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Urbanization Drift and Obesity Epidemic in Sub-Saharan Africa: A Review of the Situation in Nigeria.

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ABSTRACT

The growing trend of obesity worldwide and in sub-Saharan Africa can be linked to the urbanization drift experienced in recent years both in developed and developing countries like Nigeria, at four pivotal points namely: physical activity level, socio-economic status (SES), nutritional and psychosocial factors. Literature search was done using Medline/PubMed and Google Scholar for published studies on the urbanization rate, and the prevalence of overweight and obesity in Nigeria. The socio-demographic determinants of obesity among adults in the Nigerian population were female gender, marriage, low physical activity level, positive family history, urban area of residence and age ≥ 40 years**.** Obesity was more prevalent among women of low SES living in the urban area than those of high SES. Also overweight and obesity was more prevalent among young children (girls than boys) living in an urban than rural area and attending private than public schools. In order to prevent a higher trend of obesity in future, more of awareness/attitudinal reorientation programmes need to be created by health based action groups in collaboration with government agencies on perception, risky lifestyles and cultures associated with excessive weight gain.

Key Words: Urbanization drift, obesity epidemic, Sub-Saharan Africa, Nigeria

1. Introduction

Urbanization is the growth of urban areas as a result of rural-urban migration or sub-urban concentration into cities particularly the very large ones (Wikipedia, 2012). Currently, the world is undergoing the largest wave of urban growth in history as the level of urbanization is increasing in both developed and developing countries. Though natural and inevitable (UNFPA, 2007), however, it may be secondary to the outcome of social, economic and political development from the metropolitan pattern of organization and governance (Wikipedia, 2012). For the first time in history, in 2008 more than 50% of the world's population lives in the urban area and by 2030, it is estimated that the number of urban dwellers will reach 5 billion with urban growth concentrated in Africa and Asia

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(UNFPA, 2007) and it is projected that by 2050, 70% of the world population will be living in towns and cities. The scale and pace of urbanization in Nigeria is not different as she is the Africa's most populous country with a population of about 162 million as at 2011 (World Bank Group, 2012). With such a large and quickly growing population, Nigeria may face different and perhaps greater challenges in dealing with rapid urbanization and its associated adverse health outcomes including obesity than her neighbors (United Nations, 2008) as she experiences an upsurge of more large cities (i.e. those with over one million people) than any other country in Africa.

A well-established body of literature documents a strong link between urbanization and obesity epidemic in Nigeria (Ekezie et al, 2011) at four pivotal points namely; physical activity level, SES, nutritional and psychosocial factors. According to the world health organization (WHO), the societal change and nutritional transition are driving the high prevalence of obesity worldwide. Economic growth, modernization, urbanization and the globalization of the food market are just some of the forces thought to underline the increasing trend of obesity (Drewnowski and Popkin, 1997; WHO, 2002). Obesity has reached epidemic proportion globally with more than 1.6 billion adults being overweight and at least 400 million of them clinically obese and is a major contributor to the global burden of chronic diseases and disability (WHO, 2002; WHO, 2006). At the other end of malnutrition scale, obesity is one of today's most blatantly visible-yet most neglected public health problems (WHO, 2002). The scourge of obesity is not restricted to developed societies alone, in developing countries, it is estimated that over 775 million people suffer from obesity related problems. Obesity contributes about 2.8 million deaths each year, risk of heart diseases, strokes and diabetes increase steadily with increasing body mass index (WHO, 2011).

For instance in Nigeria, presently about eight million people are suffering from hypertension, 4 million are diabetic and 100,000 new cases of cancer are diagnosed each year (Chukwu, 2011). According to HERFON, about five million Nigerians may die of non-communicable disease (NCDs) by the year 2015, and diabetes alone is projected to cause about 52% of the mortality. Also, the economic cost of obesity related diseases in Nigeria is enormous. In 2005, it was about 400 million dollars, and by 2015, it is estimated to rise to eight billion dollars (HERFON, 2011)

The trend is almost the same in other developing countries of the world. In Indonesia and china, the incidence of obesity in cities is doubled than in country side, while in Congo, it is six times higher (Popkin, 2000) and in western Africa, it is estimated to be 10%, with the rates of obesity among women three times those found in men. In urban West Africa, rates of obesity have more doubled in the last 15 years (Abubakari et al, 2008).

However, since urbanization is expected, continuous and inevitable in human and societal development, multi-factorial, multi-dimensional, proactive approaches are needed and should be targeted at reaching many at various meet points where they could be found and in their local languages in order to curb the increasing adverse health outcomes associated with urbanization such as obesity. Hence, to contribute to existing knowledge, this review paper shall spotlight the various roles that socio-economic, cultural, nutritional, psychosocial and physical factors related to urbanization play in promoting an obesogenic environment and will relate it to the ever growing epidemiological trend of overweight and obesity in Nigerian urban cities. It shall also suggest recommendations as to what can be done to curb the trend of obesity among the Nigerian populace.

2. METHODS

Search strategy

Literature search was done using Medline, PUBMED and Google Scholar for published articles on various studies on the urbanization rates, the prevalence of overweight and obesity epidemic in Nigeria. Other articles were gotten from journal hand search. The search for articles on the prevalence of overweight and obesity in Nigeria was limited to studies conducted among Nigerians within 1997-2012.

The search keywords included: "*obesity and overweight in Nigeria, obesity prevalence in Nigeria, physical activity level and obesity in Nigeria, socioeconomic status and obesity in Nigeria, nutritional or dietary habits and obesity among Nigerians, psychosocial factors and obesity in Nigeria, urbanization drift and obesity in Nigeria, urbanization drift in Nigeria, urbanization*, *obesity and overweight",* etc.

From the search, only articles that met the inclusion criteria were used for this review. Full articles were gotten where possible. The title and abstracts of the various articles were assessed by the first author (EC), while the second author (AE) assessed the studies' selection procedure, and in cases of discordance the selection was discussed between the authors.

2.1 Inclusion criteria

Articles were included if they were published within 1997-2012, published in English and conducted among Nigerians in rural or urban settings and showed a relationship between urbanization and obesity. Additionally, other included studies showed a relationship between physical activity levels and obesity or nutritional habits, socioeconomic status and psychosocial factors with obesity among Nigerians. Other articles whose findings were contributory to the overall topic were also included.

