

Influences of Different Environmental Factors to the Increasing Rate of Obesity in the Philippines: A Review

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Abstract – *The dietary pattern of the Filipino households for the past 25 years shifted to increased energy density consumption as a product of urbanization and decreasing physical activity. This causes the emergence of increasing prevalence of obesity in the Philippines. Thus, this study aims to understand the growing overweight and obese cases in the country and to examine different environmental factors affecting the prevailing food consumption patterns and nutritional perceptions in the modern Philippines. This paper reviewed related articles and secondary data focusing on the environmental influences leading to obesity across the globe and in the Philippine setting. It was observed that increasing rates of obesity tend to follow the trends of urbanization and globalization posing risk in urban areas. This includes the adoption of Filipino to trends brought by westernization as a secular trend of urbanization. Being a country with a long history of colonialism, it is a consequence among Filipinos to have a high perception of cultural inferiority as part of internalized racial oppression leading to vulnerability to rapid changes of urbanization and globalization. Long-term strategies should become a public health priority to target the trends of obesity across all age groups particularly women and urban households which are prone to increase risk of developing obesity and limit its further negative effect on well-being.*

Keywords – *environmental influences, nutrition transition, obesity, obesity framework*

INTRODUCTION

Many historical and cultural factors influence the current dietary intake and food choices of the community. The dietary habits, food choices, and nutrition-related behaviors of people evolved from a long history of colonialism, persecution, and segregation. Through the years, food consumption of Filipinos rapidly changes in response with globalization. The rise serves as a troubling indicator of the “globesity” that threatens to overwhelm existing health care systems in the local and international realm [1].

Spreading of health-related issues concerning non-communicable diseases including obesity across the globe particularly has been associated with eating habits and poor dietary choices of western countries which coincides with increasing influence of fast foods outside Europe and America [1,2]. The problems related to obesity were first called the attention of the World Health Organization (WHO) since early 1990 wherein an estimated 115 million individuals were affected by this global pandemic while approximately 300 million individuals were experiencing health-related issues due to obesity among developed nations

[3]. However, recent data suggest that the gap between numbers is narrowing between the industrialized nation and less developed nations in terms of prevalence in obesity [4].

In the Philippines, there was a two-fold increase in the prevalence of overweight/obesity among adults from the year 1993 to 2015 with an annual average increase of 0.66 percent (%). Meanwhile, obesity rates among adolescents also continuously increased from 1989 to 2011; wherein, there was a notable increase from 8.3% to 9.2% from 2013 to 2015. Regions with the highest prevalence of overweight/obesity includes the National Capital Region (NCR), Central Luzon, and Cavite-Laguna-Batangas-Rizal-Quezon (CALABARZON). Consequently, the continuous relative increase in the prevalence of overweight and obesity among children (preschool and school age) was stopped in 2013 with a small decline in 2015. Increased energy density became a constant dietary pattern in the Philippine household for the last 25 years, and this can be attributed to the effect of increasing urbanization- increasing household food availability [5]. The increasing intake of meat, fats and oils have contributed both to the increased energy and nutrient quality and bioavailability. These results contribute to

the increased intake of cholesterol and saturated fats, and most of the time accompanied by an inactive lifestyle, contributing to the alarming trends in the increase of dyslipidemia, overweight and obesity among adults [6]-[7].

To better understand the role of different environmental factors in this accelerating trend of obesity in the Philippines, this article review will examine different environmental factors affecting the prevailing food consumption patterns and nutritional perceptions. Specifically, this review will attempt to explore how culture and community impact on the nutrition attitudes, food choices, and dietary intake of the population and identify segments of the population and community that should be targeted for education programs, desirable components of nutrition education programs.

MATERIALS AND METHODS

Search Strategies

This study utilized a narrative review through identification of eligible studies using different electronic databases such as PubMed, MEDLINE, BMJ Open Access and Science Direct. The major articles reviewed were published from January 2009-December 2019; however, the inclusion of supporting literature was not restricted in reference to the year of publication. This literature review used the following key phrases: “*environmental factors related to obesity*”, “*nutrition-related attitudes and obesity*”, “*culturally-sensitive model related to obesity*” and “*obesity in the Philippines*”. Additional materials were recognized by manual identification of reference lists of reviewed articles. Lastly, in-depth analyses of different profiles were done through review of secondary data from the available reports of the Department of Science and Technology (DOST), Food and Nutrition Research Institute (FNRI), National Economic Development Authority (NEDA), and World Health Organization (WHO).

