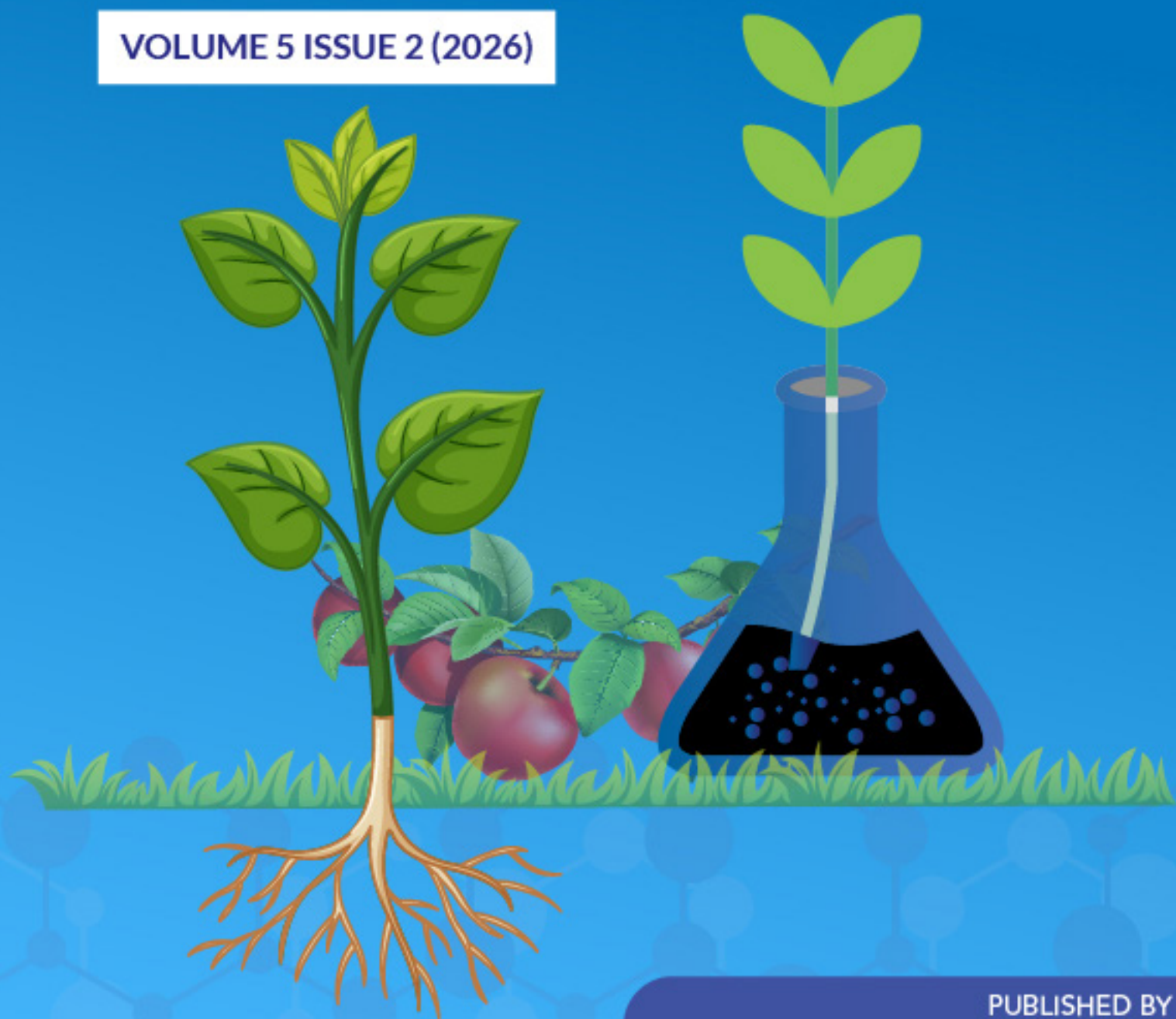




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Health Consequences and Implications of Obesity Among Market Women in the Kassena Nankana Municipality: A Call for Urgent Public Health Action