2.2 Exclusion criteria

Articles that did not meet the inclusion criteria were excluded especially those studies of "low" quality which were not too relevant to the topic.

Results

For the prevalence of overweight/obesity in urban/rural Nigeria, a total of 2305 relevant abstracts were gotten from the combined search and only 33 articles that met the inclusion criteria were used. Nineteen studies were conducted among urban participants only, six among semi-urban participants, three among urban and rural participants, and three among rural participants only while in two studies, the study setting was not specified. Nine studies were conducted among young children (<18 years of age) while 24 studies were conducted among adults (>18 years of age) participants.

3. The Prevalence of Overweight and Obesity among Nigerians

The prevalence of overweight and obesity among Nigerians from various studies are enlisted in table 1. From these studies, the major findings were that obesity was more prevalent among women of low SES living in the urban area than those of high SES in variance with what thought to be the case among developing countries (Amole et al, 2011). The socio-demographic determinants of obesity among adults in the Nigerian population were female gender, marriage, low physical activity level, positive family history, urban area of residence and age ≥ 40 years**.** Also overweight and obesity was more prevalent among young children (girls than boys) living in an urban than rural area and attending private schools than public schools. As in adults, low physical activity and poor dietary habits were also associated with the obesity prevalence among children and may not too dependent on parents SES. Hence, the above studies justify the prevalence of an obesity epidemic in Nigeria and could be projected to double with the passing years.

3.1 Urbanization Drift in Nigeria (1950-2020)

Nigeria is Africa's most populous country with a population of about 162 million as at 2011 (World Bank Group, 2012). The distribution of Nigeria's population is shaped to a great extent by urbanization. Between 1952 and 1991, the number of urban areas in Nigeria increased from 56 to 359 (Onwuka, 2005) and may triple with current infrastructural transformation agenda in Nigeria. The proportion of urban dwellers as a percentage of the overall population rose from 28.6 percent in 1980 to 46.2 percent in 2005, while the country's urban population now grows at a rate of 3.78 percent per year (Agunwamba et al, 2009). In comparison, sub-Saharan Africa's urban population growth rate of 3.67

percent falls short of this, as seen in its 2005 percentage of urban dwellers (35 percent) (United Nations, 2008). With more large cities and a quickly growing urban population, Nigeria may face greater challenges in dealing with rapid urbanization than its neighbors (United Nations, 2008; Agunwamba et al, 2009) (See Figure 2 (United Nations, 2006))

Factors that promote the pace of urbanization in Nigeria include natural increase and migration. The Nigerian total fertility rate (TFR) of 5.43 in 2006 exceeds that of sub-Saharan Africa as a whole and is more than twice the world's rate. The fertility rate in Nigeria is quite higher than that of other developing nations. However, the UN projects that the fertility rate will decline to 3.64 children per woman in 2020-2025 and to 2.4 in 2045-2050 (Agunwamba et al, 2009; United Nations, 2007), this could only be attainable if most families adopt proper family planning measures. This invariably affects the country's population status. The UN projects a population increase from about 148 million (2007) to 210 million individuals in 2025 and 289 million in 2050 (United Nations, 2007). The United Nation's World Urbanization Prospect, (United Nations, 2006) projects a decline in the urban annual growth (%) in Nigeria from 7.56% (1955-1960) to 3.75% (2010-2015) and 2.42% (2050-2055), as it is expected that many families in our cities may adopt the westernized view of small family size of one or two kids, however the Nigerian population data are not always reliable (Agunwamba et al, 2009) due to discrepancies and non-compliances.

Another contributory factor to the Nigerian urban growth is migration (rural-urban), as many people move in search of better socioeconomic opportunities (UNFPA, 2007). Among the different tribes/ethnicities, high populated and less developed tribes tend to migrate to the urban area for various purposes. In a study by Mberu et al (Mberu, 2005), it was deduced that Hausa-Fulani people are more likely to be rural-rural migrants than all other ethnic groups except Nupe-Kamberi-Gwari. Rural-urban migrants however were unlikely to be Hausa-Fulani. The Urhobo-Edo-Isoko and the Igbo-Ibibio were much more likely to migrate to urban areas, with the Igbo national dominance of the trading sector and high population and low economic development in the Igbo region likely the cause of the high out migration rates. The Niger-delta region was the origin of large numbers of people from the latter group (United Nations, 2007; Mberu, 2005). Recently, many migrate in search for economic fortunes leading to population explosions in the cities. The urban centers of Lagos, Port Harcourt, Kaduna and Kano have grown very fast especially as they are the commercial nerve centers of their respective geopolitical zones. Abuja, the Federal Capital City and some of the new State capitals have also experienced phenomenal growth as a result of migration. Rapid urban growth has resulted in the problems of urban congestion or overcrowding, poor housing, poor environmental sanitation, unemployment, crimes and other social vices which have come to characterize Nigeria's large

urban centers. Lagos by 2004 had 10 million residents and is expected to reach 17 million (United Nations, 2004) or 25 million by 2015 (Heyman and Pycroft, 2003); while UNFPA (United Nations, 2012) reports that the population of Abuja stands at about 2.3 million (2011) and may reach 3.3 million by 2015 with a population growth rate of 9.3%.

Education level could affect migration rate. Those with the higher levels of education were ten times more likely to migrate from rural to urban areas than those with the lower levels (the ratio for rural-urban migration was 2:1) (Agunwamba et al, 2009). However, a large proportion of rural-urban migrants end up unemployed for months or years (United Nations, 2004; Nigerian Institute of Social and Economic Research, 1993).