Study selection

In order to be included in this review, publications were required to be: (i) published in a reputable and peer reviewed journals written in English language; (ii) only studies using human model was considered; (iii) cross-sectional studies, ecological studies, systematic reviews and meta-analyses, prospective and experimental studies were considered to be the major article for this review; (iv) the main objective of the study is to investigate the different environmental and

cultural factors towards the increasing trend of obesity; and (v) the study used a valid research and statistical design to answer the research objectives.

Data extraction

The author recognized potentially related articles based on abstracts and titles of the published articles. Journals were retrieved and it was included if these articles met the eligibility criteria. Extraction of data includes the title, authors, duration, characteristics of the sample used, exposure and outcome variables, limitations, and result of the study. Other related articles were used as foundation to support the significant findings presented including some local studies regarding the increasing prevalence of obesity.

RESULTS AND DISCUSSION

1.1. *Global pandemic issues of obesity*

Changes in food supply for the last century was very evident from simple and traditional foods going through the introduction of fast and convenient foods offered in convenience stores, restaurants, and supermarkets [8]. Three (3) out of ten (10) adults around the globe was overweight and obese, whereas obesity among adults increases by fifty percent (50%) in many countries. Meanwhile, obesity among adolescents and children is increasing with extreme cases observed among developed nations [9]. If the numbers will sustain its robustness, there will be an almost 38% overweight and 20% obese adults by 2030, globally [10].

Obesity rates in the United States dramatically increase by two folds compared to those individuals with normal nutritional status. For the last 10 years, it has sustained its increase achieving the Malthusian limit for obesity. Higher prevalence was recorded among women irrespective to their ethnicity [11]. Meanwhile, European studies suggested that the prevalence of obesity in Southern and Eastern Europe was higher compared to Western and Northern European nations in respect with their economic differences. However, better results were observed in the younger population compared to their adult counterparts [12].

One of the most concerned regions in terms of this global issue of obesity were the developing countries for the last decades [13]. However, the trend in these countries seems to be mediated by the wealth index and educational attainment of the population providing differences between wealthy and poor individuals [14].

1.2. *Issues of obesity in the Philippines*

The Philippines has been progressively affected by transformation in terms of its economic structure due to the introduction of neoliberalism and globalization. Using the national estimates, it has been shown that the most affected population group are women and population living in highly urbanized regions (Table 1). At present, females and people living and working in the urban areas recorded the most risk of increasing

prevalence of overweight and obesity in the country [15]. Figure 1 presents the overall trend among different age groups including preschool children, school children, adolescents and adults in terms of increasing rates of obesity in the Philippines. Data was extracted from the Philippine National Nutrition Survey conducted from 1989 to 2015. The said survey was conducted every five year and updated every 3 years [7].