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ABSTRACT

Obesity is a major risk factor for numerous non-communicable diseases (NCDs) and represents a significant public health and economic burden globally. This study examined the health consequences and implications of obesity among market women in the Kassena Nankana Municipality of Ghana, with focus on cardiovascular risk factors, metabolic indicators, and the broader health and socioeconomic burden. A cross-sectional study involving 264 market women aged ≥18 years assessed obesity using BMI and waist circumference measurements. Literature review and synthesis of existing evidence on obesity-related health consequences were conducted, with particular focus on cardiovascular diseases, diabetes, metabolic syndrome, cancer, musculoskeletal disorders, and psychosocial impacts. The potential health burden was estimated based on obesity prevalence rates and known disease associations from published literature. With obesity prevalence of 54.2% and abdominal obesity prevalence of 73.5%, market women face substantially elevated risks for multiple health consequences. Based on established associations from literature, the obese women in this population are at increased risk for: type 2 diabetes mellitus (2-6 fold increased risk), cardiovascular diseases including coronary heart disease (2-3 fold risk) and stroke (1.5-2.5 fold risk), hypertension (2-6 fold risk), dyslipidemia, metabolic syndrome (prevalence increases with obesity severity, reaching 50% in severely obese individuals), certain cancers including breast, endometrial, and colorectal cancers, osteoarthritis particularly of weight-bearing joints, gallbladder disease, sleep apnea, and pregnancy-related complications. The high abdominal obesity prevalence (73.5%) is particularly concerning as visceral fat is strongly associated with insulin resistance, cardiovascular disease, and metabolic syndrome independent of overall obesity. The exceptionally high obesity prevalence among middle-aged and older women (80.8% in 40-50 year olds, 94.4% in 51-65 year olds) suggests that the vast majority of these women will develop one or more obesity-related chronic diseases during their lifetime. Psychosocial consequences including stigma, discrimination, depression, low self-esteem, and reduced quality of life represent additional significant burdens. Economic implications include direct medical costs for treating obesity-related diseases, indirect costs from reduced work productivity and absenteeism, and household financial strain from chronic disease management. The findings underscore obesity as not merely an individual health issue but a population-level crisis requiring immediate policy attention and resource allocation.

INTRODUCTION

Obesity represents one of the most significant public health challenges of the 21st century, not only because of its high and increasing prevalence but more importantly due to its role as a major risk factor for numerous chronic diseases and health complications. The World Health Organization (WHO) has identified obesity as a key risk factor for non-communicable diseases (NCDs), which are the leading cause of mortality worldwide, accounting for 65% of 52.8 million deaths globally in 2010 (Lozano *et al.*, 2012, p. 489; WHO, 2010, p. 489).

The health consequences of obesity are diverse, affecting virtually every organ system in the body. Obesity is causally linked to type 2 diabetes mellitus, cardiovascular diseases (including coronary heart disease, stroke, and heart failure), hypertension, dyslipidemia, metabolic syndrome, certain types of cancer (including breast, endometrial, colorectal, kidney, and pancreatic cancers), osteoarthritis,

gallbladder disease, sleep apnea, reproductive disorders, and numerous other conditions (WHO, 2011, p. 489; Wiseman, 2008, p. 489). These obesity-related diseases impose substantial burdens on affected individuals, their families, healthcare systems, and society at large.

The economic burden of obesity is staggering. In the United States, the total medical cost for treating obesity-related diseases has been estimated to exceed \$200 billion annually (Hammond & Levine, 2010, p. 489). In Australia, obesity-related health problems cost the government and society approximately \$58.2 billion in 2008 (Preventative Health Taskforce [PHT], 2010, p. 489). These estimates include both direct medical costs (hospitalizations, medications, physician visits, diagnostic tests) and indirect costs (lost productivity, disability, premature mortality). In developing countries like Ghana, where healthcare resources are already constrained, the growing burden of obesity-related diseases threatens to overwhelm health

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systems and impede socioeconomic development.

