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Impacts of obesity on the health of women of childbearing age: A call for action

Ojiegbe I.N

Department of Nursing, University of Ibadan, Oyo State, Nigeria

Corresponding author: ojinath@gmail.com

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ABSTRACT

Background: Obesity is a leading preventable cause of death worldwide with higher prevalence among women of childbearing age than men. It is a clinical condition characterized by accumulation of excess body fat with resultant high health challenges and reduced life expectancy. It is an emerging problem in Nigeria especially among women of childbearing age due to its negative effects on their reproductive life; hence it needs to be addressed to reduce the incidence of infertility, as well as maternal and neonatal morbidity and mortality. **Aim:** To identify the impacts of obesity on the health of women of childbearing age for improved knowledge on its prevention and management. **Methods:** Data from textbooks, original and online journals and published articles were reviewed, their findings discussed and recommendations made. **Findings:** Obesity was found to be an emerging disease due to increasing westernization of societies and change in lifestyle. It showed a higher prevalence among women than men; worse still among women of childbearing age and was found to be associated with various reproductive health problems such as difficulty in conceiving, reduced fertility, less successful assisted reproduction and poor health during pregnancy, labour and postnatal period. It also has negative foetal and neonatal consequences in babies of obese women such as neural tube defects, cleft palate, cleft lip, congenital heart disease, increased admission to neonatal intensive care units, omphalocele, macrosomia, shoulder dystocia and stillbirth. **Conclusion:** Obesity is preventable, and for obese women, management measures are available to control the condition for improved fertility and maternal and neonatal outcomes.

Key words: Obesity, infertility, neural tube defects, shoulder dystocia, still birth, reproductive health

INTRODUCTION

Obesity is one of the biggest health problems in the world which is associated with various diseases leading to the death of millions of people every year.[1] It is a medical condition in which excess body fat has accumulated to the extent that it may have an adverse affect on health, leading to reduced life expectancy, and or increased health problems.[2] It is

currently defined as a body mass index (BMI) equal to or greater than 30 kg of body weight per meter squared of height.[3] It can occur as a result of ingestion of food in excess of the body's needs, and the major causes are dietary habits (excessive intake of calorie rich food) and lack of exercise.[4]

Obesity is a global problem and its worldwide prevalence had nearly doubled between 1980 and 2008 whereby 10% of men and 14% of women were found to be obese (BMI≥ 30 kg/m^2) compared with 5% for men and 8% for women in 1980.[5] In the United States, the prevalence of obesity was found to have increased from 15% in 1980 to 36% in 2010;[6] the prevalence of extreme obesity (BMI ≥ 40 kg/m^2) was 4.4% in men and 8.2% in women, and the prevalence of childhood and adolescent obesity also tripled from 1980 to 2010 with 17% of United States children and adolescents being obese.[7] Hence, obesity is found in nearly one-third of the United States adult population,[3] and is one of the leading preventable causes of death worldwide. [8]

In developing countries, including Nigeria, obesity is rapidly becoming an emerging disease due to the increasing westernization of societies and change in lifestyle. [9] A study conducted at University College Hospital, Ibadan on prevalence of obesity among women showed the prevalence of obesity among women was 41.8%.[10] Another study in Southeast Nigeria among pregnant women showed a prevalence of 10.7%.[11] A study in Kano, Nigeria showed an overall prevalence of obesity to be 32.3% with a higher prevalence among women (20.7%) than men (13.6%).[12] Hence, obesity is an emerging problem among women of childbearing age which needs to be addressed to improve maternal and neonatal outcomes.

Causes of obesity/predisposing factors to obesity

Many factors have been found to predispose women of childbearing age to obesity; they include genetics, "hyper-palatable" junk foods, food of addiction, presence of insulin resistance, certain medications, presence of leptin, food availability and excessive consumption of sugary foods.[1] However, in women of childbearing age, factors that contribute to the development of obesity include age, gender, psychological makeup, family lifestyle, emotional dispositions such as depression, pregnancy and environmental factors.[13] Certain medical conditions such as Cushing syndrome, depression, Prader-Willi syndrome, polycystic ovarian syndrome and eating disorders, such as binge eating or bulimia; and medications such as steroids, antidepressants or birth control pills can also cause obesity in women of childbearing age, although these are much less common causes of obesity than overeating and inactivity.[13]

Obesity is generally caused by eating too much without physical activity that is, consuming high amounts of energy foods, particularly fat and sugars, but not burning off the energy through physical activity, causing much of the surplus energy to be stored by the body as fat.[14] Obesity develops gradually over time, as a result of poor diet and lifestyle choices, such as when women of child bearing age eat large amounts of processed or fast food that is high in fat and sugar, drink too much alcohol which contains a lot of calories, eat a lot of foods that are high in fat and sugar or calories and eat larger portions than their bodies need especially if relatives also eat large portions.[14] Other factors include depression, low self esteem, and inactivity.

