descriptive Statistics of the GDP Per Capita of the 36 OECD member countries

Country	GDP Per Capita ($)
Australia	50,400
Austria	50,000
Belgium	46,600
Canada	48,400
Chile	24,600
Czech Republic	35,500
Denmark	50,100
Estonia	31,700
Finland	44,500
France	44,100
Germany	50,800
Greece	27,800
Hungary	29,600
Iceland	52,200
Ireland	73,200
Israel	36,400
Italy	38,200
Japan	42,900
South Korea	39,500
Latvia	27,700
Lithuania	32,400
Luxembourg	105,100
Mexico	19,900
Netherlands	53,900
New Zealand	39,000
Norway	72,100
Poland	29,600
Portugal	30,500
Slovak Republic	33,100
Slovenia	34,500
Spain	38,400
Sweden	51,200
Switzerland	62,100
Turkey	27,000
United Kingdom	44,300
United States	59,800
Mean	43,808
Median	41,200
Mode	29,600
Standard Deviation	16442.98157

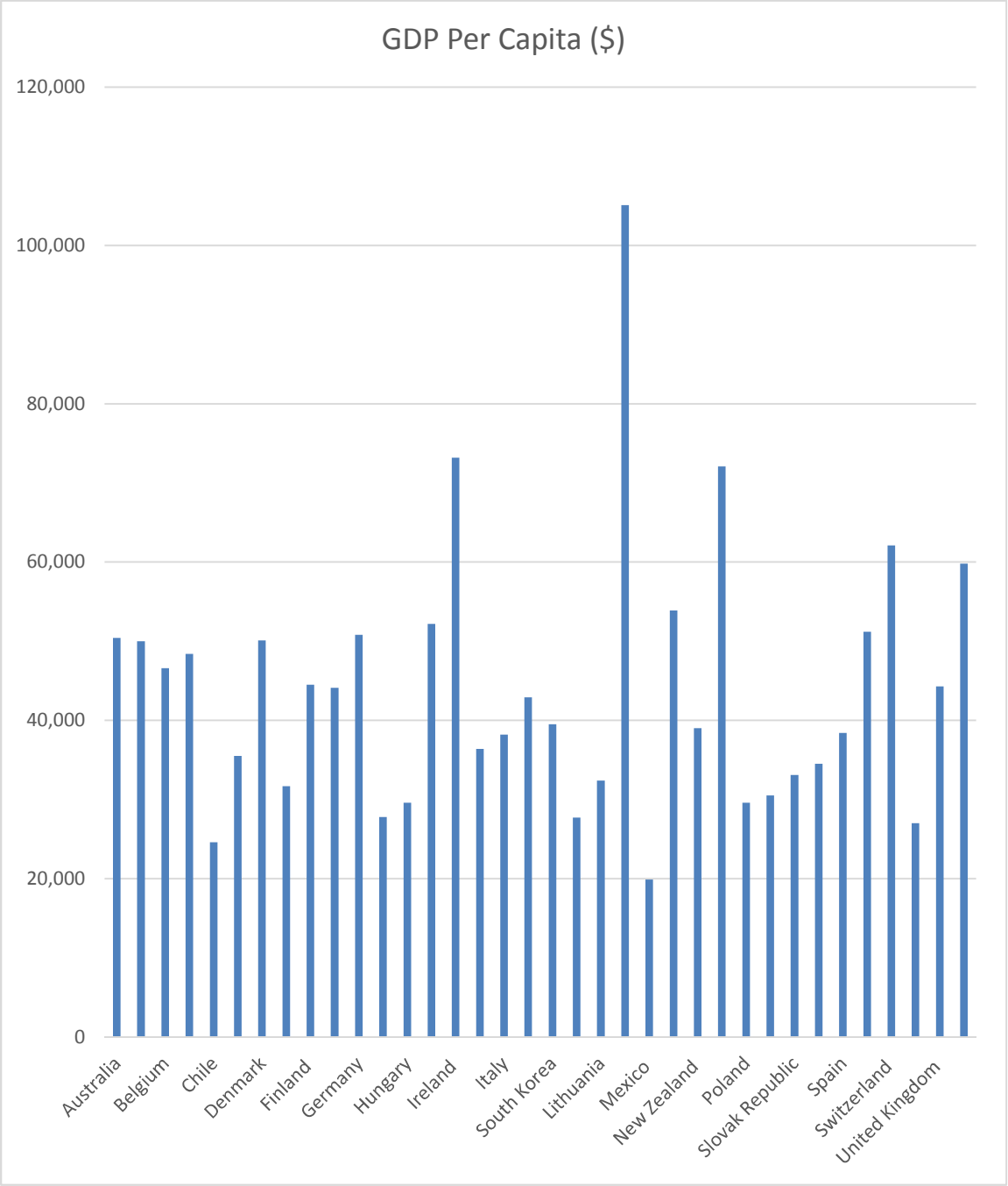

Figure 5. Bar chart showing GDP per capita of OECD member countries.

Statistical Analysis Assumptions

I utilized a Spearman's Rho correlation analysis test as opposed to a Pearson correlation analysis because some of the variables under investigation are not normally distributed, there is couple of outliers in the variables under investigation hence there is no linearity. One of the statistical assumptions of Pearson correlation is that the variables must be normally distributed, there must be absence of outliers in the variables, and a scatter plot of the variables must show linearity or somewhat linearity. Hazra and Gogtay, (2016) noted that a scatter plot is imperative to confirm linearity before performing a correlation analysis. Figures 6 and 7 are scatter plots illustrating the nonlinearity of the two independent variables and the dependent variable. As this is not the case, a Spearman' Rho Correlation analysis was utilized.

Spearman's Rho correlation is recommended when one or more continuous variables under investigation do not meet the normality of variables and linearity assumptions of Pearson correlation (Hazra & Gotgay, 2016). Spearman ranked correlation is not only used for ranked or ordinal variables as the name suggests, it can also be used for continuous variables that are not normally distributed hence lack linearity (Hazra & Gotgay, 2016). Furthermore, one of the assumptions of a regression analysis is that variables under analysis must be correlated. In this case, there was no statistically significant correlation found between the two independent and dependent variables hence a regression analysis was not eventually utilized as planned. Regression is run where there is a correlation to model the link between two or more correlated variables (Hazra & Gotgay, 2016).