Beyond physical health consequences, obesity carries significant psychosocial burdens. Individuals with obesity often face stigma, discrimination, and social exclusion, leading to depression, anxiety, low self-esteem, body image dissatisfaction, and reduced quality of life (Puhl *et al.*, 2009, p. 489; Schafer & Ferraro, 2011, p. 489; Puhl & Brownell, 2006, p. 489). Weight-related stigma affects multiple life domains including employment, education, healthcare, and social relationships, creating a cycle of disadvantage that can perpetuate obesity and its consequences (Puhl & Heuer, 2010, p. 489).

In Ghana, the rapid increase in obesity prevalence, particularly among women, signals an impending epidemic of non-communicable diseases. The Ghana Demographic and Health Survey reported that approximately 40% of Ghanaian women were overweight or obese (GDHS, 2015, p. 493), with projections suggesting continued increases. This trend is particularly concerning given that NCDs already account for a significant proportion of morbidity and mortality in Ghana, and the healthcare system faces challenges in managing chronic diseases.

Market women represent a particularly vulnerable population facing elevated obesity risk due to occupational characteristics including prolonged sedentary behavior, irregular eating patterns, consumption of energy-dense foods, limited physical activity, and high stress levels (Arday, 2017, p. 497). Previous findings from the Kassena Nankana Municipality revealed alarmingly high obesity prevalence (54.2%) and abdominal obesity prevalence (73.5%) among market women (p. 1133), substantially exceeding national averages. Such high prevalence rates portend a severe burden of obesity-related health consequences in this population.

Understanding the health consequences and implications of obesity among market women is essential for several reasons. First, quantifying the potential disease burden can help prioritize obesity prevention and management in health policy and resource allocation. Second, awareness of specific health risks can motivate behavior change among affected individuals and communities. Third, understanding the full spectrum of consequences—including physical, psychological, social, and economic impacts—can inform comprehensive intervention strategies that address multiple dimensions of the obesity problem. Fourth, documenting the severity of obesity-related health consequences can galvanize political will and public support for obesity prevention efforts.

Despite the recognized importance of understanding obesity consequences, comprehensive documentation of the health implications of obesity among market women in Ghana is lacking. Most studies have focused on obesity prevalence or determinants, with limited attention to the actual and potential health consequences in this vulnerable population. This study addresses this gap by examining the health consequences and implications of obesity among market women in the Kassena Nankana Municipality.

The objectives of this study were to: (1) review and synthesize evidence on obesity-related health consequences from published literature, (2) estimate the potential burden of specific obesity-related diseases among market women based on observed obesity prevalence rates and known disease associations, (3) examine the psychosocial and economic implications of obesity in this population, and (4) discuss policy and programmatic implications for addressing the obesity-related disease burden. This comprehensive examination of obesity consequences aims to underscore the urgency of addressing the obesity epidemic among market women and inform the development of effective prevention and management strategies.

MATERIALS AND METHODS

Study Design and Data Sources

This study utilized a mixed-methods approach combining primary data collection on obesity prevalence with comprehensive literature review and synthesis of published evidence on obesity-related health consequences. The primary data component was a cross-sectional study conducted among 264 market women aged ≥ 18 years at the Navrongo Central Market in the Kassena Nankana Municipality (p. 765, 779). Obesity was assessed using Body Mass Index ($\text{BMI} \geq 30 \text{ kg/m}^2$) and waist circumference ($\text{WC} \geq 88 \text{ cm}$ for abdominal obesity) following WHO criteria (WHO, 2011, p. 489).

LITERATURE REVIEW

A comprehensive literature review was conducted to identify and synthesize evidence on health consequences of obesity. The review focused on: (1) cardiovascular diseases and metabolic disorders, (2) cancer, (3) musculoskeletal and other physical health consequences, (4) psychosocial impacts, and (5) economic burden. Evidence was drawn from systematic reviews, meta-analyses, cohort studies, and authoritative reports from organizations including WHO, International Diabetes Federation, and American Heart Association. Relative risks and disease prevalence estimates associated with obesity were extracted from published studies to estimate potential disease burden in the study population.

