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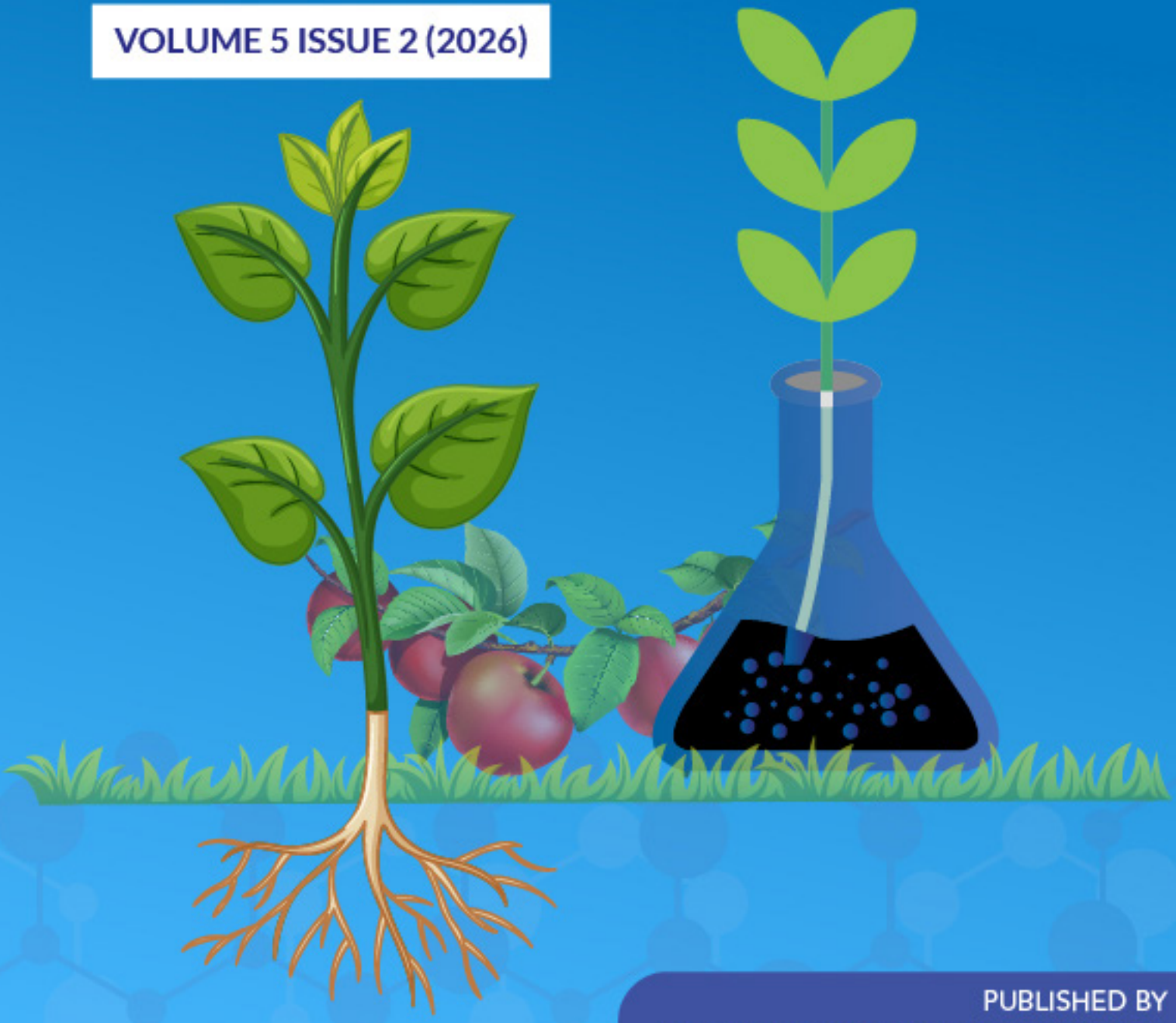

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# Determinants of Obesity among Market Women in the Kassena Nankana Municipality: A Cross-Sectional Analysis