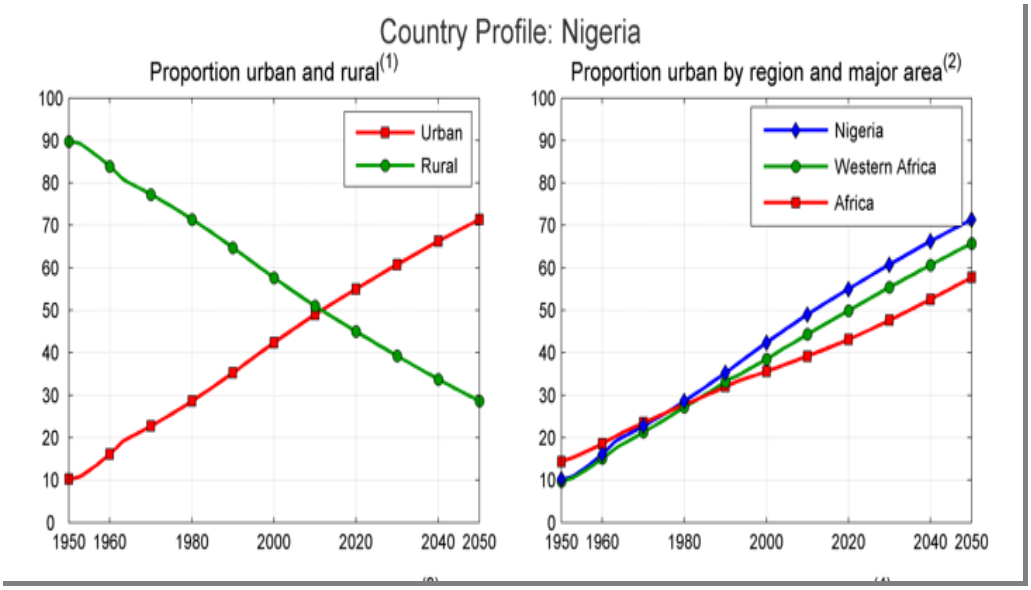

FIGURE 1: The urban-rural population projections (1950-2050) in Nigeria. (Source: UN Population Divisions/DESA, 2012 (**49**))

Notes:

(1) Proportions of urban and rural population in the current country or area in per cent of the total population, 1950 to 2050.

(2) Proportions of urban population in the current country as compared to the major area and region in which this country is located. The proportion is expressed in per cent of the population between 1950 and 2050.

Environmental degradation and conflict may drive people off the land. Often people who leave the country side to find better lives in the cities have no choice but to settle in shanty towns and slums, where they lack access to decent housing and sanitation, health care and education, in effect, trading in rural for urban poverty (UNFPA, 2007). As the total fertility rate (TFR) for rural regions in Nigeria (6.1 children per women) exceeds that for urban (4.9 children per

woman), it is evident therefore that Nigeria's urban population has grown at a faster rate than the rural population for reasons beyond urban fertility alone (Agunwamba et al, 2009), emigrants from neighboring African countries may also possibly contribute to the phenomenal urban growth.

With regards to the main processes driving urbanization, rural to urban migration and natural population growth in existing urban areas are possible contributory factors (Leon, 2008). Although difficult to estimate with certainty (White et al, 2004), there is a consensus among demographers that rural to urban migration account for 60% of the urban population growth today (Cohen et al, 2004), less than 40% due to migration from rural areas, and the remainder being a result of annexation, where by an expanding urban area comes to incorporate small towns or villages which previously had been classified as non-urban (Leon, 2008; Cohen et al, 2004). Figure 1 shows the urban-rural population projections (1950-2050) in Nigeria. As shown below, the rate of urbanization doubles and by 2050, 70% of the Nigerian population will be living in our cities.

4. DISCUSSION

4.1 The Link between Urbanization and Obesity

Before the recent effects of industrialization and development, poverty and hardship in developing countries hinder a greater number of people from being obese (Sola et al, 2011). Today, the influence and drive of modernization have changed resources, environment and behavior on a global scale (**39**). Theories that follow traditional pathways have reduced the cause of obesity to a simple dichotomy of diet and physical activity pattern and perhaps genetic influences putting into perspective a balance equation of energy input and output. However, one must not be oblivious of the role of globalization in our ever-changing world as a catalyst for weight gain (WHO, 2002; Popkin and Gorgon-Larsen, 2004). Recent studies suggest that, the forces of rapid globalization, urbanization and mechanization account for the shift in the dietary pattern and physical activity levels that tends to increase the risk of obesity in children and adults worldwide (Ekezie et al, 2011; Akarolo-Anthony and Adebamawo, 2012; Leon, 2008).

As shown in figure 2, urbanization can be linked to obesity by four pivotal factors namely: nutritional factors, physical activity levels, socio-economic status and psychosocial factors. These factors are extrinsic to an individual while the genetic susceptibility or predisposition plays an intrinsic role to an individual's weight gain. The interplay between these factors may result in excessive weight gain or the risk of developing non communicable diseases.

4.2 Nutritional factors

Paradoxically, developing nations (e.g Nigeria) use their growing incomes to replace their traditional diets, rich in fibers and grains with diets that include a greater proportion of fats and caloric sweeteners (Drewnowski and Popkin, 1997). During the course of development, population undergoes nutrition transition characterized by an increased consumption of fats and simple sugars and a decrease in fruits and vegetable intake. Nutrition transition involves moving away from traditional diet that are high in complex carbohydrates and low in fats to a modernized diet which has higher concentration of simple sugars and energy from fats and lower contribution of energy from complex carbohydrates (Drewnowski and Popkin, 1997). The average staple diet of a rural African population (including Nigeria) consists of carbohydrates (70%) with rather low protein intake. It has high fiber content, moderate oil mostly palm oil, with average salts content (Ulasi et al, 2010). In addition, it is rich in vegetables and fruits as mostly those in these rural communities are farmers. However, those with very large family size and fewer resources (poor economy) are rather under weight than overweight (Chakrabarty and Bharati, 2010). From prior studies, urbanization has resulted in nutrition transition from traditional diet to western diets (which include more saturated fats and sugars and less of the traditional diet of fiber and protein). With more rural communities being converted to semi urban/urban communities due to migration and natural increase, the introduction of modernization and westernization, will result in many tending to adopt western diet patterns including fast food and drinks (Ulasi et al, 2010).