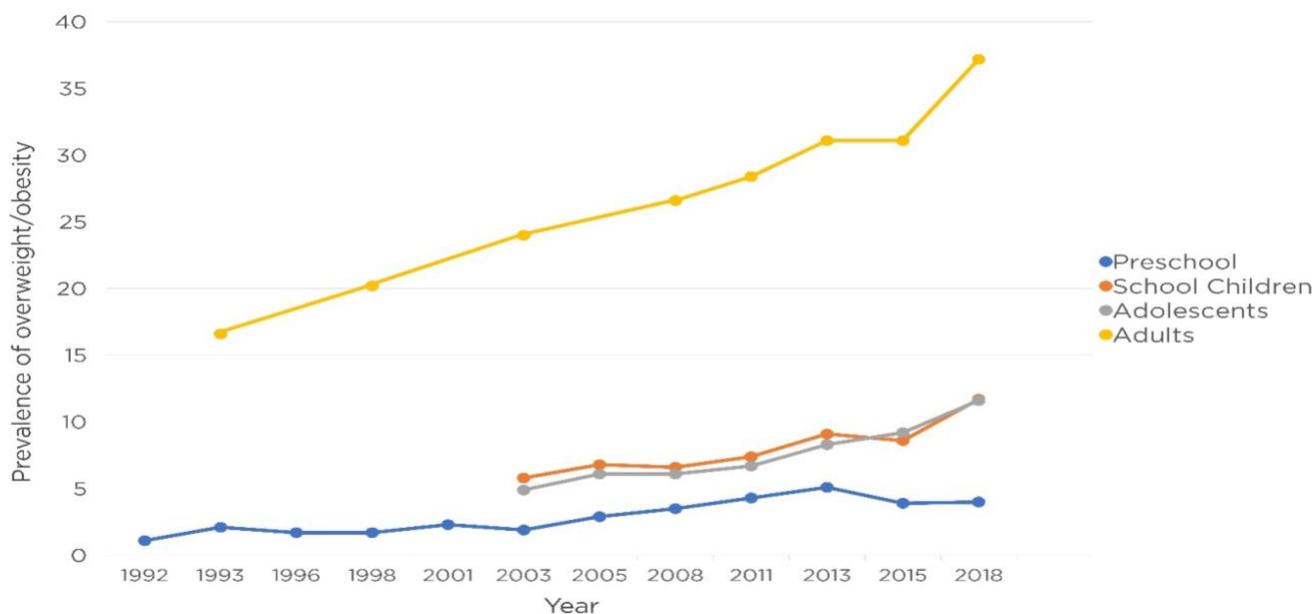


Figure 1. Trend of increasing rate of obesity in the Philippines across all age groups, 1989-2018

Overall, the prevalence of obesity in the Philippines has sustained its increasing trend since the 1990s and has almost increased by two-folds since 2003. Childhood obesity provided a small decrease from 9.1 % in 2013 to 8.6% in 2015 compared to its steady increase from the 1990 to 2013. Meanwhile, the prevalence of obesity among the adolescent population sustained its steady increase (9.2%) which can be attributed to their pre-adolescence weight. The increase for the last decades was two-fold higher since 1992 with an annual average increase of 0.66%. The increase give way to the recent number of 4 out of 10 overweight or obese Filipino adults as of today. Details were shown in Figure 1. [7].

The emergence of the increasing trend of obesity across the Philippine archipelago for the last three decades can be observed in the result of National Nutrition Survey (Figure 1 and Table 1) [5]. The increasing trend of obesity can be attributed to changes in the dietary pattern of the Filipino households for the past 25 years with the interplay of different factors. There was an observable shift of increased energy density consumption as a

product of urbanization and decreasing physical activity among population [5].

Based on the recent result of the national survey, rice was still considered as the staple food among Filipino households followed by fish and its products, and vegetables; however, there were no observed differences between the intake of rural from urban households. Urban households tend to consume more of meat and its products, other cereal products, oils and fats, and beverages while rural households tend to consume more of starchy roots and tubers, rice and rice products, vegetables, and sugar and its products. Highest wealth quintiles dwelling in urban areas tend to have higher food consumption compared to their lowest quintile counterparts. Also, urban households have higher energy intake compared to their rural counterpart. Processed foods which were usually consumed by urban households were hotdogs while in rural households their processed foods consumption usually includes canned and dried sardines. In relation to this, processed food consumption tends to increase as the wealth status of the household also increases [16].

Table 1. Prevalence of overweight/obesity in the Philippines aggregated by sex and region, 2008-2015