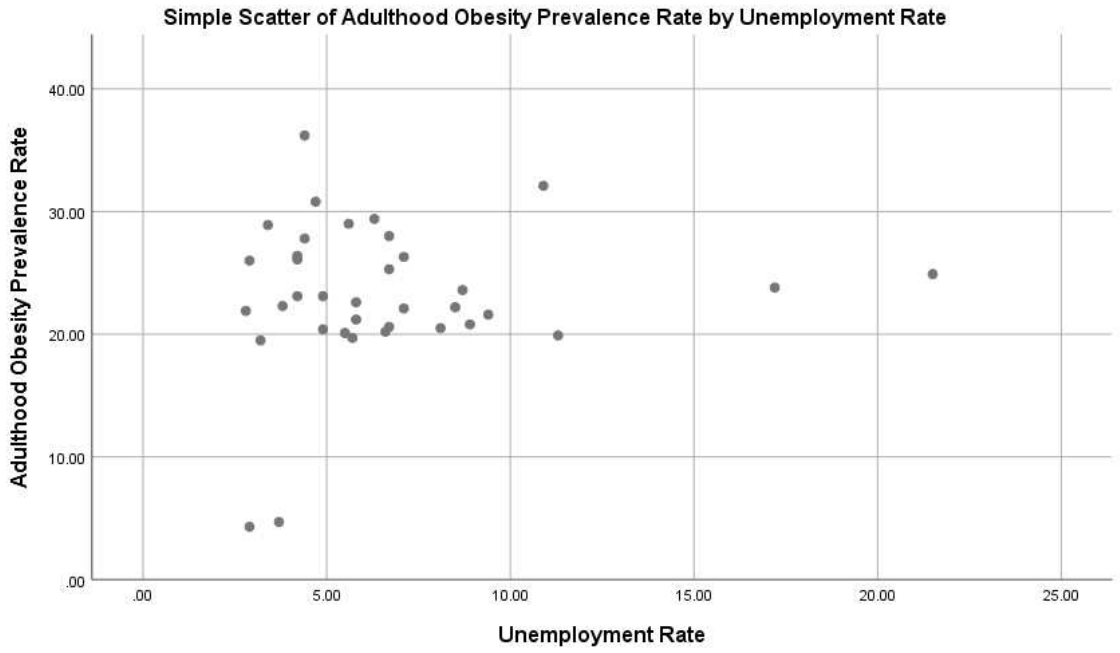

Figure 6. Scatter plot showing adult obesity prevalence rate by unemployment rate.

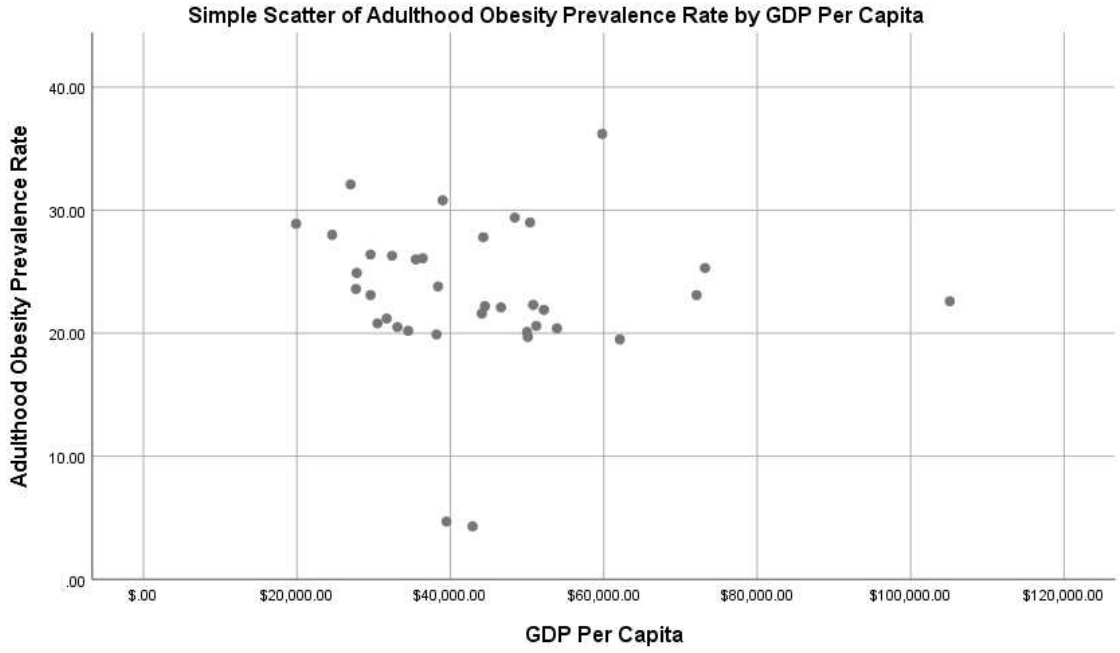

Figure 7. Scatter plot showing adult obesity prevalence rate by GDP per capita.

Statistical Analysis Findings in Relation to Research Questions

To address the research questions, RQ1 and RQ2, a Spearman's Rho correlational analysis test for association was performed for each of the two independent variables in relation to the dependent variable.

Spearman's Rho Correlational Analysis Test for Relationship

Research Question 1: What is the relationship between unemployment rate and adult obesity prevalence rate in OECD member countries?

H_0: There is no statistically significant relationship between unemployment rate and adult obesity prevalence rate in OECD member countries.

H_1: There is a statistically significant relationship between unemployment rate and adult prevalence rate in OECD member countries.

A Spearman's Rho correlational analysis was performed utilizing the population size N= 36 to determine whether there is any correlation between the OECD member countries' adult obesity prevalence rates and their unemployment rates. The tables below were the SPSS Version 25 outputs. Table 5 shows the mean and standard deviation of the adult obesity prevalence rates and unemployment rates of the 36 OECD member countries while Table 6 shows the result of the correlation test. The mean and standard deviation for the 36 OECD member countries' adult obesity prevalence rates are 23.2056% and 6.07773% respectively while the mean and standard deviation for the 36 OECD member countries' unemployment rates are 6.6306% and 3.85248% respectively. Both variables have 36 observations each hence there are no missing data.