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## ABSTRACT

This study examined the determinants of obesity among market women in the Kassena Nankana Municipality of Ghana, focusing on socio-demographic characteristics, dietary patterns, physical activity levels, and lifestyle behaviors. A cross-sectional study was conducted among 264 market women aged ≥18 years. Body Mass Index (BMI) and waist circumference (WC) were measured using standard protocols. Dietary intake was assessed using 24-hour dietary recalls and food frequency questionnaires. Principal Component Analysis (PCA) was used to derive dietary patterns. Physical activity, meal skipping, work-related stress, and other lifestyle factors were evaluated using structured questionnaires. Chi-square tests, Fisher's exact tests, Mann-Whitney U tests, and Kruskal-Wallis tests were used to examine associations between potential determinants and obesity status. Obesity prevalence was 54.2%, with 73.5% having abdominal obesity. Significant associations were found between obesity and age ($p<0.001$), with women aged 40-50 years showing the highest obesity rates (41.3%). Educational level was significantly associated with obesity ($p=0.005$), with 54.2% of women with no formal education being obese compared to 11.2% of those with tertiary education. Married women had significantly higher obesity rates (72.0%, $p<0.001$) than single women (7.7%). Type of housing showed a significant association with obesity ($p=0.027$). Lifestyle factors significantly associated with higher BMI and WC included meal skipping ($p=0.008$ for BMI, $p=0.046$ for WC), lack of physical exercise ($p=0.003$ for BMI, $p<0.001$ for WC), and work-related stress ($p=0.019$ for BMI, $p=0.043$ for WC). Three dietary patterns were identified: Pattern 1 (fruits, vegetables, protein, starchy foods), Pattern 2 (vegetables and starchy foods), and Pattern 3 (fruits and stew-based foods). Dietary patterns 1 and 2 showed weak positive correlations with BMI ($r=0.154$, $p=0.034$ and $r=0.213$, $p=0.003$, respectively). Age showed strong positive correlations with both BMI ($r=0.676$, $p<0.001$) and WC ($r=0.635$, $p<0.001$). Obesity among market women is determined by multiple interacting factors including age, educational level, marital status, physical inactivity, meal skipping patterns, work-related stress, and dietary behaviors. Comprehensive interventions addressing these modifiable determinants are urgently needed to reduce obesity burden in this vulnerable population.

## INTRODUCTION

Obesity has emerged as a major public health crisis globally, with its prevalence increasing dramatically over the past four decades. This escalating epidemic is driven by complex interactions among biological, environmental, socio-demographic, and behavioral factors (Girma & Genebo, 2002; Ahrens *et al.*, 2011; Moore *et al.*, 2010; Ziraba *et al.*, 2009; Gupta & Kapoor, 2012). Understanding these determinants is crucial for developing effective prevention and intervention strategies, particularly in vulnerable populations such as market women in developing countries.

In sub-Saharan Africa, obesity prevalence has increased substantially, with urban populations showing particularly high rates. Studies indicate that 20-50% of urban African populations are overweight or obese (Kamadjeu *et al.*, 2006, p. 489; Sodjinou *et al.*, 2008, p. 489). Ghana has not been spared from this epidemic, with obesity prevalence among women reaching 22% nationally and even higher rates in urban areas (Ofori-Asenso *et al.*, 2016, p. 489). This dramatic increase in obesity prevalence is attributed to rapid urbanization, economic development, nutritional transition, and lifestyle changes including sedentary behavior and consumption of energy-dense foods (Méndez *et al.*, 2005, p. 489; Ziraba *et al.*, 2009; Ng *et al.*, 2011, p. 489).

Women in developing countries face disproportionately higher obesity rates compared to men, with biological, physiological, and socio-cultural factors contributing to this gender disparity (Abubakari *et al.*, 2008, p. 489; Amegah *et al.*, 2011, p. 489; Mogre *et al.*, 2012, p. 489). Women's physiological predisposition to deposit more fat than lean mass (Lovejoy, 1998; Shi & Clegg, 2009; Taylor *et al.*, 2010), combined with factors such as pregnancy-related weight retention, hormonal changes, and cultural practices, increases their vulnerability to obesity (van Propel, 2012, p. 489).