Disaggregation	Preschool children				School-aged children				Adolescents				Adults			
	2008	2011	2013	2015	2008	2011	2013	2015	2008	2011	2013	2015	2008	2011	2013	2015
All	3.3	4.3	5.0	3.8	6.6	7.4	9.1	8.6	6.2	6.7	8.3	9.2	26.6	28.4	31.2	31.1
Sex																
Male	3.6	4.7	5.4	4.0	7.6	8.2	9.9	8.8	6.3	6.8	8.6	9.4	23.0	24.6	27.6	26.8
Female	2.8	3.9	4.6	3.7	5.7	6.7	8.2	8.4	5.9	6.6	7.9	8.9	30.1	32.0	34.4	35.2
Region																
NCR	4.1	6.2	6.5	6.0	12.6	12.6	16.6	17.9	10.2	11.2	14.7	16.1	32.2	36.2	39.9	36.1
CAR	4.9	5.3	6.1	3.2	10.1	10.8	11.7	9.9	8.2	11.4	11.6	11.4	29.9	30.4	34.5	34.3
Ilocos	3.5	6.3	5.4	3.2	6.5	9.6	9.8	9.2	7.4	9.0	8.6	11.1	23.0	26.1	27.3	26.6
Cagayan Valley	3.4	3.2	5.7	3.8	6.5	7.1	9.2	9.1	5.9	6.9	7.8	10.1	22.3	23.0	25.1	24.9
Central Luzon	5.1	5.1	6.2	5.9	8.4	11.0	11.9	12.5	7.8	9.6	10.8	12.7	29.8	31.9	32.6	31.4
CALABARZON	3.9	5.9	6.6	4.9	8.7	12.1	12.1	11.3	8.7	8.9	9.6	11.8	29.3	30.2	33.2	33.1
MIMAROPA	2.5	3.4	5.5	3.2	3.2	4.0	5.4	5.2	3.3	3.9	4.7	4.1	20.5	21.9	24.7	23.0
Bicol	1.6	3.4	3.8	2.6	2.7	4.0	4.6	4.0	2.6	3.0	4.2	3.6	20.5	22.5	24.7	24.2
Western Visayas	3.1	3.5	4.6	3.3	5.2	4.5	5.2	7.1	4.0	4.6	5.5	6.6	19.4	21.9	22.9	22.6
Central Visayas	2.2	2.6	3.6	2.6	4.5	4.3	7.9	6.0	5.5	4.8	6.0	7.1	28.0	28.0	30.1	28.3
Eastern Visayas	1.8	3.4	3.2	2.3	4.3	4.3	4.7	4.9	3.5	3.6	4.9	5.7	27.0	28.1	32.9	31.1
Zamboanga Peninsula	2.0	4.4	2.6	2.6	3.4	3.4	5.1	5.4	3.5	3.2	4.8	5.0	23.9	24.9	25.9	28.4
Northern Mindanao	2.2	2.4	4.8	1.9	5.5	4.0	6.7	5.0	4.5	5.0	7.1	7.3	29.1	27.7	33.9	31.8
SOCCSKARGEN	2.0	3.1	3.4	2.7	5.1	6.4	5.8	5.2	5.9	5.4	7.1	7.2	28.8	29.5	32.8	33.3
ARMM	2.2	2.4	3.5	2.7	6.3	4.3	6.0	6.4	4.0	5.4	5.7	7.4	25.4	25.7	27.2	26.4
CARAGA	5.9	3.9	3.9	4.1	5.4	4.4	4.9	4.5	5.7	4.0	5.3	4.3	17.1	18.8	23.2	24.5
	2.0	1.9	3.7	1.6	5.6	3.2	6.2	5.2	5.7	4.3	6.8	5.5	29.6	27.6	34.9	30.6

Source: FNRI, DOST

Aside from wealth index, urban-rural differences affect the regional dietary patterns due to differences in food availability, distribution, and access. The consumption of “other cereal and cereal products,” fats and oils, milk and milk products, and meats and meat products were higher compared to that of vegetables which are lower in urban areas compared to other regions with different extent of urbanization. The regions with the highest proportion of urban population other than the NCR were Central Luzon and CALABARZON which had almost 60% urban communities and had higher consumption of “other cereals and cereal products”, eggs, milk and milk products, and meat and meat products. Meanwhile together with Central Luzon, the region had a lower intake of vegetables, starchy and tubers than most of the region which were less urbanized [16].

In a related study, Food consumption Away from Home (FAFH) per capita registered the highest annual growth of 9.19% that explains the increase of FAFH per household at 8.59% per year from 2003-2012 [17]. It was supported by the results of the National Nutrition Survey conducted last 2015 which found out that 32.2% of households in the country took their meals and snacks outside their home. Higher prevalence was found among the rich and richest quintile living in urban communities particularly in CALABARZON, NCR, and Central Luzon. Snacks were the usual food consumed outside home followed by lunch and dinner, respectively [5].

Most urbanized regions in the Philippines which includes the NCR, Cavite, Laguna, Batangas, Rizal and Quezon (CALABARZON) and Central Luzon seems to provide the biggest contribution in the level FAFH consumption among average Filipino household. The numbers are indication of the changing consumer

preferences that resulted to remarkable shift in dietary patterns and food intake, particularly in highly urbanized areas resulting to increasing trend of obesity. The remarkable increase in FAFH intake consumption of Filipino households suggests that merging in the consumption incidence of these food consumed away from home implied a remarkable shift in the dietary patterns and behavior of Filipino households. However, the complexity of the growing issues of obesity in the country can be best explained by understanding the different factors related to obesity [17].