Estimation of Disease Burden

Potential disease burden among market women was estimated by applying published relative risk estimates for obesity-related diseases to the observed obesity prevalence in the study population. For example, if obesity increases diabetes risk 2-6 fold and obesity prevalence is 54.2%, we can infer that a substantial proportion of obese market women are at elevated diabetes risk compared to normal-weight women. These estimates provide insights into the likely magnitude of obesity-related health consequences in this population.

Ethical Considerations

Ethical approval was obtained from the Committee on

Human Research, Publication and Ethics at Kwame Nkrumah University of Science and Technology. All participants provided written informed consent.

RESULTS AND DISCUSSION

Obesity Prevalence and Risk Profile

Among 264 market women studied, obesity prevalence was 54.2% (143/264) and abdominal obesity prevalence was 73.5% (194/264) (p. 1133). Mean BMI was 31.4 ± 5.0 kg/m² and mean waist circumference was 97.0 ± 11.1 cm. The combined overweight and obesity prevalence was 90.9%. Age-specific obesity rates increased dramatically: 18-28 years (4.0%), 29-39 years (45.7%), 40-50 years (80.8%), and 51-65 years (94.4%), $p < 0.001$. These high prevalence rates establish the foundation for estimating obesity-related disease burden.

Cardiovascular Disease Risk

Obesity substantially increases cardiovascular disease (CVD) risk through multiple pathways. Meta-analyses have demonstrated that obesity increases coronary heart disease risk 2-3 fold (Bogers *et al.*, 2007). With 54.2% obesity prevalence among market women, a substantial proportion faces elevated coronary heart disease risk. The risk is compounded by abdominal obesity (73.5% prevalence), which is independently associated with CVD even after adjusting for BMI.

Stroke risk is increased 1.5-2.5 fold in obese individuals. Hypertension, a major CVD risk factor, is 2-6 times more common in obese versus normal-weight individuals. Studies have shown strong associations between elevated BMI and blood pressure in children and adolescents (Berenson *et al.*, 1998; Akis *et al.*, 2007; Boyd *et al.*, 2005; Cao *et al.*, 2012; Choy *et al.*, 2011), with these relationships persisting into adulthood. Given the high obesity prevalence, particularly among middle-aged and older market women, a substantial burden of hypertension and other CVD is anticipated.

Dyslipidemia, characterized by elevated triglycerides, total cholesterol, and LDL cholesterol, and reduced HDL cholesterol, is strongly associated with obesity, particularly abdominal obesity. Visceral fat accumulation contributes to atherogenic dyslipidemia through increased free fatty acid flux to the liver and altered adipokine secretion (Despres, 2007, p. 751).

Type 2 Diabetes Mellitus

Obesity is the strongest modifiable risk factor for type 2 diabetes, increasing risk 2-6 fold depending on obesity severity and duration. The relationship is particularly strong for abdominal obesity, with visceral fat contributing to insulin resistance through multiple mechanisms including inflammation, altered adipokine secretion, and increased free fatty acid release (Boney *et al.*, 2005). With 73.5% of market women having abdominal obesity, diabetes risk in this population is substantially elevated. Children and adolescents with obesity show early signs of glucose dysregulation. Al Mamun *et al.* (2009) found

that childhood overweight status predicted diabetes at age 21 years. Given the high obesity prevalence among market women, many may have been overweight/obese since young adulthood, compounding their diabetes risk through prolonged exposure.

Metabolic Syndrome

Metabolic syndrome—a cluster of conditions including abdominal obesity, elevated blood pressure, dyslipidemia, and impaired glucose metabolism—substantially increases CVD and diabetes risk. Obesity is central to metabolic syndrome pathogenesis. Studies show that metabolic syndrome prevalence increases with obesity severity, reaching 50% in severely obese individuals (Weiss *et al.*, 2004, p. 751). Adolescents with obesity also show high metabolic syndrome prevalence (Cook *et al.*, 2003).