Results in Table 6 show that the correlation coefficient between adult obesity prevalence rate and unemployment rate is .032 which is close to 0 indicating a super weak relationship between adult obesity prevalence and unemployment rate. To further confirm that there is a super weak relationship between the two variables –adult obesity prevalence rate and unemployment rate- under investigation, the level of significance is .852 which is greater than the traditional 0.05 and when $p > 0.05$, the null hypothesis, H_0, which states that there is no statistically significant relationship between unemployment rate and adult obesity prevalence rate in OECD member countries is rejected. Indeed, there is no statistically significant relationship between adult obesity prevalence rate and unemployment rate in OECD member countries. In the absence of a strong significant relationship between the two variables, a regression analysis was not performed.

Table 5

Descriptive Statistics of the Adult Obesity Prevalence Rate and Unemployment Rate

Descriptive Statistics

	Mean	*Std. Deviation*	*N*
Adult obesity prevalence rate	23.2056	6.07773	36
Unemployment rate	6.6306	3.85248	36

Table 6

Spearman's Rho Correlation Test between the Adult Obesity Prevalence Rate and Unemployment Rate

			Adult obesity prevalence rate	Unemployment rate
Spearman's rho	Adult obesity prevalence rate	Correlation coefficient	1.000	.032
		Sig. (2-tailed)	.	.852
		N	36	36
	Unemployment rate	Correlation coefficient	.032	1.000
		Sig. (2-tailed)	.852	.
		N	36	36

Research Question 2: What is the relationship between GDP per capita and adult obesity prevalence rate in OECD member countries?

H_0: There is no statistically significant relationship between GDP per capita and adult obesity prevalence rate in OECD member countries.

H_1: There is a statistically significant relationship between GDP per capita and adult prevalence rate in OECD member countries.

Again, Spearman's Rho correlational analysis was performed utilizing the population size, *N*= 36, to determine whether there is any correlation between the OECD member countries' adult obesity prevalence rates and their GDP per capita. The tables

below were the SPSS Version 25 outputs. Table 7 shows the mean and standard deviation of the adult obesity prevalence rates and GDP per capita of the 36 OECD member countries while Table 8 shows the results of the correlation test. The mean and standard deviation for the 36 OECD member countries' adult obesity prevalence rates are 23.2056% and 6.07773% respectively while the mean and standard deviation for the 36 OECD member countries' GDP per capita are $43,808.3333 and $16,442.98157 respectively. Again, both variables have 36 observations each hence there are no missing data.

Results from Table 8 indicate that the correlation coefficient between the adult obesity prevalence rate and GDP Per Capita is -.234 which indicates a negative weak relationship between adult obesity prevalence and GDP per capita. Though a weak relationship, this indicates that in OECD member countries, when the GDP per capita decreases, the adult obesity prevalence rate tends to increase, and when the GDP per capita increases, the adult obesity prevalence rate will tend to decrease instead. Nevertheless, this is a weak relationship and to further confirm the weakness of the relationship between the two variables, the adult obesity prevalence rate and GDP per capita, the level of significance is .170 which is greater than the traditional 0.05 and when $p > 0.05$, we fail to reject the null hypothesis, H_1, which states that there is no statistically significant relationship between GDP per capita and adult obesity prevalence rate in OECD member countries. Indeed, there is no statistically significant relationship between adult obesity prevalence rate and GDP per capita in OECD member countries. Similarly,

in the absence of a significant relationship between the two variables, there was no need to perform a regression analysis.

While there are no statistically significant association between the two independent variables and the dependent variable, it can be observed that GDP per capita was more associated with adult obesity prevalence rate, albeit negative association, than unemployment rate in OECD member countries. The correlation coefficient between adult obesity prevalence rate and GDP per capita = -.234 is closer to a positive or negative 1 than 0.032, the correlation coefficient between adult obesity prevalence rate and unemployment rate. Furthermore, while the level of significance of both correlations is greater than the conventional 0.05, making the association between the two independent variables and the dependent variable statistically insignificant, the level of significance of the association between adult obesity prevalence rate and unemployment rate is 0.852 and this is greater than 0.170, the level of significance for the association between adult obesity prevalence rate and GDP per capita. Statistically, 0.852 > 0.170 > 0.05 simply put.

Table 7

Descriptive Statistics of the Adult Obesity Prevalence Rate and GDP Per Capita

Descriptive Statistics

	Mean	*Std. Deviation*	*N*
Adult obesity prevalence rate	23.2056	6.07773	36
GDP per capita	$43,808.3333	$16,442.98157	36

Table 8

Spearman's Rho Correlation Test between the Adult Obesity Prevalence Rate and GDP Per Capita

			Adult Obesity Prevalence Rate	GDP Per Capita
Spearman's rho	Adult obesity prevalence rate	Correlation coefficient	1.000	-.234
		Sig. (2-tailed)	.	.170
		N	36	36
	GDP per capita	Correlation coefficient	-.234	1.000
		Sig. (2-tailed)	.170	.
		N	36	36

Summary of the Results and Findings

In this section, the results and findings from the secondary data analysis of the adult obesity prevalence rates, unemployment rates and GDP per capita of the 36 OECD member countries as reported by the CIA were presented. Also included in this section was a brief purpose of the study, the research questions, the null and alternative hypothesis, procedures for data collection and analysis, the statistical analysis assumptions and tables and figures showing the descriptive statistics of the data and the results of the correlational analysis test performed. I investigated two continuous

independent variables (unemployment rate and GDP per capita) and one continuous dependent variable (adult obesity prevalence rate).

Analyzing the two continuous independent variables and the single continuous dependent variable, two research questions and their associated null and alternative hypotheses were addressed. The research questions were addressed by performing a Spearman's rho correlation analysis to test for association between the two independent variables and the dependent variable. I settled for a Spearman's rho correlation test because the variables under investigation fail to meet the assumptions of a Pearson correlation test.

For Research Question 1, I tested if there was any statistically significant relationship between unemployment rate in percentage and adult obesity prevalence rate in OECD member countries. The results emanating from the Spearman's Rho correlation analysis test for association between adult obesity prevalence rate and unemployment rate in the 36 OECD member countries indicated that there is a super weak relationship between the adult obesity prevalence rate and unemployment rate and further indicated that the super weak relationship between the two variables is not statistically significant. This informed the decision to accept the first null hypothesis which posits that there is no statistically significant relationship between adult obesity prevalence rate and unemployment rate in OECD member countries.