2. Environmental factors resulting to increasing rate of obesity in the Philippines

The complexity of the problem in terms of obesity and its related conditions provides a new burden to the current public health system in the country because of this recent economic prosperity. This can be explained by a phenomenon called nutrition transition which said to exist among developing regions, where urbanization rapidly increases, and food patterns were greatly affected by the shift in economy and physical activity was greatly affected by sedentary lifestyle. Increasing rates of overweight/obesity is a multifactorial trend evolving through different factors which will be comprehensively discuss in the succeeding discussion.

3.3.1. Influence of food availability and supply

Findings of several studies suggested that the reason behind the obesity epidemic can be attributed to the changing environment including its food supply. Obesity most likely followed the changes in caloric quality and quantity of the available food supply for the population. From simple food production, the global shift forwards to

the production of a more industrialized food system that provides a more convenient and processed foods originating from the cheap agricultural inputs [18].

In the Asia Pacific Region, the largest provider of calories are cereal products particularly rice and white flour while the availability of vegetable oils had significantly increased for the last 50 years. Meanwhile the increase in meat consumption can be attributed to importation of chicken meat which is usually high in fat. Regions in the Asia-Pacific are mostly food dependent which implies that the population do not have the chance to choose from a range of nutritious foods. Also, it seems that the people in the Pacific were affected by economic and social barriers that allow them to consume foreign foods which are nutritionally-inferior compared to the locally produced foods fat [19]-[20].

3.3. Food consumption patterns and utilization at the individual level

Before the 21st century, mainstream research focused on the risk factors of obesity at the individual level which are usually considered as modifiable and are primarily attributed to inactive lifestyle and poor dietary practices [20]. Several studies postulated that the increased consumption of specific food groups increased the prevalence of obesity. This is the increase in consumption of refined cereals and sugar-sweetened products including the sugar-sweetened beverages [21]-[22]. In a related study conducted in the United Arab Emirates, it was found out that the risk of developing obesity among girls who always and frequently consumed their breakfast was decreased by half-fold; however, those boys who had their breakfast in school increased the chance of being obese by three-folds. The result of the study also showed that midnight snacking was significantly associated with obesity among boys by increasing the likelihood of 1.2 but not in girls [23].

Moreover, increasing the odds of developing obesity due to eating breakfast in school cafeterias tends to be related to the consumption of high-energy foods. In Bahrain, it was observed that high-caloric foods were the usual foods consumed in school cafeteria which includes carbonated and non-carbonated beverages, cheese, and broad beans. Usual snacking among adolescents and adults became an important part of their dietary patterns which are usually high calorie containing with a direct link to increase risk of developing obesity [24]-[26].

3.4. Relative influence of fast food to obesity

Relative to dietary habits at the household level, evidence suggest that their relationship between consumption of fast-food products and obesity; however, its causal role cannot be still explained. In a related study conducted in the US, it was found out that the availability of a fast-food service within one-tenth mile from a school

increases the odds of developing obesity by 5.2%. A 0.1 miles distance from a fast-food restaurant corresponds to an increase of 30 to 100 calories per day [27].

Meanwhile, presence of a fast-food store within a half-mile within the residence increases the likelihood of 1.6% of increasing the chance of gaining weight above 20kg. The effect still increases by 5.5% when the fast-food store is within 0.1 miles away from the residence. Moreover, the effect of half miles explains an increased caloric intake of 1 to 4 calories per day. Fast food chains within the school vicinity increase the likelihood of 0.5% increase of obesity for the last three decades among its students [28]. In a related study, the effect of fast-food chains in the vicinity also put the quality of the diet of students into jeopardy. It was found out that the odds of consuming vegetables and juices per day decreases when there is a fast-food chain within the vicinity compared to their counterparts. Increased the consumption of fried potatoes and sodas was also observed compared to those students studying in school away from fast food stores resulting to higher rates of obesity [29].