The 73.5% abdominal obesity prevalence among market women suggests that a large proportion likely has metabolic syndrome or is at high risk for developing it. Visceral adipose tissue (VAT) measurement and metabolic indicators would be valuable for assessing metabolic syndrome prevalence in this population (Chiba *et al.*, 2007, p. 751; Yamashita *et al.*, 2012, p. 751; Rosito *et al.*, 2008, p. 751).

Cancer Risk

Obesity increases risk for numerous cancers including breast (particularly postmenopausal), endometrial, colorectal, kidney, pancreatic, liver, ovarian, and gallbladder cancers (Wiseman, 2008, p. 489; Colditz & Peterson, 2018). Mechanisms include altered hormone metabolism (particularly estrogen), chronic inflammation, insulin resistance, and altered growth factor signaling.

For breast cancer, obesity increases risk through elevated estrogen levels from aromatization of androgens in adipose tissue (Cleary & Grossmann, 2009). The relationship between obesity and breast cancer is complex, with obesity protecting premenopausal women but promoting late-stage colon cancer (Chen & Iverson, 2012). Endometrial cancer risk is particularly elevated in obese women due to unopposed estrogen exposure.

Given the high obesity prevalence among middle-aged and older market women (80.8% and 94.4% respectively), cancer risk in this population is substantially elevated. The cumulative lifetime cancer risk for obese women is significantly higher than for normal-weight women.

Musculoskeletal Disorders

Obesity substantially increases osteoarthritis risk, particularly in weight-bearing joints (knees, hips, ankles). Excess body weight increases mechanical stress on joints, accelerating cartilage degradation. Additionally, adipose tissue-derived inflammatory mediators contribute to joint inflammation and damage. For market women who spend long hours sitting and frequently stand to attend to customers, obesity compounds joint stress and may accelerate osteoarthritis development. The high obesity prevalence suggests that many market women likely

experience or will develop osteoarthritis, potentially limiting mobility and work capacity.

Other Physical Health Consequences

Numerous other health consequences are associated with obesity

Gallbladder Disease: Obesity increases gallstone risk 2-3 fold through altered cholesterol metabolism and bile composition. **Sleep Apnea:** Obesity, particularly upper body obesity, increases sleep apnea risk through airway narrowing. Sleep apnea, in turn, contributes to hypertension, CVD, and metabolic dysfunction. **Reproductive Disorders:** Obesity in women is associated with menstrual irregularities, polycystic ovary syndrome (PCOS), infertility, and pregnancy complications including gestational diabetes, preeclampsia, and increased cesarean delivery rates (Oversen *et al.*, 2011, p. 489; Abenhaim *et al.*, 2007). **Kidney Disease:** Obesity increases chronic kidney disease risk and accelerates progression to end-stage renal disease (Taylor *et al.*, 2010). **Respiratory Problems:** Obesity is associated with reduced lung function, asthma exacerbation, and increased respiratory infections. **Liver Disease:** Non-alcoholic fatty liver disease (NAFLD) is strongly associated with obesity and can progress to cirrhosis and liver cancer.

Psychosocial Consequences

Beyond physical health consequences, obesity carries substantial psychosocial burdens that significantly affect quality of life:

Stigma and Discrimination: Obese individuals, particularly women, face pervasive weight-based stigma and discrimination in multiple life domains (Puhl *et al.*, 2009, p. 489). The finding that 76.5% of market women expressed negative attitudes toward obese individuals suggests that even within this population with high obesity prevalence, stigma persists. This internalized stigma can lead to psychological distress and may paradoxically perpetuate obesity by deterring individuals from engaging in physical activity in public spaces or seeking healthcare. **Depression and Anxiety:** Obesity is associated with increased rates of depression and anxiety (Bjerkset *et al.*, 2008; Ball *et al.*, 2009). The relationship is bidirectional, with obesity contributing to depression through psychosocial pathways (stigma, body image dissatisfaction) and biological mechanisms (inflammation, hormonal changes), while depression can contribute to weight gain through behavioral (reduced physical activity, emotional eating) and physiological pathways.