Types of obesity

Obesity has been classified into two based on the anatomical distribution of body fat: [15]

1. **Android (apple shaped or upper body) obesity:** Here, excess fat is located in the central abdominal area of the body and it is associated with greater risk for hypertension, insulin resistance, diabetes, dyslipidaemia, and coronary heart disease.[15] It is described as waist – hip ratio of more than 0.8 for women and more than 1.0 for men.[15] In the android type of obesity, the person stores fat around his or her abdominal region and the individuals are said to have an apple-like body shape.[16] Fat can appear in other areas of the upper trunk like the upper chest (front or back), nape area of the neck and shoulders.[16] Android fat distribution is associated with an increased insulin resistance in obese adolescents.[17] Women suffering from this type of obesity develop a more masculine feature like the growth of more hairs throughout the body called hirsutism and usually have more fat than men suffering from the same type of obesity.[16]
2. **Gynoid (pear shaped or lower body) obesity:** Here, excess fat is distributed in the lower extremities around the hip or gluteal region and it is defined as waist- hip ratio of less

than 0.8 for women and less than 1.0 for men.[15] This type of obesity is commonly found in females and relatively benign health wise.[15] Here, the fat distribution is more at the hip and thigh areas making their hips to be rounded and their buttocks generally look larger than normal and their hips look strikingly similar to the shape of the pear fruit.[16] Individuals with gynoid obesity are at less risk of developing chronic illnesses linked to obesity and overweight.[16]

Any of the above types of obesity (android or gynoid) could lead to morbid obesity, more especially android obesity.[18]

Morbid obesity

Morbid obesity occurs when the excess body fat becomes a danger to the overall health of people with obesity.[19] This occurs when an individual has more than twice his/her ideal body weight (100 pounds or more) or body mass index exceeding 40kg/m^2. When a woman of childbearing age develops morbid obesity, she will not be able to perform her activities of daily living effectively and would need other people's support for survival.[18] Also, people who have a BMI of 25 to 29 are considered over-weight; those with a BMI of 30 to 39, obese; and those with a BMI greater than 40, extremely obese (morbid obesity).[18]

Impacts of obesity on the health of women of childbearing age

Obesity is a medical condition that poses grave consequences on women of childbearing age if proper control measures are not implemented early. It can lead to various reproductive health problems such as difficulty in conceiving, poor health during pregnancy, and poor perinatal and postpartum outcomes.[20] It can also lead to reduced fertility and less successful assisted reproduction, thereby resulting to conception difficulty or failure in women.[21,22] The chances of women to become pregnant decreases as BMI increases and maternal BMI beyond the normal range (BMI ≥25 kg/m2) could increase the risks of adverse pregnancy outcomes.[23] Obese women are less likely to ovulate regularly, thereby leading to decreased fecundity, more difficulty in achieving pregnancy and increased risk of miscarriage.[24] A study on the effect of body mass index on the outcomes of first assisted reproductive technology cycles revealed that there is about 68% decreased chance of having a live birth among obese women with a BMI > 30 following the procedure compared with women who are not obese with BMI < 30.[25]

Due to higher progesterone levels in obese women they may experience poor lactation[26] which could deprive infants born to overweight and obese women the health benefits associated with breastfeeding, such as improved immunity and a reduced risk of sudden infant death syndrome (SIDS).[27] Certain major and minor co-morbid conditions have also been found to be associated with obesity. These include: [28]

i. **Respiratory problems:** such as obstructive sleep apnoea, central hypoventilation syndrome, exercise intolerance, and worsening of asthma, cardiovascular; hypertension, high triglyceride, low plasma level of high density lipoprotein (HDL) and high plasma level of low density lipoprotein (LDL).[28]
ii. **Endocrine disorders:** such as polycystic ovary syndrome and type 2 diabetes mellitus.[28]
iii. **Gastrointestinal disorders**: such as non-alcoholic fatty liver disease, gall stones, gastro-oesophageal reflux disease and constipation.
iv. **Genitourinary problem:** including kidney stones.
v. **Orthopaedic problems:** such as slipped capital femoral epiphysis, Blount disease and back, foot, knee and hip pain.
vi. **Skin problems:** such as acanthosis nigricans and intertrigo.
vii. **Psychiatric problems**: such depression, anxiety and eating disorder.[28]