In the Philippines, the dynamics of food supply has outgrown the increasing numbers of fast-food restaurants and convenient stores which provide quick and easy access food to different stakeholders like students, working mothers, professionals and all other individuals that demand faster food preparation. The appetite of the Filipino population in terms of fast-food products have increased significantly, following the launch of fast-foods in the country 50 years ago [30] -[31].

However, the relative increase of international food chain brands has not always transformed into success since many Western chains. The local brands that were homegrown have been fair playing in the market compared to their Western brands counterparts because of through and aggressive marketing [32]-[35]. Local fast-food chains are more favored compared to Western-based fast-food restaurants which observed 70 per cent eating for once or twice a month only. Participants in this study also claimed that their first experience for this type of food took place before they turned to five. Moreover, young adult Filipinos tends to be more prone to the negative outcome of usual fast-food patronage because of their vulnerability against misinformation regarding the products' overall nutritional value. Hence, it was clear that the local brand chains have a more competitive advantage over its Western counterparts that capture the sensibilities of the Filipinos [17].

3.5. Influence of physical activity and lifestyle

Related to food habits and intake, the physical activity of the global population became sedentary also. The changes in the patterns of physical activity in the general population specifically among adolescents have relatively changed because of increased screen time in television

and indiscriminate use of internet and online gaming [36]. Alongside with the advent of technology, migration to urban cities poses risks to the population by introduction of different stressors such as congestion and traffic noise, fear of crime and crowding which are all potential source of stress and fatigue. These results to a poor contact with the environment particularly “green spaces” which can be defined as “open areas with natural vegetation” [37].

In a meta-analysis done by Kolehmainen and Sinja [38], it was predicted that psychological stress can lead to lower physical activity due to behavioral inhibition and a predisposing factor for a more sedentary lifestyle [38, 39]. Sedentary lifestyle of men and women leads to high prevalence of overweight and obesity across different age [40]. In the Philippines, physical inactivity was reported at 42.5% among adult population with highest prevalence in Central Luzon wherein 5 out of 10 individual followed by CALABARZON at 43.3% and NCR at 43.3% [41]. In a study done in Pampanga, Philippines by Acampado and Valenzuela [42], it was found out that the physical activity was associated significantly with educational level wherein greater proportion of physical inactivity was found in higher year levels and primary reason was lack of time. It is also suggested that there are some enabling factors associated with increased physical activity that includes involvement of their peers and friends, family support, sports equipment and skills related to it and an advice from a medical professional.

Aside from sedentary lifestyle, other related lifestyle factors that predict obesity are cigarette smoking and excessive alcohol intake [43]-[44]. Cigarette smoking was positively associated with central adiposity particularly among women [45,46]. Meanwhile, several prospective studies suggested alcohol consumption and drinking behavior is highly correlated with obesity and weight gain [47]. The increase in weight over four years by exposing an individual to one shot per day of alcohol predicted an increase of 0.19 kilograms whereas, the relationship was found stronger on beer [22], [48]. Hence, the interplay of different stressors causes to increase the physical inactivity among the population leading to development of overweight/obesity.

3.6. Nutrition-related attitudes and food literacy

Nutrition-related attitudes such as food choices and other considered behavior can also affect the dietary pattern of individuals by cultural and social factors [49]. Several studies suggested that nutrition literacy has a big role in development of eating behavior of adolescents and further sustained during adulthood [50,51,52]. In a 10-year longitudinal study conducted to track the involvement in food preparation of adolescence to adulthood to improve their quality of diet, it was found out that those individuals exposed to meal preparation

during their early years had been engaged in food preparation during adulthood [53]. In relation to this, research studies suggested that students tends to be dissatisfied with the available food in their schools that resulted in skipping meals. Also, children tend to prefer buffet set-up that offers unlimited quantities from their list of favorite items [54]-[55].

Related studies suggested that higher knowledge on food showed healthier food practices and consumed a variety of foods. It was also found out that improved knowledge on food preparation tends to decrease the intake of fat but increase in the carbohydrate consumption. These studies also revealed that males had a lower food knowledge compared to females, but they tend to have better dietary practices compared with their counterparts [56,57,58,59]. Moreover, it was also found out that usual involvement in cooking increased the likelihood to have better dietary practices. In relation, the increase in participation in food preparation improves the likelihood of an adolescent to increase their vegetable and fruit intake and decrease the chance of consuming fried foods, sweetened products, high salt, and sugary foods during adulthood [60]-[61].