For Research Question 2, I tested if there was any statistically significant relationship between GDP per capita in dollars and adult obesity prevalence rate in OECD member countries. A Spearman's Rho correlation analysis was also utilized as

both variables under investigation did not meet the assumptions of a Pearson correlation test. The SPPS Version 25 outputs for Spearman's Rho correlation test for association between these two variables indicated that there is a weak relationship between GDP per capita and adult obesity prevalence rate in OECD member countries. The level of significance for the correlational analysis further indicated that the weak relationship is not statistically significant. In view of this, I accepted the second null hypothesis which posits that there is no statistically significant relationship between adult obesity prevalence rate and GDP per capita in OECD member countries.

In the next section - Section 4, I interpreted the results and findings of this study in relation to the literature and theoretical framework discussed in Section 1 of this study. The limitations of this study, implications for positive social change and recommendations emerging from the interpretation of the results and findings were also discussed in Section 4.

Section 4: Application to Professional Practice and Implications for Social Change

Introduction

The main purpose of this quantitative cross-sectional study was to investigate the relationship between two independent variables (i.e., unemployment rate and GDP per capita) and the dependent variable (i.e., adult obesity prevalence rate) in the 36 OECD member countries. There are divergent views on the correlation between unemployment rate, GDP per capita, and adult obesity prevalence rate in developed countries. Because the increasing prevalence rate of adult obesity in developed countries has continued to rise, as evidenced by the high incidence and prevalence of obesity-induced morbidities, all factors significantly correlated with this trend must be investigated and identified. Kersh (2009) noted that obesity prevention has defied clinical actions and public health exhortations, necessitating policy responses; hence, all factors correlated with the increasing prevalence of adult obesity in developed countries must be investigated for appropriate policy responses. To carry out this study, I retrieved and analyzed secondary data from the website of CIA, an agency reputable for intelligence reporting.

Summary of the Key Findings

To answer the research questions, I investigated two continuous independent variables (i.e., unemployment rate and GDP per capita) and one continuous dependent variable (i.e., adult obesity prevalence rate). To test for correlation between the variables, a Spearman's rho correlation test was performed as opposed to a Pearson correlation test because the variables under investigation did not meet the assumptions of a Pearson correlation test because there was the presence of outliers in the data. The type, strength,

and significance of the relationships that exist between the variables were all utilized to make inferences.

Using SPSS Version 25, I performed a Spearman's Rho correlation analysis to determine the association between adult obesity prevalence rate and unemployment rate to answer the first research question. A statistically insignificant, weak, positive correlation coefficient of .032 emerged. While the correlation is not statistically significant at $p = 0.852$, a correlation coefficient of positive .032 proves that a positive correlation exists between adult obesity prevalence rate and unemployment rate, albeit weak. This means that as the unemployment rate increases, the adult obesity prevalence rate will tend to increase too. In view of the statistically insignificant relationship between adult obesity prevalence rate and unemployment rate, I failed to reject the first null hypothesis, which posited that there is no statistically significant relationship between adult obesity prevalence rate and unemployment rate.

I performed a correlation analysis between adult obesity prevalence rate and GDP per capita to answer the second research question. The results of the analysis show that a negative correlation exists between adult obesity prevalence rate and GDP per capita, albeit weak and statistically insignificant. This means that as GDP per capita increases, the adult obesity prevalence rate has a tendency to decrease. The correlation coefficient of the analysis is negative .234, with a significance level of $p = .170$, which is greater than the conventional 0.05. In view of the statistically insignificant relationship, I failed to reject the second null hypothesis, which posited that there is no statistically significant relationship between adult obesity prevalence rate and GDP per capita.

Interpretation of the Findings

The main aim of this study was to investigate the association between unemployment rate, GDP per capita, and adult obesity prevalence rate in developed countries using OECD member countries as a case study. In view of this, I came up with two research questions and corresponding null and alternative hypotheses for each of the questions. For the first research question, the null hypothesis was that there is no statistically significant relationship between unemployment rate and adult obesity prevalence rate in OECD member countries, and the alternative hypothesis was that there is a statistically significant relationship between unemployment rate and adult obesity prevalence rate in OECD member countries. The results from the correlation analysis indicated that although a positive relationship exists between unemployment rate and adult obesity prevalence rate, the relationship is weak and not statistically significant. In view of the statistically insignificant relationship, I failed to reject the null hypothesis for the first research question.

For the second research question, there was the null hypothesis that there is no statistically significant relationship between GDP per capita and adult obesity prevalence rate in OECD member countries, and an alternative hypothesis that there is a statistically significant relationship between GDP per capita and adult obesity prevalence rate in OECD member countries. The results from the correlation analysis indicated that although a negative correlation exists between GDP per capita and adult obesity prevalence rate, the relationship is weak and statistically insignificant. In view of this statistically insignificant relationship, I failed to reject the null hypotheses.

The positive correlation that exists between unemployment rate and adult obesity prevalence rate, albeit weak and statistically insignificant, and the negative relationship that exist between GDP per capita and adult obesity prevalence rate, albeit weak and statistically insignificant, mean that as GDP per capita is increasing or improving and unemployment rate is decreasing, the adult obesity prevalence rate in the population will tend to decrease too. An increasing GDP per capita and/or a decreasing unemployment rate in a population simply translates to an improving economy. This shows that an improved economy, a reduced unemployment rate, and, by extension, an improved socioeconomic status of the population can, to an extent, facilitate a reduction in the adult obesity prevalence rate in a developed economy. The extent that an improved economy, a reduced unemployment rate, and the improved socioeconomic status of the population can trigger the reduction of adult obesity prevalence rate in a developed economy depends on more significant factors, such as the lifestyle and eating habits of the population.

As a cross-sectional study, mediating variables were not interrogated, however, the type, strength and significance of the correlation between the variables of interest and insights from the descriptive statistics indicate that there are more significant variables mediating between the dependent variable (adult obesity prevalence rate) and the independent variables (unemployment rate and GDP per capita) under investigation. Insights from Japan may indicate that the healthy eating index of a population is one of these mediating variables. Japan has the lowest adult obesity prevalence rate and the second lowest unemployment rate among OECD member countries. The Japanese also

have an excellent healthy eating habit (see Yamori, 2004). This could mean that there is actually a high coincidence of low unemployment rate and low adult obesity prevalence if the more significant factors – significant mediating variables - are favorable. In other words, a stronger and more significant correlation between the dependent variable and independent variables will likely exist, if the mediating variables are favorable. These mediating variables, apparently, are obstructing the strength and significance of the correlation that exists between the independent variables (unemployment rate and GDP per capita) and the dependent variable (adult obesity prevalence rate). These mediating variables are, unarguably, the significant risk factors of adult obesity which are the healthy eating index and physical activity index of the population.