Body Image Dissatisfaction and Low Self-Esteem: Obese individuals, particularly women, often experience body image dissatisfaction and low self-esteem (Conley & Boardman, 2007). These psychological consequences can affect social relationships, work performance, and overall quality of life.

Social Isolation: Weight stigma and body image concerns may lead to social withdrawal and isolation, further affecting mental health and quality of life.

Economic Burden

The economic consequences of obesity operate at multiple levels:

Direct Medical Costs: Treating obesity-related diseases incurs substantial healthcare expenditures including hospitalizations, medications, physician visits, and diagnostic tests. In developed countries, obesity-related medical costs exceed \$200 billion annually (Hammond & Levine, 2010, p. 489). In Ghana and other developing countries with limited healthcare resources, the growing burden of obesity-related chronic diseases threatens to overwhelm health systems.

Indirect Economic Costs: Obesity-related health problems result in lost productivity through absenteeism (missing work due to illness), presenteeism (reduced productivity while at work), disability, and premature mortality. For market women, chronic diseases may limit their ability to work long hours, affecting income and household economic security.

Household Financial Burden: Managing chronic diseases requires ongoing medication costs, regular medical visits, and sometimes hospitalizations. For market women with modest incomes, these expenses can cause significant financial strain and may lead to catastrophic health expenditures, pushing families into poverty (Hossain *et al.*, 2007, p. 489).

Reduced Economic Productivity: At the population level, high obesity prevalence reduces overall economic productivity and impedes socioeconomic development. The loss of healthy, productive years to obesity-related disability and premature mortality represents a substantial economic burden (Bloom *et al.*, 2011, p. 550).

Discussion

This study documents alarming obesity prevalence rates (54.2% general obesity, 73.5% abdominal obesity) among market women in the Kassena Nankana Municipality and synthesizes evidence on the profound health consequences associated with obesity. The findings paint a concerning picture of current and impending disease burden in this vulnerable population.

Magnitude of Potential Disease Burden

The exceptionally high obesity prevalence, particularly among middle-aged and older women (80.8% and 94.4% respectively), suggests that the vast majority of market women will develop one or more obesity-related chronic diseases during their lifetime. Based on established risk estimates from published literature, we can anticipate substantial disease burden:

Cardiovascular Diseases: With obesity increasing CVD risk 2-3 fold and 54.2% of women being obese, a significant proportion will likely develop coronary heart disease, stroke, or heart failure. The 73.5% abdominal obesity prevalence further compounds CVD risk. Hypertension prevalence is expected to be very high given that obesity increases hypertension risk 2-6 fold.

Type 2 Diabetes: Given that obesity increases diabetes

risk 2-6 fold, and considering the high abdominal obesity prevalence (which is particularly strongly associated with diabetes), diabetes prevalence among market women is likely substantially elevated. Many women may already have undiagnosed diabetes or prediabetes.

Metabolic Syndrome: With 73.5% having abdominal obesity and likely high prevalence of hypertension and dyslipidemia, metabolic syndrome prevalence among market women is probably very high, potentially exceeding 50% among those with severe obesity.

Cancer: The cumulative lifetime cancer risk for obese women substantially exceeds that of normal-weight women. Given the high obesity prevalence among postmenopausal women, increased incidence of obesity-related cancers (breast, endometrial, colorectal) can be anticipated.

Musculoskeletal Disorders: Osteoarthritis prevalence is likely high and will increase as obese women age, potentially limiting mobility and work capacity.

Implications for Healthcare System

The anticipated obesity-related disease burden has profound implications for Ghana's healthcare system. Managing chronic diseases like diabetes, hypertension, and CVD requires long-term care including regular medical visits, medications, monitoring, and sometimes hospitalization. With already constrained healthcare resources, the growing burden of obesity-related NCDs threatens to overwhelm the system, diverting resources from other health priorities including maternal and child health, infectious disease control, and emergency services. Healthcare facilities in rural and peri-urban areas like the Kassena Nankana Municipality may be particularly ill-equipped to manage the complex, long-term care needs of patients with multiple chronic conditions. Shortages of trained healthcare providers, limited availability of medications and diagnostic equipment, and inadequate infrastructure pose significant challenges.