In the Philippines, limited studies explore the effect of nutrition-related behaviors and food literacy in the food intake and dietary patterns. However, in a study conducted by Florentino et al. [62], it was found out the students from private schools in Manila usually consumed high calorie food, animal products, fats and oils, sugar-sweetened beverage that resulted to consumption of higher total energy, sugar and protein compared to public-school students which can be explained by income class differences. Hence, it is apparent that food- and nutrition literacy can highly influence the food intake and dietary patterns of adolescents which can impact on the future nutritional status of an individual.

3.7. Genes and ethnicity as a predictor of obesity

Research studies also started to focus on the environmental influences that interact with the genetic factors linking to obesity [63]. There are two major types of obesity according to phenotype: the monogenic obesity which is characterized by single-cell mutation that eventually leads to insufficiency and the polygenic obesity that includes many polymorphic genes that have complex interaction with the environment and the gene. The major types of genes related to obesity are MC4R, PCSK1, POMC and BDNF which are all also predisposing factors to other diseases. MC4R contains a coding sequence SNP at its downstream which can increase the likelihood of being obese [64]. The likelihood of increasing food intake with related food behavior phenotypes for polygenic obesity particularly SNP rs17782313 in MC4R and SNP rs9939609 in FTO

sequence which predisposes obesity related to high fat and energy intake [65].

In the study conducted in Europe and China, it has been reported that there was strong association between the FTO gene polymorphism with obesity [66]. Same results had been established in terms of the relationship of FTO to obesity in the study conducted in Singapore among Chinese, Malay and Japanese population [67]-[68].

Meanwhile, in the Philippines, it has been established that the association of the homozygous allele of the SNP rs4994 had reached its statistical significance with percent body fat, Body Mass Index (BMI) and waist circumference which are all predisposing factors to certain types of obesity. Meanwhile, the SNP in the first genetic sequence of FTO increased the likelihood of increased BMI among Filipino women which suggests that gene was an important factor that increases the susceptibility to obesity [69]. Studies also suggested that Filipino and Asian- American women had higher visceral fat deposition compared with Caucasians that puts these populations into higher risk of having central obesity [70]-[71]. These contemporary studies highly suggest that the Asian population particularly women is at risk to developing obesity because of their specific genetic traits that predisposes to higher food intake and central adiposity.

4. *An analysis of the increasing obesity cases in the Philippines*

Culture has a robust influence on the nutritional status of the population since it molds the food choices along with social influences that directly impacts their eating behavior [74]. Thus, in order to understand the multifactorial problem of obesity and its complexity based on the present literature in the provided discussion it is necessary to infuse culture in the discussion [75]. Eating habits are shaped by different environmental factors however, many dietary habits are already inculcated in culture and genes of the population from their root of origin or ethno-linguistic classification. This attempt has been made to explain the multifactorial causation of increasing rates of obesity in the Philippines by reviewing available literature and construction of a framework.

As presented in Figure 2, the different factors were divided into three dimensions namely: environmental,

household and individual which are all leading to obesity. Meanwhile, each dimension has been divided again into three major distinct classification of factors leading to obesity which includes the basic causes which are all leading to the underlying causes that are all requisite factors to the immediate causes of obesity.

It has been discussed that the major driver of obesity across the globe is the rate of urbanization and globalization. The Philippines among other developing countries also experienced stronger economy and increasing Gross Domestic Product (GDP) and Gross National Product (GNP) for the last two decades which leads to increased urbanization of different regions. Along with rapid urbanization, the rates of obesity in the country were also increasing particularly among adults. Filipinos tend to experience negative perception towards ethnic and cultural inferiority because of a long history of colonialism making Filipinos vulnerable to introduction of different Western commodities to the country including marketing of convenient and fast-food restaurants. Throughout the years, the number of Filipinos eating outside their home dramatically because of the demands from their work and lifestyle. Nutrition-related attitudes and food literacy of children has also a direct impact on their future dietary patterns as adults. Improved nutrition-related attitudes and food literacy have been suggested to come up with better nutritional outcomes.