It is not a coincidence that South Korea, another Asian country, has the second lowest adult obesity prevalence rate among the OECD member nations after Japan. South Korea, incidentally, also has one of the lowest unemployment rate among OECD member countries, precisely the OECD member country with the fifth lowest unemployment rate. This may indicate that the significant risk factors of adult obesity are largely minimized in Asia hence if Asia was home to a majority of the OECD member countries like Europe, perhaps a stronger and more significant positive relationship will exist between adult obesity prevalence rate and unemployment rate and, similarly, a stronger and more significant negative relationship will exist between adult obesity prevalence rate and GDP per capita in this study.

These findings are consistent with the findings of Marques et al. (2018) who postulated that individuals who are unemployed are more likely to have a higher BMI. A

BMI of 30 and above in adults translates to obesity (United Health Foundation, 2018b). These findings are also consistent with those of Sung et al. (2019) who noted that people with low socioeconomic status were more likely to have a higher BMI. Hughes et al. (2017) came to a similar finding in a study with a population comprising 40,000 U.K. households. Hughes et al. (2017) posited that unemployment was positively associated with obesity in nonsmoking population. The United Kingdom has a significant nonsmoking population of over 80% of the total population (Allen et al., 2016). Frankenfeld et al. (2015) also reported findings somewhat similar to the findings of this study. Frankenfeld et al. argued that obesity is more common in U.S. men and women of lower socioeconomic status. They reasoned that areas with residents of high socioeconomic status are more likely to have greater access to grocery stores and further concluded that residents of these areas have been found to have a lower BMI. The findings of Vågerö et al. (2016) are also somewhat consistent with the findings of this study. In a study to determine the impact of unemployment on long-term mortality, Vågerö et al noted that mass unemployment imposes a long-lasting mortality risk on a fairly large segment of the population. They further noted that unemployment worsens a population's health and well-being and called for an abolishment of mass unemployment because that would improve people's health and well-being. While the adult obesity prevalence rate of a population is not a direct reflection of the population's health and well-being, it is a major determinant of a population's health and well-being (see United Health Foundation, 2018a). It is also a major risk factor for the leading causes of mortalities, such as cardiovascular and heart diseases, in developed economies (United

Health Foundation, 2018a). The positive association, albeit weak and insignificant, that exists between the adult obesity prevalence rate and unemployment rate validates the findings of Vågerö et al.

These study findings are inconsistent with the findings of Ruhm (2000, 2003) who noted that a negative relationship exists between unemployment rate and adult obesity prevalence rate. They noted that unemployment afforded individuals more time to exercise and prepare healthy meals, thereby making them more likely to maintain a healthier body weight. As reasonable as their argument may sound, the findings of the current study did not validate their postulation. The findings of the current study are also not aligned with the findings of Zienkiewicz et al. (2014) who reported that there is a significant positive relationship between obesity prevalence and GDP per capita of the Polish regions they examined. They noted that obesity prevalence was higher in regions that are more economically advanced and, by extension, with higher GDP per capita and lower unemployment rates. Zienkiewicz et al., however, conducted their study on adolescents and young adults only.

Q. Zhang et al.'s (2014) findings are also somewhat consistent with the findings of this study. Q. Zhang et al. conducted a study to determine the association between U.S. adult obesity and economic conditions of the state and county during in the latest U.S. recession and noted that the recession in the United States, characterized by a significantly increased unemployment rate, did not lead to a significant increase in adult obesity risk across employment groups. Q. Zhang et al.'s conclusion implies that although there was an increase in adult obesity risk in the unemployed group during the

last recession, the increase was not significant. This is consistent with the insignificant relationship that exists between adult obesity prevalence rate and unemployment rate and the insignificant relationship that exists between adult obesity prevalence rate and GDP per capita that were found in this study.

A positive relationship, however, exists between adult obesity prevalence rate and unemployment rate and a negative relationship exists between adult obesity prevalence rate and GDP per capita, and a visual analysis of the descriptive statistics shows that Japan has the lowest adult obesity prevalence rate among OECD member countries and at same time the second lowest unemployment rate. This could mean that a high coincidence of low adult obesity prevalence rate and low unemployment rate can exist if the lifestyle and eating habits of the target population are healthy. Japan is a global reference point for healthy eating habits (Yamori, 2004).

While a negative relationship exists between GDP per capita and adult obesity prevalence rate and a positive relationship exists between unemployment rate and adult obesity prevalence rate in developed economies, both relationships are statistically insignificant. This indicates that while low unemployment rate and high GDP per capita can act as leverage in the reduction of the adult obesity prevalence rate in a developed economy, OECD member countries with a high adult obesity prevalence rate should prioritize and focus on interventions that are geared towards modifying the behavior, eating habits, and lifestyle of their citizenry. Insights drawn from the descriptive statistics of the variables with particular reference to Japan validate this assertion. Developed

countries with a high adult obesity prevalence rate should use Japan as a reference point and, by extension, emulate what Japan is doing or has done.

Interpretation of the Findings in the Context of the Theoretical Framework

The negative relationship that exists between GDP per capita and adult obesity prevalence rate and the positive relationship that exists between unemployment rate and adult obesity prevalence rate, albeit weak and insignificant, are validation of the theory of social suffering. The theory of social suffering postulates that harsher economic conditions, untold hardship, and more suffering in the society have a tendency to increase the prevalence rate of morbidities in the society (Kleinman, 2010). The findings of this study confirmed that this postulation is also true in the case of adult obesity. The theory posits that socioeconomic forces, such as harsh economic conditions, can in some cases cause diseases to proliferate (Kleinman, 2010). This simply means that as economic conditions get harsher, the incidence and prevalence rates of diseases increases. It was abject poverty that created tuberculosis and similar diseases to proliferate (Kleinman, 2010). Tuberculosis, however, is a communicable disease and the findings of this study prove that this theory may also be applicable to noncommunicable diseases such as adult obesity.