Global availability of cheap vegetable oils and fats has resulted in greatly increased fat consumption among low-income nations (Drewnowski and Popkin, 1997) including Nigeria. Consequently the nutrition transition now occurs at low levels of gross national product than previously, and is accelerated further by high urbanization rates (Drewnowski and Popkin, 1997). Rapid urbanization is accompanied by unhealthy dietary practices, sedentary lifestyles and obesity, all of which are major risk factors of non-communicable diseases (NCDs). All these risk factors are lifestyle related and are influenced by the change from rural to urban lifestyle (Yaday and Krishnam, 2008). In our rural communities, where farming is predominant, people eat fresh foods and fruits and less fats, but as they migrate from rural to urban centers or as their communities experience transformation, with little lands to farm on, many tend desire the consumption of processed can foods/drinks. The result evidently is the reduction in the nutritional status and life expectancy for urban dwellers as against rural dwellers.

Early nutritional status of an individual is a factor that is influenced by rapid urbanization and could directly or indirectly affect weight gain at latter life. Nature provided breast milk as the first and safest food and source of immunity to a new born baby. Some studies have found that breast-feeding may also

protect a child from obesity (Toschke et al, 2002). Infant feeding is important in the development of obesity, because children who are bottle-fed have higher rates of being obese than those who are breast-fed (Gillman et al, 2001), but this relationship has been inconsistent in adults, while in other studies it failed to be protective. Though, rural parents are hardworking but most mothers are not too busy to breastfeed their babies as against some urban women (working-class) who are too busy to breastfeed and hence resort to artificially compounded baby formulas with low natural nutrient constitution and longer shelf life.

Since living in the city can be very expensive, most of the times, both parents may work secularly to make ends meet. Urbanization in Nigeria is also accompanied by higher female participation in the work force and with a shift away from traditional time intensive preparations towards precooked convenient food at home to fast-food and snacks outside meals. Particularly for the urban populace, the shift towards fast and convenience foods is also a shift away from fresh fruits and vegetables, pulses and other roots/tubers, towards a much more sugary, salty and fatty diet. It is also often a shift away from a diet rich in fiber, minerals and vitamins towards one rich in energy including sugar, saturated fats and cholesterol (Shetty and Schmiduber, 2011).

Urbanization in Nigeria not only affects changes in the dietary patterns within the country; it may also promote changes and convergences across borders. Urbanization provides infrastructure, transportation facilities, ports and roads, trains and air ports, thereby facilitating trade both within and across countries. It affords international suppliers the advantages of proximity to locally-concentrated mass of consumers, allowing their foreign distribution channels (e.g. international supply chains, super markets, and fast-food chains) to operate efficiently and profitably. Foreign distribution channels bring foreign diets, meaning more processed, sugary, fatty foods that are energy-rich in general (Shetty and Schmiduber, 2011). This has resulted in the globalization of the food market invariably resulting in the availability of cheap vegetables oils/fats and its consumption in low income countries (Drewnowski and Popkin, 1997) like Nigeria and as a result most people will prefer these foods/drinks/oils just because they are foreign.

Poor dietary knowledge as another factor, also promotes excessive weight gain. Poor dietary knowledge may affect food choices and preference. Some individuals go for food due to their palatability and pleasure than for their nutritional composition. This is more common among children. Most urban kids when taken to fast food points prefer white bread, savory snacks, cookies, chips, biscuits, other form of potatoes and chocolates (Skidmore and Yamei, 2004), which are not part of traditional African recipes. If this trend is not reversed and the individuals educated, such young ones grows up with the notion that foods that taste sweet and oily is better. Most persons, who eat away, do this possibly

for reasons of less time at home due to job demands. It is reported that these away from home foods are low in natural and basic ingredients in their preparation (Drewnowski and Popkin, 1997). Eating away from home has been shown to be associated with increased energy intake as well as overweight and obesity (Binkley et al, 2000; French et al, 2000). Restaurants and grocery stores are the primary settings from which people obtain food. These settings are often designed to maximize sales of food by strategically placing and promoting items to encourage impulse purchases. The superficial characteristics of food products, including packaging and portion sizes, design, salience, health claims and labeling, strongly influence food choices and consumption in ways for which people generally lack insight. Also, increasing the size of entrée result in increased energy intake (Diliberti et al, 2004) as some restaurants serve excessive portion, therefore it could be recommended that one leave half of his/her entrée behind or better yet share a plate with someone. Dietary behaviors /pattern may also reflect patterns influenced by social class and may be influenced by stress levels. Most persons tend to eat more when they work hard, while most individuals prefer high fat diets, since these do not switch off appetite as well as carbohydrate and protein. Also fat consumption induces very little energy expenditure as most is stored (Hunter et al, 2002). Studies have shown that the prevalence of obesity is greatest in those who eat more fats. Snacking and loss of formalized meal pattern reduces the conscious recognition of food eaten. Additionally, excessive alcohol consumption promotes weight gain by providing substantial energy. It can also stimulate appetite and loosen restraint (Hunter et al, 2002**)**.

Unfortunately giving off smoking increases appetite and decrease metabolic rate, leading to an average weight gain of 2.8 kg in males and 3.8 kg in females. Thus to prevent such weight gain, dietary advice on healthy eating should be given to all giving up smoking **(**Hunter et al, 2002). It is recommended that food preferences should not be based on palatability and portion size only but most especially on its nutritional value. The family, medical practitioners such as dieticians should enlighten others on the benefits of healthy dieting and what constitutes balanced diet. Additionally, poor eating behaviors like binge eating and drinking should be discouraged and any affected should see a medical practitioner for advice.

4.3 Physical activity level

In recent years, modernization and industrialization in our urban areas has given rise to a generalized state of reduction in the use of human energy during labour as well as capital intensive manufacturing of goods and services. Various studies report that 25-65% of Nigerians are physically inactive (Ekpenyong et al, 2012) with rapid urbanization as a major driving force. In a study by Akarolo-Anthony and Adebamowo (2012), 58.9% of the participants

reported that they don't exercise, 11.2% exercise 1day/week, and 8.7% exercise 2days/week and 21.2% exercise at least 3days/week. 55% spend at least 6 hours/week sitting at home watching TV, 51% spend at least 6 hours/week sitting doing other things. >90% don't spend any time on sports (running, biking, tennis, squash, soccer, swimming, hiking, aerobics, and weights). 24% spend >10hours/week walking or standing at home, while 67% spend >10hours/week working at home. The result showed that urbanized Nigerian adults adopt a sedentary lifestyle and are more physically active while executing housework than while away from home.