Obesity and overweight in women of childbearing age predispose them to suffer many negative health consequences and risks in pregnancy which was classified into the following:[29]

i. **Maternal consequences:** such as caesarean section, chest, genital and urinary tracts infections, cholecystitis, depression, diabetes (gestational and type 2), difficult surgical access, failed attempts at vaginal birth after caesarean section, failed induction of labour and gestational hypertension.[29] Other maternal consequences include haemorrhage, maternal mortality, obstructed labour, obstructive sleep apnoea, operative and complicated vaginal birth,

preeclampsia, preterm birth, reduced breastfeeding, surgical site infections and thromboembolic disease.[29]

ii. **Foetal / neonatal consequences:** Mothers' obesity has many negative impacts on the newborn which could further endanger their lives. There is usually an increase in the risk of foetal anomalies such as neural tube defects, cleft palate, and congenital heart diseases.[30] A study found similar negative impacts of maternal obesity on the newborn such as high rate of admission to neonatal intensive care units, omphalocele, cleft lip, macrosomia, shoulder dystocia, stillbirth, suboptimal electronic foetal monitoring and suboptimal ultrasonography.[29] Since detection of foetal anomalies is more difficult in obese women than in normal weight women due to suboptimal ultrasonography in obese women, the risk of stillbirth among obese women is approximately double that among normal-weight women.[31]

iii. **Anaesthetic consequences:** Difficult intubations, difficult intravenous access, increased failure of epidural analgesia during labour, increased risk of regurgitation and aspiration of stomach contents were found to be higher in overweight and obese women than in normal weight women.[29] Another study revealed similar anaesthetic consequences and also added that there could be airway obstruction, difficulty in maintaining airway, breathing and circulation during anaesthetic procedures thereby increasing the chance of 100% oxygen therapy.[32]

Another author described the impacts of obesity on women as follows:[33]

i. **Physical impacts:** such as coronary heart disease**,** high blood pressure**,** stroke**,** type 2 diabetes**,** cancers**,** fertility problems and non-alcoholic fatty liver disease.

ii. **Psychological impacts:** such as depression, anxiety, low self esteem and body dissatisfaction.

iii. **Social impacts:** Obese individuals are more likely to suffer from prejudice and discrimination, have fewer friends, lower educational attainment, lower employment, lower salary, less likely to marry, more likely to divorce and more likely to commit suicide.[33]

Impacts of obesity on the reproductive health of women of child bearing age

Although studies have shown that the mechanisms of impacts of obesity on fertility are not well understood, yet it has been shown to be associated with several reproductive disturbances especially abdominal phenotype of obesity.[34] A study revealed that a good number of women who suffered from different menstrual disorders, infertility and recurrent miscarriages were either overweight or obese.[35] Findings of another study also showed that the incidence of anovulatory cycles, oligomenorrhoea and hirsutism are higher in obese women than in normal-weight women; there was also higher incidence of infertility among women (adult married women without children) who were obese during puberty and early adolescence than in those who were not obese.[36]

Obesity could lead to functional hyper-androgenism and hyperinsulinaemia which accompanies the insulin-resistant state.[34] In women with the polycystic ovary syndrome, abdominal obesity may be co-responsible for the development of hyperandrogenism and the associated chronic anovulation, through mechanisms primarily involving the insulin-mediated overstimulation of ovarian steroidogenesis and decreased sex hormone binding globulin blood concentrations.[34] In obese women and/or those with polycystic ovary syndrome (PCOS), an increase in the number of fat cells results in increased leptin and insulin levels and an increase in luteinizing hormone (LH), but not follicle stimulating hormone (FSH) levels, thereby stimulating the development of follicles that secrete supra-normal levels of testosterone, which rarely ovulate (anovulation), hence low progesterone.[37] These could be aggravated by insulin-induced reduction in sex-hormone-binding globulin (SHBG) from the liver, which increases ovarian testosterone production/action.[37]

Prevention of obesity and its associated complications in women of childbearing age

It is pertinent to commence the prevention of obesity and its associated complications in women early, before they reach the reproductive age. The following measures are recommended for reducing the risk for obesity in women:[38]

i. reducing sugar intake,
ii. reducing saturated, trans and dairy fat,
iii. increasing soluble fibre content in their diet,

iv. eating whole grains,
v. snacking on nuts, and
vi. increasing fruit and vegetable intake.[38]