The positive relationship, although weak and insignificant, that exists between unemployment rate and adult obesity prevalence rate is also consistent with the theory of social suffering. In line with the theory, if the unemployment rate decreases, characterized by reduced hardship and suffering in the population, adult obesity prevalence will tend to reduce too. And if the unemployment rate increases, characterized

by an increased hardship and suffering in the population, adult obesity prevalence rate will tend to increase too. Similarly, the negative relationship, although weak and statistically insignificant, that exists between GDP per capita and adult obesity prevalence rate is also consistent with the theory of social suffering. This means, in line with the theory, if the GDP per capita of a nation increases or improves, characterized by improved economic conditions and reduced hardship and suffering, the adult obesity prevalence rate will tend to reduce. And if the GDP per capita of a nation decreases or worsens, characterized by harsh economic conditions and increased hardship and suffering, the adult obesity prevalence rate has the tendency to increase.

The tendency of adult obesity prevalence to drop, albeit negligible, when unemployment rate drops and/or when GDP per capita improves as observed by the positive association between adult obesity prevalence rate and unemployment rate and the negative association between adult obesity rate and GDP per capita is a clear validation of the theory of social suffering. The type of relationships that exist between unemployment rate, GDP per capita, and adult obesity prevalence rate also lends credence to the postulations of Wilkinson and Pickett (2010). Wilkinson and Pickett noted that greater equality, largely characterized by reduced economic hardship across all socioeconomic classes, reduced social inequality and reduced social suffering, makes a population healthier. These postulations of Wilkinson and Pickett (2010) are consistent with the theory of social suffering. While a positive relationship exists between unemployment rate and adult obesity prevalence rate and a negative relationship exists between GDP per capita and adult obesity prevalence rate, in line with the theory of

social suffering, both relationships are weak and statistically insignificant. This shows that improved economic conditions characterized by minimal social suffering can, indeed, be leverage in the reduction of morbidity rates in a population, however, focus and priority should be given to more significant risk factors of the morbidities in question for the leverage to be maximized. It means that improved economic conditions characterized by minimal social suffering can, to an extent, facilitate a decline in a population's morbidity rate if other factors are at an optimal level. In other words, the extent an improved economic conditions and minimal social suffering can facilitate a decline in the morbidity rate of a population will largely depend on the significant risk factors of the morbidity.

Limitations of the Study

In this study, I investigated the relationship between unemployment rate and adult obesity prevalence rate and the relationship between GDP per capita and adult obesity prevalence rate in developed countries. I settled for the OECD member countries as a case study because the OECD member countries are predominantly developed countries (OECD, 2018b) and there are conflicting lists of developed countries. While the OECD member countries are predominantly developed, there are few OECD member countries namely Mexico, Chile, Turkey and South Korea that are classified as developing countries by the United Nations. United Nations in a World Economic Situation and Prospects report published in 2014 released a list of developed countries which was also made up of 36 countries like the OECD member countries. In the list, however, United Nations included Croatia but excluded Chile, they included Malta but excluded Mexico,

they included Romania but excluded Turkey and lastly, they included Cyprus but excluded South Korea. These four countries excluded from the list of developed countries were classified as developing countries by the United Nations (United Nations, 2014).

United Nations is a foremost leading development agency that uses several criteria and measures to classify countries into either developed or developing country. It is the parent body for several other subdevelopment agencies such as the United Nations Development Program, World Bank, International Monetary Fund, and World Health Organization (WHO). The inclusion of countries (Chile, Mexico, Turkey and South Korea) that are not generally or universally accepted as developed countries in this study could limit, to an extent, the reliability of the study findings. The inclusion of these four United Nations-classified developing countries in this study of developed countries may have also reduced the homogeneity of the study population. Results and findings emanating from a homogenous study population are more generalizable than results emanating from a heterogeneous study population (Jager, Putnick, & Bornstein, 2017).

OECD member countries are only 36 countries drawn from various continents namely Europe, North America, Asia, and South America hence these OECD member countries are most likely to exhibit different cultures, lifestyles and eating habits thereby making the study population more heterogeneous than homogenous. As mentioned earlier, results and findings emanating from a homogenous study population are more generalizable than results emanating from a heterogeneous study population (Jager et al., 2017). Furthermore, the OECD member countries are not equitably distributed across continents therefore the continents are not equally represented. Out of the 36 OECD

member countries, 28 are in Europe which is more than 75% of the study population hence the study findings may be tilted towards a European context.

Recommendations for Further Research

This is a cross-sectional study that investigated the correlation between two independent variables (unemployment rate and GDP per capita) and dependent variable (adult obesity prevalence rate) in developed countries. The 36 OECD member countries were utilized as a case study because OECD member countries are predominantly developed countries and there are conflicting lists of developed countries. Future researchers should investigate the correlation between adult obesity prevalence rate, unemployment rate and GDP per capita utilizing a different list of economically advanced countries such as the United Nations or World Bank lists of high-income countries to determine if the results and findings will be consistent with the results and findings of this study.

In the World Economic Situation and Prospects 2014 Report, United Nations released a list of 51 high income countries. World Bank Group, using their criteria, also came up with a conflicting list of high-income countries consisting of 79 countries (World Bank Group, 2019). 79 or 51 are larger study population size than 36 hence future researchers are recommended to investigate the correlation between the three variables - unemployment rate, GDP per capita and adult obesity prevalence rate - using the United Nations' list of 51 high-income earning countries or the World Bank Group's 79 countries. Studies involving greater study population size are more reliable. Excluding the fact that the recommended study will involve larger study population size of 51 or 79,

it is recommended that the correlation between unemployment rate, GDP per capita and adult obesity prevalence rate in high-income countries should also be investigated. In line with the United Nations World Economic Situation and Prospects Report published in 2014, all developed countries are high-income countries; however, not all high-income countries are developed countries. United Nations published a list of 36 developed countries as opposed to a list of 51 high income countries that was published in the same report (United Nations, 2014).

Further researchers should also investigate the correlation between unemployment rate, GDP per capita and adult obesity prevalence rate in the first 50 or first 100 countries (for greater sample size) with the highest Human Development Index utilizing the Human Development Index as one of the independent variables. For appropriate policy purposes, it will also be useful to know the correlation between Human Development Index and adult obesity prevalence rate. This recommended investigation will help to further validate the correlation between adult obesity, unemployment rate and GDP Per Capita in economically advanced countries. Countries with high Human Development Index are economically advanced countries.