In most rural communities in Nigeria, the physical activity level is very high and less sedentary. It is common sight to see children travel far to streams/springs to fetch water, go to farm, work hard and hence are less prone to be overweight and obese even in genetically predisposed individuals. Adult men and women also engaged in some physical activities such as physical strenuous domestic routines as well as walking long distances to farms, markets and to hawk their goods and wares, which at times are strenuous and may be deleterious to health (Ogunbode et al, 2011).

However, the situation in our urban cities is the reverse of these; most families in the urban areas have limited space to exercise due to congestion and overcrowding in their residential areas.

Most task at home, at offices and factories, and other points are mostly performed using machines and less man power exertion. Though, modern technology has been conducive, its adverse health effects are enormous. Most people in Nigeria are oriented to rapid transportation, capital intensive, instead of labour-intensive jobs. At various places and homes, instead of the staircase, it is common to see many go for motorized lifts. Human labour has been replaced with labour technology such as remote controls, dish and cloth washing machines and computers (Ekezie et al, 2011). The horse drawn carriage of less than a century ago is a far cry from today's fast cars and planes. In fact, a modern day business man whose grandfather probably either walked to work or rode a horse or a bicycle may fly across the Atlantic Ocean between meals (Watchtower, 2008). Work related activities have declined in the recent decades while leisure time dominated by television viewing, computer use has increased. Parents have a key role to play in encouraging the development of an obesogenic environment at home, especially through their examples on their kids. Parents of good examples encourage and also participate in regular exercise of 30 minutes daily with their family members (American Heart Society, 2012). An advance in technology has produced a generation of sedentary children. Most children are essentially glued to their seats at homes (more especially during school holiday periods or after school) focusing on television, videogames, surfing the internet and updating their status on the social network, thereby increasing their odds for excessive

weight gain. Family environment also plays an important role in the development of obesity globally. Lengthy periods of television viewing, lack of family meals at home, eating out at restaurants, childhood neglect, depression (Ebbeling et al, 2002) and single child over pampering have also been associated with both childhood and adulthood risk of obesity. Several studies found a positive association between the times spent watching TV and obesity in children. Two primary mechanisms by which television viewing contributes to obesity have been suggested: reduced energy expenditure due to prolonged periods of inactivity and increased dietary intake, either during viewing or as a result of food advertising (Robinson, 1999). Sleep duration is influenced in both adults and young ones by the duration of TV/video gaming/ social networking, night clubbing and job shift/demands (McLaren, 2007) and are associated with weight gain. Many individuals who spend longer hours watching TV/playing video games tend to sleep less. Many children or adults who are in the habit of staying late at night watching a movie/playing games/ surfing the internet or clubbing tends to be involved in excessive night eating to sustain alertness.
Promotion of increased physical activity by all, which can be maintained in a long term, is recommended. Such exertion need not be over strenuous, as walking briskly for 30 minutes each day can result in an additional weight loss of 1 kg per month (American Heart Association, 2012).

4.4 Socioeconomic Status

An association can be found between one's socioeconomic status and the development of obesity (McLaren and Kuh, 2004; Bovet, 2002; Gilbert et al, 1994).Urbanization may also affect an individual's socio-economic status in terms of education, occupation, monthly income and area level of development indicators. In developing countries such as Nigeria, a strong direct relationship has been observed for men, women and children with a higher likelihood of obesity amongst persons of different socio-economic strata (Swinburn et al, 1999). The relationship between SES and obesity in developing countries has been inconsistent and controversial. Previous investigators have reported the relationship between SES and obesity in developing countries to be, positive and strong, implying that the higher the SES the more the obesity (Fezeu et al, 2006). On the other hand, a consistent and strong inverse relationship has been established between SES and obesity in the developed Western societies (Sorensen, 1995). However, Fezeu et al (2006) submitted that the reported positive relationship between SES and obesity may not be true for all developing societies. It is believed to be highly dependent upon the stage of industrial development of a country or region (Bourdieu, 1984). In the study by Mbada et al **(**Mbada et al, 2009) in Nigeria, the overall prevalence rates of overweight and obesity in the lower, middle, and higher socioeconomic strata were 24.8 and

12.9%, 18.9 and 5.65%, and 14.6 and 4.86%, respectively. BMI values also differ significantly among the socioeconomic strata, with individuals in the lower socioeconomic stratum having a higher mean value. Additionally Sola et al (2012) found that obesity was more prevalent in less educated women in the urban centers. Both studies findings are at variance with previous studies in developing societies which report a positive relationship between SES and obesity. For example, in a study among adult residents of Accra, Ghana, Amoah (2003) found higher rates of overweight among individuals of higher social class compared with their lower-income counterparts, while Fezeu et al. (2006) reported a positive SES/obesity relation in another study in urban Cameroon.

In the other hand, obesity can be viewed as a social phenomenon (Robinson, 1999) especially based on the Bordieu concept of 'habitus'. According to the Bordieu concept of 'habitus' which states that the body (inclusive of appearance, style, behavior, affinities) is a social metaphor of a person's status (Bourdieu, 1984), no little wonder, the possession of "pot belly" or "beer belly" in men (accumulation of fats on the abdominal region-abdominal obesity) is seen as a sign of wealth, health, power and high socio-economic status, so that even men of low socio-economic status may desire it. Fat and chubby children are perceived as healthy children (the fattening rooms of calabar, BBC News, 2007).

Cultural attitudes also influence obesity. Among the Efiks, Annangs tribes of Nigeria and the Pacifics communities, the cultural practice of fattening is common (Brinks, 1989). Women are kept indoors to lighten their skin and fed foods that are fattening (along with reduced activity). Among the Efiks and Annangs, the women taken through the fattening (*Nkubo*) room are prepared for their bridegroom. At the end of the fattening, the most "big" maiden (pubescent girl) is seen to be the most beautiful and a pride to her family (the fattening rooms of calabar, BBC News, 2007; Brinks, 1989). Most of these women may still remain obese especially for those genetically predisposed and less active due to the prevailing environment. The fact is the desire to lose weight is higher among the educated obese than those of low education status, hence the possible high prevalence of obesity among those of the low SES. Therefore, there is a need for proper enlightenment as to the risk associated with obesity to be extended to those who still hold tenaciously to these cultural norms. Behavioral modification of the populace as to the perception of risk of excessive weight gain is very essential and recommended. The message can be broadly dispensed through the mass media and during one to one hospital visit by medical practitioners.