Market women represent a particularly high-risk group for obesity due to their unique occupational and lifestyle characteristics. The sedentary nature of market trading, characterized by prolonged sitting during sales activities, limited opportunities for physical activity, and irregular eating patterns, creates an obesogenic environment (Arday, 2017, p. 497). Additionally, market women often



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face high levels of work-related stress, time constraints that limit meal preparation and physical activity, and frequent exposure to energy-dense convenience foods. Despite these recognized risk factors, comprehensive data on the specific determinants of obesity among market women in Ghana remain limited.

Previous research has identified multiple determinants of obesity among women in various settings. Socio-demographic factors such as age, education, marital status, and socioeconomic status have been consistently associated with obesity risk (Ayesu, 2013, p. 547; Ziraba *et al.*, 2009, p. 547; Chiriboga *et al.*, 2008, p. 550). Studies have shown that obesity prevalence increases with age, with middle-aged women showing particularly high rates (Mattah *et al.*, 2013, p. 489). Educational level has demonstrated inverse associations with obesity in many populations, although this relationship may vary by setting and cultural context (Abdulai, 2010, p. 547; Ayesu, 2013, p. 547).

Dietary factors play a crucial role in obesity development. The consumption of energy-dense foods high in fats and sugars, inadequate fruit and vegetable intake, frequent snacking, and irregular meal patterns have all been linked to increased obesity risk (Ayesu, 2013, p. 547). In Ghana and other West African countries, traditional dietary patterns are increasingly being replaced by Western-style diets characterized by higher consumption of processed foods, sweetened beverages, and fast foods (Bowman & Harris, 2003, p. 550). The transition from traditional diets rich in whole grains, vegetables, and lean proteins to modern diets high in refined carbohydrates, saturated fats, and added sugars contributes significantly to the obesity epidemic.

Physical inactivity has been identified as a major determinant of obesity globally. The World Health Organization reported that physical inactivity causes approximately 3.2 million deaths annually worldwide (WHO, 2010, p. 746). Sedentary behaviors, including prolonged sitting during work, excessive television viewing, and limited participation in recreational physical activities, are strongly associated with weight gain and obesity (Hallal *et al.*, 2012, p. 746). For market women, occupational sedentariness combined with household responsibilities may leave little time or energy for regular physical activity.

Other lifestyle factors that may contribute to obesity include meal skipping patterns, particularly breakfast skipping, which has been associated with higher BMI in multiple studies. Work-related stress has also been linked to weight gain through various mechanisms, including emotional eating, disrupted sleep patterns, and hormonal changes that promote fat accumulation. Additionally, reproductive factors such as parity, breastfeeding patterns, and menopausal status have been shown to influence obesity risk in women (Bobrow *et al.*, 2013, p. 550; Cohen *et al.*, 2009, p. 550).

Despite the recognized importance of understanding obesity determinants for prevention and intervention, comprehensive studies examining the full range of potential risk factors among market women in rural and peri-urban Ghana are scarce. Most existing research has focused on urban populations or has examined individual risk factors in isolation rather than comprehensively assessing the multiple interacting determinants of obesity. This study addresses this knowledge gap by examining socio-demographic, dietary, lifestyle, and occupational determinants of obesity among market women in the Kassena Nankana Municipality.

The objectives of this study were to: (1) determine the associations between socio-demographic characteristics (age, education, marital status, ethnicity, income, housing) and obesity; (2) assess the relationship between dietary patterns and obesity; (3) examine the influence of physical activity levels and sedentary behaviors on obesity; (4) evaluate the associations between lifestyle factors (meal skipping, work stress) and obesity; and (5) identify the relative contributions of different determinants to obesity risk. Understanding these determinants will inform the development of targeted, culturally appropriate interventions to prevent and manage obesity among market women and similar vulnerable populations in Ghana.