If there is an available data set, another recommendation for further research is investigating the correlation between Japan's adulthood obesity prevalence rate, unemployment rate and GDP per capita in the last 30 to 50 years. Since Japan is a reference point for healthy eating and healthy lifestyle, it will be useful to determine the strength and significance of the association between the three variables utilizing only Japan as a case study. The findings will be useful in confirming further the correlation

between GDP per capita, unemployment rate and adult obesity prevalence in a developed country and will also be useful in the further validation or otherwise of the theory of social suffering.

Implications for Professional Practice and Social Change

The increasing prevalence of adult obesity has been a menace in developed countries. All factors contributing or correlated to the increasing prevalence rate of adult obesity in developed countries need to be investigated. The findings of this study will be useful in understanding the factors correlated with the increasing prevalence of adult obesity so that appropriate policies and interventions to contain the menace can be formulated. The positive relationship that exist between unemployment rate and the adult obesity prevalence rate, albeit super weak and insignificant, and the negative relationship that exist between GDP per capita, albeit weak and insignificant are pointers that lowering the unemployment rate, improving the GDP per capita and, by extension, improving the economy could act as a leverage in the reduction of adult obesity prevalence rate only if more significant factors such as the eating habit, behavior and lifestyle of the population are optimal. It further means that low unemployment rate, high GDP per capita and, by extension, better economy will be beneficial in the reduction of adult obesity prevalence rate in a developed economy, however, more focus and priority should be given to interventions aimed at modifying the significant risk factors of adult obesity. In other words, governments of developed countries with high prevalence rate of adult obesity should focus and prioritize interventions aimed at modifying the unhealthy behaviors, eating habits and physical lifestyle of their citizens.

Insights from the descriptive statistics with particular reference to Japan further underpin this assertion. Japan has the lowest adult obesity prevalence rate among the OECD member countries and, incidentally, the second lowest unemployment rate after Iceland. But for Iceland's low population of less than 400,000 people as opposed to Japan's high population of over 120 million people (CIA, 2018c); Japan would have also been the OECD member country with the lowest unemployment rate. This may indicate that there could be a high coincidence of low unemployment rate and low adult obesity prevalence rate if the lifestyle and eating habits of the population are healthy. Japanese' healthy lifestyle and eating habit may lend credence to this postulation. In a peer-reviewed article on the global epidemic of obesity and lessons from Japan, Yamori (2004) noted that diets such as Japanese daily foods could minimize the risks of obesity and other lifestyle-related diseases. This shows that Japanese and their eating habits are a reference point in the fight against obesity. Insights from Japan are evident that the positive relationship that exists between unemployment rate and adult obesity prevalence rate can be significant when the lifestyle and eating habits of the population are healthy.

Insights from Japan and the rest of the OECD member countries, however, is also evident that in developed economies, the lifestyle and eating habits of the population are more associated with the population's adult obesity prevalence rate than socioeconomic factors such as unemployment rate and GDP per capita. This is consistent with the findings of Siddarth (2013) who noted that eating habits, time spent on sedentary activities and behavioral lifestyle were significantly correlated with obesity in adult age. The findings of this study, validated by lessons from Japan, may have shown that the

eating habits of a population and the time spent on sedentary activities are more related to the country's adult obesity prevalence rate than socioeconomic factors such as GDP per capita and unemployment rate.

Japan introduced initiatives such "diet and nutrition teachers" in Japanese schools to inculcate healthy eating habits in Japanese children and adolescents (Nakamura, 2008). Habits inculcated in childhood linger often into adult and old age. In Japan, several public health agencies also introduced an initiative called the "kitchen car", a bus with its rear converted to kitchen used for teaching lessons on various healthy cooking practices (Nakamura, 2008). A good number of men and women found in OECD member countries with high prevalence rate of adult obesity may be inclined towards consuming healthy meals but may lack knowledge on healthy cooking practices. To control lifestyle-related and non-communicable diseases such as obesity in all ages, Japan enacted a strong legislation known as the "Specific Health Check and Guidance System" and came up with a laudable framework to control noncommunicable diseases in Japan (Wu et al., 2017).

In view of the above insights, governments of OECD member countries with high prevalence rate of adult obesity such as the United States and the rest of them are recommended to prioritize interventions that will help inculcate healthy eating habits, physical activity and other healthy behaviors in their citizens beginning from their childhood. It is recommended that governments of these countries emulate the Japanese initiatives. Japan is a reference point for adult obesity control. Implications for social change is that although better economy can act as a leverage in the reduction of adult

obesity prevalence rate in developed economies, lifestyle and eating habits remain the most significant risk factors of adult obesity hence all men and women in developed countries with high prevalence rate of adult obesity should inculcate healthy habits of eating and physical lifestyle. Governments of developed countries with high prevalence rate of adult obesity should design and implement interventions aimed at minimizing the significant risk factors of adult obesity in their respective countries with a view to maximizing the impact of improved GDP per capita, low unemployment rate and, by extension, better economy on the reduction of adult obesity prevalence rate. In other words, a robust economy and, by extension, lesser social suffering in the population can, to a reasonable extent, facilitate the reduction of adult obesity prevalence in a developed economy if other significant risk factors of adult obesity in the population are significantly minimized.

Conclusion

The negative insignificant relationship between adult obesity prevalence rate and GDP per capita and the positive insignificant relationship between adult obesity prevalence rate and unemployment rate may have led credence to the theory of social suffering. The fact that there is a negative association between GDP per capita and adult obesity prevalence rate, though weak and insignificant, validates the theory of social suffering. Also the positive association between unemployment rate and adult obesity prevalence rate, albeit super weak and insignificant, also validates the theory of social suffering which posits that the more the social suffering in a population due to harsh economic conditions, the higher the prevalence and incidence rate of diseases in the

population. This indicates that, in developed economies, better socioeconomic conditions could act as a leverage in the reduction of adult obesity prevalence rate, however, more focus and priority should be given to the design and implementation of interventions that will help inculcate healthy lifestyle and healthy eating habits in the target population as lifestyle and eating habit of a population are more significantly associated with adult obesity prevalence rate than socioeconomic conditions.