4.5 Psychosocial Factors

Though education, monthly income, occupation, area level of development influence one's choice of diet and participation in physical exertive

activity in relation to body weight gain/loss, however other factors could play a major role. These factors are grouped as psychosocial factors. These include: eating disorders, body image perception, self esteem, drugs, weight based teasing, work place environment and depression (Goldfield et al, 2007).

Abnormal feeding behavior is an important cause of obesity. Although physiologic mechanism regulates food intake, there are also important environmental and psychosocial factors that cause abnormal feeding behavior, excessive energy intake and obesity. Psychological factors may contribute to obesity in some people. For example, people gain weight due to large amount of stressful situations such as a death of a parent, a severe illness or even mental depression. Over eating and weight gain are listed among the vegetative features of depression (Andreoli et al, 2004). Eating can be a means of releasing tension for depressed persons (Simmons-Alling and Tally, 2008) when they are sad, anxious, lonely and frustrated. Comfort eating may result in a temporary attenuation of their depressed mood, the weight gain that results may cause a dysphoric mood due to their inability to control their stress. The resulting guilt may reactivate the cycle, leading to a continuous pattern of using food to cope with emotions (Collins and Bentz, 2009).Other eating behaviors are instrumental to excessive weight gain.

A specific pattern of eating associated with obesity is termed 'night eating syndrome', which may be more common than generally recognized. A patient has anorexia in the morning and overeats (hyperphagia) in the evening, often making repeated excursions to the kitchen and is associated with difficulty in sleeping. More recently, night eating syndrome has been viewed as a disorder of circardian rhythm (Collins and Bentz, 2009). This behavior is associated with a lower than normal rise in plasma leptin and melanocortin levels at night although cause and effects are uncertain (Andeoli et al, 2004).

Additionally, a distorted perception of body image and abnormal eating patterns due to diseases like bulimia nervosa has resulted in excessive weight gain in some due to binge episode of eating. Binge eating or mindless eating, frequent snacking on high calories food all classified as problematic eating behaviors are chronic risk factors for excessive weight gain.

Certain drugs also encourage excessive weight gain though most have antidepressant actions. The drugs includes: Paxil (Paroxetine), Depakote (Valproic acid), Lithium, Prozac (Fluoxetine), Remeron (Mirtazapine), Zyprexa (Olanzapine), Deltasone (Prednisone), Thorazine (Chloropromazine), Elavin, Endep, Vanatrip (Amitriptyline), Allegra (Fexofenadine and Pseudoephedrine), etc (Storrs, 2012) and most of these drugs may alter food intake and behavior. It is common to find most girls or women go for these drugs just because they want to be "chubby" or "fat" in order to fit into their peer group and to earn more

respect. Hence low self esteem (Struass, 2000) and negative body image perception may prompt others to want to gain weight.

Aside from psychological disorders induced weight gain, obesity and workplace (e.g. organizational and hazardous) may be related. Obesity may represent an additional risk factor for cardiometabolic disease that result from workplace exposures (Schulte et al, 2007) in terms of the mental, physical and emotional stress. Most Nigerian workers especially those in our urban area tend to cope with regular bouts of psychosocial stress in and out of their workplace.

Psychosocial stress can be traced to physical conditions, organizational structure, interpersonal conflicts, personal characteristics and nature of work (Haq et al, 2008; Lath, 2010). Specific jobs and organizational stressors include high level of job demands, too much work, insufficient social support, harassment and discrimination; etc (Wahab, 2012). There is increasing evidence that obesity and overweight may be related, in part to adverse work conditions. In particular, the risk of obesity may increase in high demands, monotonous work, low control work environments and for those who work long hours (Schulte et al, 2007).

Empirical evidences suggest both a direct and an indirect effect of psychosocial and other work conditions on health are through health behaviors. Indirect pathways may include effects of job stress on physical activity, frequency and pattern of eating (eating behaviors) and other behaviors that may be related to body mass index (Landsbergis et al, 2008; Belkic et al, 2004).

It is factual that obesity arises from a complex source and biological phenomenon and is often perceived as an individual's behavior, this therefore means that a significant association can be found between workplace condition and cardiometabolic risk behavior such as poor diet, overeating, physical inactivity, excessive alcohol consumption and smoking which impart weight change (Lalluka et al, 2004). The pathway by which stress affect health behaviors and BMI are not too clear. However, in order to cope with psychosocial stress, some Nigerians resort to "short term coping strategies" such as smoking, drinking alcohol excessively, binge eating, which tend to predispose one to cardiometabolic health risk. An occupational study conducted in both low control and high demand work environments showed that stress alters food choices in human and causes a shift toward energy dense food items that contain saturated fats and sugars (Wardle et al, 2000).

Workers who walk night shift or shift work are prone to developing non communicable diseases such as obesity, diabetes and sleep disorders. These workers include nurses, doctors, waitresses, truck drivers, police officers, fire fighters etc. Evidences are emerging that shift work alters the body's circadian rhythm which invariably may affect body metabolism (Kruten et al, 2007; Knutson, 2012). In a study conducted among Nigerian nurses by Ogunjimi et al (Ojofeitimi et al, 2007), the prevalence rate of obesity was high (62.2% of 500

nurses were obese). This could possibly be correlated with their eating habits and work shift.

Aside from high job demands impacting on psychosocial stress, employer-employee and employee-employee interrelationship can induce psychosocial stress in most workers in Nigeria hence some workers resort to overeating and drinking in order to cope with stain relationships and poor job satisfaction at workplace.

The hectic pace in our cities has brought immense stress on its active populace. The city life presents its own challenges leaving many with little or no choice than to adapt to it. In most urban cities including those in Nigeria, during the weekends, more persons resort to night clubbing in an attempt to unwind and rest off after a hard week's job. These ones tend to sleep less, drink more (mainly alcohol beverages), eat more (especially fatty foods/meats), smoke more and get involved in many other risky behaviors thereby increasing their odds for both communicable and non-communicable diseases. For those affected, the use of antiretroviral drugs (Knutson, 2012) in addition to consumption of unhealthy diets, tobacco consumption (cessation), heavy alcohol consumption and sedentary lifestyles are risk attitudes for the development of metabolic disorders including obesity.