Increased globalization and urbanization also pose risk to the available blue and green spaces for the community which results in inadequate areas for physical activities and leisure. These spaces have viable influences on stress management that can affect the dietary behavior of an individual. Stress could further amplify the issues of obesity by changing the dietary patterns and behavior of individuals which results in higher food intake and increases the likelihood of involvement in different unhealthy lifestyle such as cigarette smoking and binge drinking [77]. Lastly, based on the genetic traits of the Filipino women tend to be at risk to develop obesity because they have the specific receptor which are obesogenic in nature. Moreover, Asian including Filipino women have higher central adiposity compared to their Caucasian counterparts which increases the likelihood to develop obesity.

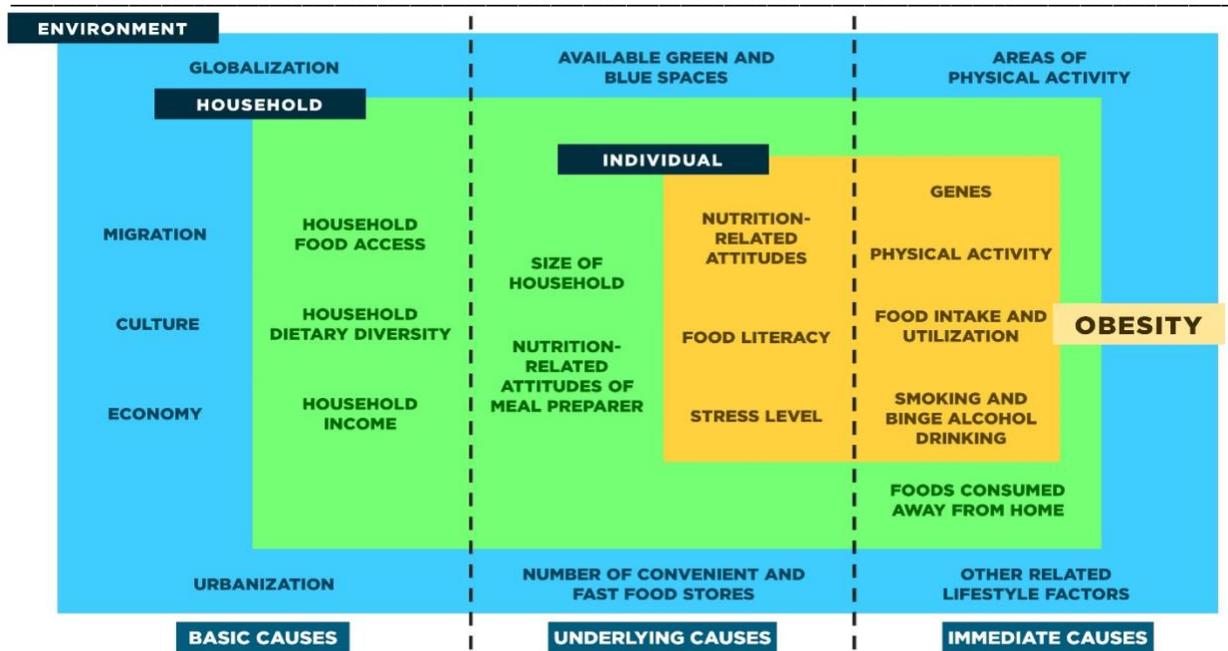


Figure 2. Conceptual Framework explaining the multi-factorial origin of obesity in the Philippines

CONCLUSION AND RECOMMENDATION

The profound increasing rates of obesity in the Philippines has been observed among adolescents and persists into adulthood with higher prevalence among women and in older age. The increasing rates of obesity tend to follow the trends of urbanization and globalization posing risk among urban dwellers. The interaction of different environmental factors because of globalization, secular trends, cultural and individual factors resulted in increasing prevalence in the country [77]. The obesogenic environment coupled with obesogenic traits amplify the existence of the problem that eventually lead to different problematic conditions including non-communicable diseases.

Thus, a framework linking the relationship to different environmental and cultural factors could help the national and local leaders to use it in their program planning. Long-term strategies should become a public health priority to target the trends of obesity across all age groups and limit its further negative effect on well-being. Improving access to healthy and nutritious food while legislating and narrowing the policies regarding the marketing of convenient and fast foods must be enacted to provide options for dietary behavior change among individuals vulnerable to obesity particularly women and households living in urban areas. Lastly, research must be continuously done at the sub-community level to allow local planners to develop more appropriate solutions which are culturally accepted in the norms of the society.

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