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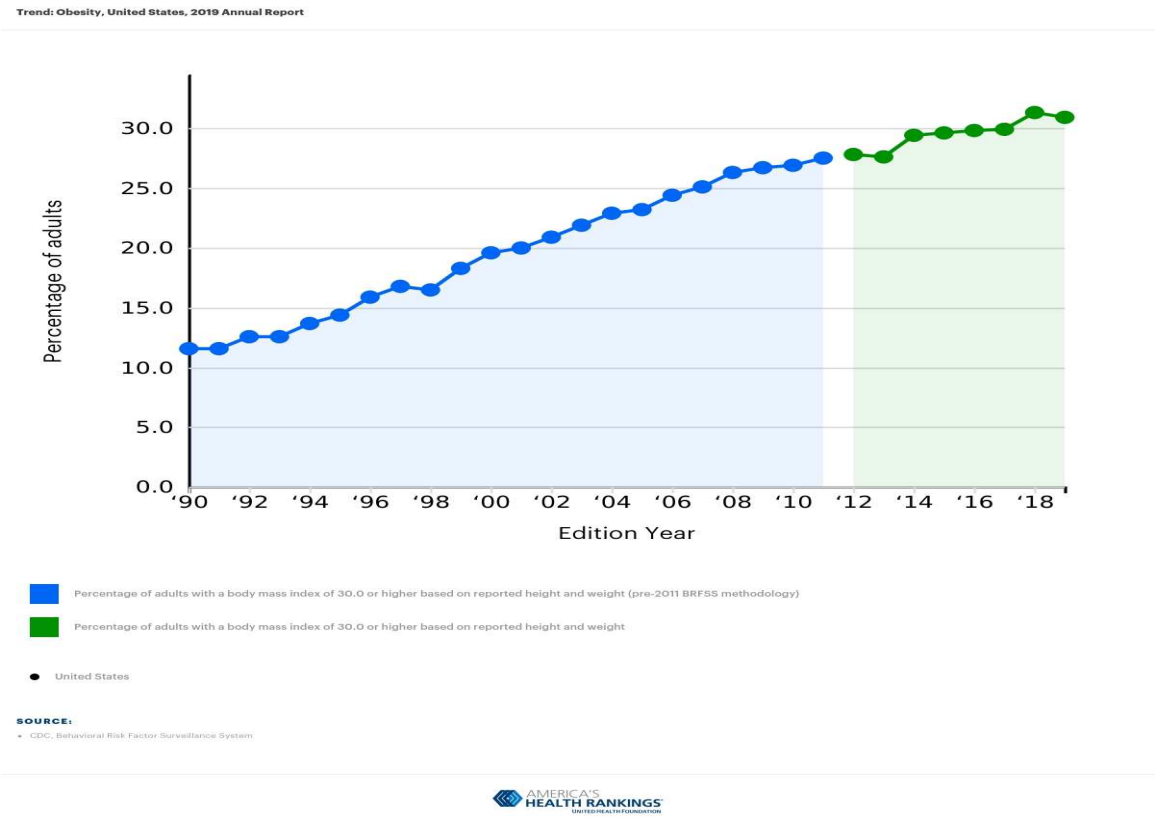
Appendix A: Graph Showing the Increasing Trend of Adult Obesity in the United States

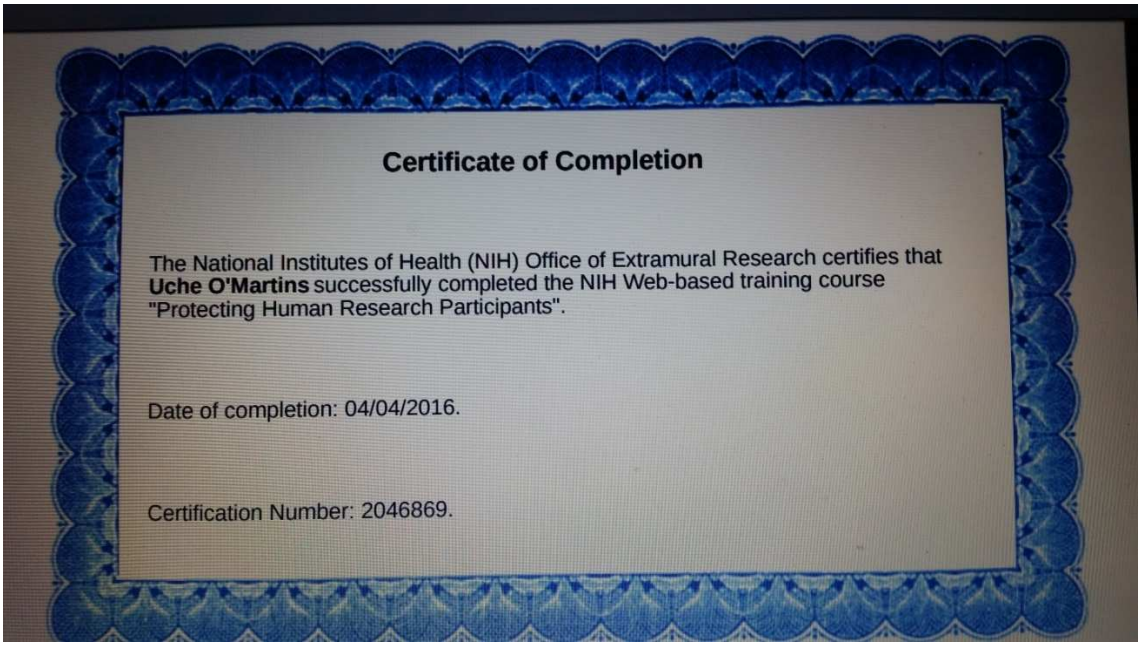


Percentage of adults with a body mass index of 30.0 or higher based on reported height and weight (pre-2011 BRFSS Methodology).

Percentage of adults with a body mass index of 30.0 or higher based on reported height and weight.

Graph showing the increasing adult obesity trend in the United States, one of the OECD member countries. Retrieved from https://www.americashealthrankings.org/search?q=obesity

Appendix B: National Institutes of Health Certificate



Certificate of Completion

The National Institutes of Health (NIH) Office of Extramural Research certifies that **Uche O'Martins** successfully completed the NIH Web-based training course "Protecting Human Research Participants".

Date of completion: 04/04/2016.

Certification Number: 2046869.

Appendix C: Walden University Institutional Review Board Approval Number

10-25-19-0598508