5. Insight This Paper Brings

- Urbanization is linked to obesity by four pivotal factors: socioeconomic status, physical activity level, nutritional and psychosocial factors.
- The socio-demographic determinants of obesity among adult in Nigeria were female gender, marriage, low physical activity level, positive family history, urban area of residence and age ≥ 40 years. Obesity was more prevalent among women of low SES living in the urban area than those of high SES in variance with what thought to be the case among developing countries. The fact is that, the desire to lose weight is higher among the educated than low educated obese, hence the possible high prevalence of obesity among those of the low SES. Since being fat is misconceived to be a sign of power, respect and an evidence of good living, many less educated women may wish to remain obese. Additionally, overweight and obesity was more prevalent among young children (girls than boys) living in an urban than rural area and attending private schools than public schools. Obesity among young ones is more prevalent among children with parents of high SES than low SES, since they tend to desire chubby kids and may provide environments that promote excessive weight gain.
- Various studies reported that 25-65% of Nigerians were physically inactive (Abubakari et al, 2008; Ekpenyong et al, 2012) and involve less in regular exercises/sport (Akarolo-Anthony and Adebamowo, 2012) and some less

educated individuals would prefer foreign and junk foods over traditional and home processed meals especially those in the urban areas.

- Positive natural selection of people with a higher body mass index (BMI), assortative mating, and heavier people forming relationships with each other are other factors which have been implicated in the etiology of obesity in Nigeria. Other social determinants to obesity include the income differential, marital status, and BMI change in friends, siblings or spouse irrespective of geographical distance, psychosocial stressors and work environment (Ogunbode et al, 2011).

Conclusion/Recommendations

The rising epidemic of obesity in Nigeria and other parts of sub Saharan Africa is a corollary of the increasing trend of urbanization, as there is a clear difference in the prevalence of obesity between the urban and rural areas. The link between obesity and urbanization could be undermined by attitudinal reorientation, through effective awareness campaigns encompassing (i) proper and practical nutritional choice education (ii) the need for regular physical activity and reduction in excessive body weight.

Also, in view of the recent increase in childhood obesity in both developed and developing countries, and the fact that an overweight child today may be an obese adult tomorrow and an obese adult today may be a father or mother to an obese child in the future (Amoah, 2003; Brinks, 1989; Andreoli et al, 2004) hence, much has to be done to prevent childhood obesity at schools and homes. The parents (especially mothers) should pay more attention to the nutritional status of their families. Parents should encourage their children to regularly exercise through their examples.

- At school, the physical and health education and food nutrition studies curriculum should be imbued to be more practical and less theoretical. Good dietary habits such as eating at home and less consumption of fast foods should be emphasized.
- Those who are overweight should be discouraged from attaining obesity status while for those already obese; stigmatization could be reversed by public enlightenment and support groups while health care professionals should encourage those ones to attain a healthy weight through proper dieting and increased physical activity.
- Also, anti-obesity clubs should be formed in every sector of the society in order to create more awareness.
- The government, health promotion agencies, media and others could play a major role in curbing the growing trend of obesity in Nigeria and worldwide.

- The enlightenment should be done in the local language and should involve reputable leaders such as traditional, religious, and peer group leaders.

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Table 1: Published articles on the prevalence of overweight/obesity in urban and rural settings in Nigeria					
Authors	**Study setting**	**Sample population/characteristics**	**Total sample**	**Over weight Prevalence (%)**	**Obesity Prevalence (%)**
Adedoyin et al (2009)	Semi-urban	Adults§	2097	20.3%	12.5%
Adegoke et al (2009)	Semi-urban	School children	720	2.8%	0.3%
Adesina et al (2012)	Urban	School children (10-19 years)	960	6.3%	1.8%
Adeyemo et al (2010)	Urban	Out patients volunteers (adults§)	106	27.7%	11.4%
Akarolo-Anthony and Adebamowo (2012)	Urban	Adults§	1059	36%	25%
Akinpelu et al (2008)	Urban	School children (12-18 years)	1638	0-8.1% (males) 1.3-8.1% (females)	0-2.7% (males) 0-1.9% (females)
Akintunde et al (2010)	Urban	Hypertensive patients(adults) §	1102	31.9%	16.5% (mild) 5.3%(moderate) 3.7% (severe)
Amira et al (2011)	Urban	Hospital volunteers (adults) §	1368	32.7%	22.2%
Amole et al (2011)	Urban	Adults§	400	-	8.9%(males) 19.5%(females)
Ansa et al (2001)	Urban	Children (6-12 years) Adolescents (13-15 years) Teenagers (16-18 years)	100	-	2.3% 4.0% 3.0%
Bakari et al (2007)	Sub-urban	Adults §	317	18.5%	13.1%
Ben Bassey et al (2007)	Urban Rural	Adults §	1504	3.7% 3.0%	0.4% 0.0%
Chigbu and Aja (2011)	Urban	Pregnant women	3167	-	10.7%
Desalu et al (2008)	Urban	Adults§	810	35.1%	9.8%
Ekezie et al(2011)	Urban Rural	Adults§	567	-	22.5% 20.5%
Ekpenyong et al (2011)	Urban	Civil servants (18-55 years)	2042	-	11.5%
Ezeanochie et al (2011)	Urban	Pregnant women	201	-	9.23%