Individual and Household Impacts

For individual market women and their families, obesity-related health consequences translate into reduced quality of life, functional limitations, chronic pain and discomfort, psychological distress, and premature mortality. The financial burden of managing chronic diseases can be catastrophic for households with modest incomes, potentially leading to poverty and affecting children's education and wellbeing.

Market women's occupational capacity may be compromised by chronic diseases, affecting their ability to earn income and support their families. The sedentary nature of market trading may be difficult to sustain for women with severe osteoarthritis, cardiovascular disease, or other complications.

Socioeconomic Development Implications

At the population level, high obesity prevalence and associated disease burden impede socioeconomic

development through multiple pathways: (1) reduced labor force productivity due to illness and disability, (2) diversion of household resources from productive investments to healthcare, (3) strain on government budgets from healthcare costs and lost tax revenue, and (4) perpetuation of poverty cycles as chronic disease burden concentrates in disadvantaged populations. The concentration of obesity among women with lower educational attainment (64.9% obesity prevalence) suggests that obesity and its consequences may exacerbate existing socioeconomic inequalities.

Urgency of Intervention

The findings of this study underscore the urgent need for comprehensive interventions addressing obesity among market women. Prevention strategies targeting younger women (before significant weight gain) and management interventions for those already obese are both critically needed. The recommendation from the study emphasizes that sensitization programs must be organized by the Ghana Health Service to provide awareness about obesity causes and health implications (p. 1845). Routine physical activities, avoidance of high-fat foods, and regular breakfast consumption are recommended preventive measures (p. 1847-1849).

However, individual behavior change alone is insufficient. Environmental and policy interventions are needed to create supportive contexts for healthy behaviors. This includes: improving food environments in and around markets, creating opportunities and facilities for physical activity, implementing workplace wellness programs for market women, strengthening primary healthcare capacity for obesity screening and management, subsidizing healthy foods and taxing unhealthy products, and implementing regulations on food marketing and labeling.

Research Gaps and Future Directions

The study noted the limitation that quantitative data on specific health implications were not collected (p. 1851). Future research should conduct comprehensive health assessments including measurement of blood pressure, blood glucose, lipid profiles, and screening for metabolic syndrome to quantify actual disease burden. Longitudinal studies following market women over time would provide valuable data on obesity-related disease incidence and progression. Cost-effectiveness analyses of different intervention approaches would inform resource allocation decisions. Qualitative research exploring market women's experiences of obesity and chronic disease would provide insights for developing culturally appropriate, acceptable interventions.

Strengths and Limitations

The study's strength lies in its large sample size and comprehensive assessment of obesity prevalence (p. 1855). However, the reliance on literature-based estimates rather than direct measurement of disease outcomes is a limitation (p. 1859). The cross-sectional design precludes

assessment of temporal relationships. The restriction to a single municipality limits generalizability, although findings likely apply to similar market populations in Ghana.

CONCLUSION

The alarmingly high obesity prevalence among market women in the Kassena Nankana Municipality, 54.2 percent for general obesity and 73.5 percent for abdominal obesity, signals a severe and escalating burden of noncommunicable diseases with serious consequences for individual health, quality of life, healthcare systems, and socioeconomic development. Evidence from established research shows that most obese women face elevated lifetime risks of cardiovascular diseases, type 2 diabetes, metabolic syndrome, several cancers, osteoarthritis, and other chronic conditions. Beyond physical illness, many experience stigma, discrimination, depression, and reduced wellbeing, which further limit productivity and social participation. The economic impact includes rising medical expenses, income loss due to illness, and household financial strain that can deepen poverty. At the population level, such high prevalence, including over 94 percent among women aged 51 to 65 years, places substantial pressure on health services and weakens local development. Obesity among these women represents a public health crisis that demands urgent policy action, targeted prevention for younger women, structured management for those already affected, stronger chronic disease care, and environmental and policy reforms that support healthy behaviors across the municipality.

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