Other recommended measures include: [39]

i. exercising regularly for 150 to 300 minutes of moderate-intensity activity a week,
ii. having a healthy eating plan,
iii. eating low-calorie nutrient-dense foods, such as fruits, vegetables and whole grains,
iv. avoiding food traps that cause one to eat
v. monitoring weight regularly, at least once a week and being consistent with healthy-weight plan at all season of the year.[39]

In women of childbearing age, it is recommended that they should: [40]

i. control their appetite,
ii. get their blood sugar stable as blood sugar instability increases appetite and food cravings,
iii. reduce portion sizes for higher calorie foods
iv. reduce their stress since stress stimulates adrenal hormone, cortisol which promotes insulin resistance and raises blood sugar levels and weight gain, and
v. tone their muscles with regular physical exercise.[40]

A call for action to health educate women of childbearing age on prevention and control of obesity

To avert the grave consequences of obesity on women, nurses and other medical personnel must at every given opportunity give health education to this special group who have higher prevalence of obesity than men.[7] Nurses/midwives particularly have important roles to play in the prevention of obesity among women of childbearing age, mainly through health education. The community health nurse should health educate all women of childbearing age and other community members on the importance of active and regular moderate physical activity, eating five or more fruits and vegetables per day, limiting long stay in front of television and other sedentary activities, creating safe walking and bicycle paths and providing increased physical activity opportunities for all women (recreation department, rental of bicycles, aerobics, etc).[41]

Nurses and other health professionals should support and encourage families of young women at risk of obesity through individual and family-based interventions, increased physical activity that fits easily into women's everyday life such as walking and exercise, obesity preventive measures before, during and after pregnancy, and all actions aimed at preventing obesity involving parents.[42] The findings from a study also recommend that health professionals should encourage health promotion, awareness-raising activities and targeted follow-up with different population groups and interventions that improve diet such as dietary modification, targeted advice, family involvement and goal setting.[42]

The treatment remedies for obesity and its implication to nursing/ midwifery practice

Obesity in women of childbearing age can be properly managed if early and consistent interventions are given by the health care providers. Women of childbearing age also need to comply with all the treatment regimens in order to achieve maximum control. A study adapted the 5 A's (Ask, Assess, Advise, Agree, and Assist) for counselling, during control and management of obesity in women.[43] Hence, the nurse/midwife and other medical personnel should:

i. **Ask** permission to discuss weight and explore women's readiness for change.
ii. **Assess** body mass index, waist circumference, obesity stage and its complications
iii. **Advise** women about the health risks of obesity and benefits of modest weight loss
iv. **Agree** on realistic weight-loss expectations, targets, behavioural changes, etc.
v. **Assist** in identifying and addressing barriers, and providing resources and consultations.[43]

Weight reduction can be achieved through the following:

i. **Physical activity:** Regular physical activity 40-60 minutes per day prevents unhealthy weight gain and obesity even without dietary caloric restriction.[44] The best long-term results may be achieved when physical activity produces an energy expenditure of at least 2,500 Kcal/week.[44] An increase in physical activity can create an energy deficit, and is an important component of weight loss treatments.[15] People who

combine caloric restriction and exercise with behavioural treatment may expect to lose about 5 – 10% of pre – intervention body weight over a period of 4 – 6 months.[15]

ii. **Caloric restriction:** Dieting is the most commonly practiced approach to weight control.[45] Dietary restriction is an effective strategy for weight loss in women of childbearing age and the most common form of dietary restriction implemented is daily calorie restriction (CR) and intermittent calorie restriction.[45] Daily calorie restriction (CR) involves reducing energy by 15-60% of usual caloric intake every day and that intermittent calorie restriction involves 24hours of at liberty food consumption alternated with 24 hours of complete or partial food restriction.[45] Hence, it is good to combine caloric restriction and other treatment measures like increased physical activity.

iii. **Pharmacologic treatment:** The weight-loss medications currently approved by then United State Food and Drug Administration as a measure to achieve weight loss in adults who have BMI of 30 or above are:[15]

a. Sibutramine: This is an appetite suppressant that inhibits the re-uptake of both serotonin and norepinephrine.[15]

b. Orlistat: This is a lipase inhibitor that inhibits gastric and pancreatic lipases, thus decreasing the breakdown of dietary fat into smaller molecules. [15]

iv. **Surgical treatment of obesity:** this could be divided into two broad procedures which are Gastric (Stomach) restrictive procedures and Combination restrictive/mal-absorptive procedures, each with sub-groups:

1. Gastric (Stomach) restrictive procedures:

a. Vertical banded gastroplasty (VBG): In VBG, the stomach is "stapled" to reduce its capacity to approximately 15ml (1/2 Oz) and silastic ring is inserted to help prevent the stomach from "stretching" in size.[46] This generally leads to an early feeling of satiation or fullness.[46]

b. Laparoscopic gastric banding: With the aid of a laparoscope, an adjustable band is placed around the upper portion of the stomach resulting in a much smaller stomach. This restricts the amount of food that can be eaten.[46] The inner diameter of the band can be adjusted by injecting saline through the port and the adjustability of Laparoscopic Adjustable Gastric Banding (LAGB) is a major advantage over vertical-banded gastroplasty.[47] Laparoscopic sleeve gastrectomy (LSG) is an operation that involves a vertical resection and removal of the body and fundus of the stomach, leaving a tubular gastric lumen from the gastroesophageal junction to the antrum.[47]

1. Combination restrictive/mal-absorptive procedures:

a. Rouxen-Y-Gastric Bypass: This procedure involves both a "restrictive" procedure which decreases the size of the stomach by stapling across the top of it and a "mal-absorptive" component, achieved by bringing-up-and attaching a portion of the intestine directly to the stomach (thus by "passing" part of the small intestine).[46] This surgery causes gastrointestinal hormonal changes, which result in decreased hunger and improved satiety or fullness.[46] Roux-en-Y Gastric Bypass **(**RYGB) combines a restrictive component and a limited proximal intestinal bypass.[47] Most RYGB procedures are now performed laparoscopically, resulting in faster recovery and fewer pulmonary and wound complications compared with open surgery.[47]

b. Bilio-pancreatic bypass procedures and similar extensive intestinal bypass procedures: In these procedures, the digestive juice from the liver and pancreas are diverted to the distal small intestine near the entrance to the large intestine; thus, food enters the stomach, rapidly transverses the distal small intestine (where absorption of nutrients primarily occurs), and is then delivered to the large intestine (where-excess water from the stool is removed).[46] This results in mal-absorption of nutrients with subsequent weight loss up to 80% of excess body weight.[46] Although these procedures offer the best and most durable weight loss results of any bariatric procedure performed today, higher complication rates, nutritional deficiencies, and a higher mortality rate have limited their widespread use.[47]

To maintain success with weight management after surgery, women need to drink fluids 30 minutes before and/or 30 minutes after meals, and not during the meal, eat lean sources of protein first followed by fruits, vegetables and whole grains and avoid high-fat or high-sugar foods and aim for a minimum of 50 to 60 grams of protein per day.[28] Women should also drink at least six to eight cups of non-calorie fluids daily (water is the best), drink two glasses of skim or 1% milk daily in addition to water (between meals), and eat three meals a day and take multivitamins and supplements daily.[28]

CONCLUSION

Obesity is a worldwide challenge especially, among women of childbearing age, which is caused mainly by genetic and environmental factors. Among all the causes, the leading cause of obesity is the excessive consumption of foods high in low density lipoprotein (bad) cholesterol. It is also more prevalent in women than men and has so many negative impacts on women of childbearing age. Obesity among women of childbearing age is a preventable and controllable medical condition which only demands determination to achieve success. It has numerous grave consequences on the childbearing women if ignored, but, these can be thwarted if they work closely with nurses and other expert health personnel. Creation of awareness on the part of the nurses, midwives and other medical personnel would encourage women to make good choices and adopt healthy lifestyles that promote weight reduction. Hence, there is a way out.

RECOMMENDATIONS

It is thus recommended that every woman should check her body mass index (BMI) at least once every 6 weeks. This is because some significant BMI could be suggestive of obesity. Also, women with high risk for obesity should reduce their intake of foods rich in low density lipoprotein, such as organ meats, egg yolk, pork, and saturated fats. These women should take foods rich in high density lipoprotein and vegetables. In addition, obese women should seek for medical advice before they become pregnant or embark on any of the treatment measures. This is to control/reduce the complications/risks associated with those pregnancy, childbirth and treatment measures, most especially the pharmacologic treatment and surgical intervention. Furthermore, all obese women should take high dose (5mg) folic acid supplementation pre-conceptually for at least one month to promote their fertility.[48]

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