Fertuga et al (2011)	Semiurban	School children (6-10 years)	1016	3.0%	0.5%
Goon et al (2011)	Rural	Female secondary school children (12-18 years)	722	-	7.5%
Illoh et al (2011)	Rural	Adults patients (18-90 years)	2156	-	6.0%
Mbada et al (2009)	Urban	Adults (30-60 years)	1067	24.8% 18.9% 14.6%	12.9%(low SES) 5.65%(medium) 4.86%(high SES)
Ogunjimi et al (2010)	Urban	Nurses	500	-	62.2%
Olatunbosun et al(2011)	Urban	Adult civil servants§	998	17.45%	8.82%
Omigbodun et al (2010)	Rural	School students (10-19 years)	1799	-	2.3%
Ojofeitimi et al (2007)	Semi-urban	Adolescent females in private schools	257	4.0%	1.2%
Osuji et al (2010)	Semi-urban	Adult women §	186	38.5%	20.7%
Puepet et al (2002)	Urban	Adult volunteers§	902		21.4%
Senbanjo and Adejuyigbe (2007)	Urban	Pre-school children	270	13.7%	5.2%
Sola et al (2011)	Urban and Rural	Adults (18-45 years)	435	22%	4% More normal weight persons in the rural than urban setting
Sola et al (2012)	Urban	Adults§	229	-	Overall: 22.3% Obesity in urban vs rural settings: 40.7% vs 4.3%
Wahab et al (2011)	Urban	Adult§	300	53.3%	21.0%
World Bank (2012)	-	Obesity (non pregnant women) [1a]	-	-	5.8%
World Bank (2012**)**	-	Obesity (non pregnant women)[1b]	-	-	6.4%

§ Legally in Nigeria, persons above 18 years of age can be regarded as adults.

[1a] 2003 Nigeria Demographic and Health Survey.

[1b] 2008 Nigeria Demographic and Health Survey.

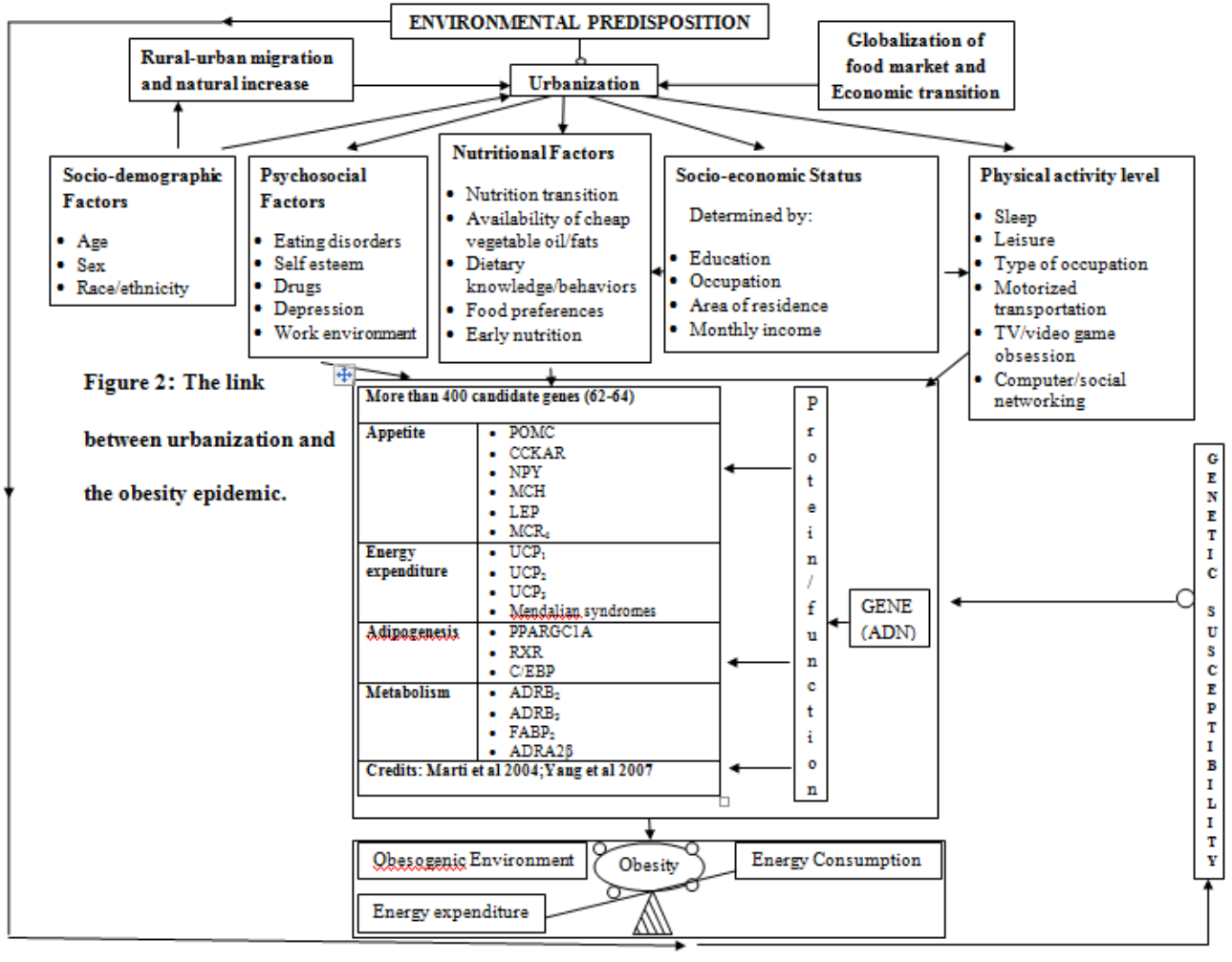

Figure 2: The link between urbanization and the obesity epidemic.

Legend for Figure 2 Key

- ↓ and ↑- influences
- POMC- Proopiomelanocortin
- CCKAR-Cholescystokinin A receptor
- NPY- Neuropeptide Y
- MCH- Melanocortin
- LEP-Leptin
- MCR_4-Melanocortin 4 receptor
- UCP_1-Uncoupling protein 1
- UCP_2- Uncoupling Protein 2
- UCP_3- Uncoupling Protein 3
- PPARGC1A-Peroxisome proliferators-activated receptor, γ, co activator 1α.
- RXR-Retiniod X receptor
- c/EBP- Ccaat-Enhancer-Binding Proteins
- $ADRB_2$- β-adrenergic receptor 2
- $ADRB_3$- β-adrenergic receptor 3
- $FABP_2$ -Fatty acid binding protein 2
- ADRA2β- β-Adrenergic receptor 2A
- Mendelian syndromes (eg. Prader-Willi Syndrome)

For a complete list of the obesity candidate genes, see Rankinen et al (**62**)