## MATERIALS AND METHODS

### Study Design, Setting, and Population

This cross-sectional descriptive study was conducted at the Navrongo Central Market in the Kassena Nankana Municipality, Upper East Region of Ghana (p. 765). The municipality has a population of 135,610 with a density of 104 people per square kilometer (KNM, 2015, p. 771). The study population comprised market women aged 18 years and above who had demarcated stores, shops, or stands in the market (p. 779). Women with physical deformities that could affect anthropometric measurements accuracy were excluded (p. 789).

### Sample Size and Sampling Technique

Sample size (n=264) was calculated using Cochran's formula based on 22% obesity prevalence among Ghanaian women (Ofori-Asenso *et al.*, 2016, p. 793). Systematic random sampling was employed to select participants from the estimated market population of 600 women.

### Data Collection

#### Anthropometric Measurements

Body weight was measured using a calibrated digital scale (Seca 876, Germany) to the nearest 0.1 kg, with participants wearing light clothing and no shoes. Height was measured using a stadiometer (Seca 213, Germany) to the nearest 0.1 cm, with participants standing erect without shoes. Body Mass Index (BMI) was calculated as weight in kilograms divided by height in meters squared ($kg/m^2$). Obesity was classified according to WHO criteria: normal weight (18.5-24.9 $kg/m^2$), overweight (25.0-29.9 $kg/m^2$), and obese (≥30.0 $kg/m^2$) (WHO,

2011, p. 489).

Waist circumference (WC) was measured at the midpoint between the lowest rib and the iliac crest using a non-stretchable measuring tape to the nearest 0.1 cm. Abdominal obesity was defined as WC ≥88 cm for women (WHO, 2011, p. 489).

**Socio-demographic Data**

Structured questionnaires were used to collect data on age, educational level (basic, secondary, vocational, tertiary, none), marital status (single, married, divorced, widowed), ethnicity, monthly income, and housing status (owned, rented, family house, government, caretaker).

**Dietary Assessment**

Dietary intake was assessed using 24-hour dietary recalls and food frequency questionnaires. Trained nutritionists conducted the recalls, and food portion sizes were estimated using household measures and food models. Energy and nutrient intakes were calculated using food composition tables. A semi-quantitative food frequency questionnaire assessed consumption frequency of various food groups over the past month. Principal Component Analysis (PCA) was used to derive dietary patterns from food frequency data (p. 1539).

**Lifestyle and Physical Activity Assessment**

Physical activity levels were assessed using structured questionnaires inquiring about participation in regular exercise, occupational physical activity, and sedentary behaviors. Meal skipping patterns, including which meals were typically skipped (breakfast, lunch, or supper), were documented. Work-related stress was assessed through self-reported questionnaires. Sleep duration and quality were also evaluated.

**Data Analysis**

Data were analyzed using SPSS version 25. Descriptive statistics (frequencies, percentages, means, standard deviations) were used to describe participant characteristics. Chi-square tests and Fisher's exact tests examined associations between categorical variables and obesity status. Mann-Whitney U tests and Kruskal-Wallis tests compared continuous variables (BMI, WC) across categorical groups. Principal Component Analysis identified dietary patterns, with varimax rotation used to improve interpretability. Pearson correlation coefficients assessed relationships between age, dietary patterns, nutrient intakes, and anthropometric measures. Statistical significance was set at $p<0.05$.

## RESULTS AND DISCUSSION

### Socio-demographic Determinants of Obesity

**Age and Obesity**

Age showed a strong and statistically significant association with obesity status ($\chi^2=117.808$, $p<0.001$). The distribution of obesity across age groups revealed a clear pattern: only 1.4% of obese women were aged 18-28 years, 33.6% were aged 29-39 years, 41.3% were aged 40-50 years, and 23.8% were aged 51-65 years (p. 1150-1156). This distribution indicates that obesity prevalence increases progressively with age, peaking in the 40-50 year age group.

Conversely, normal weight status was most common in the youngest age group, with 70.8% of normal-weight women being 18-28 years old, decreasing to 25.0% in the 29-39 year group, 4.2% in the 40-50 year group, and 0% in the 51-65 year group. Mean BMI and waist circumference also increased significantly with age: 18-28 years (26.3±2.2 kg/m², 86.7±6.3 cm), 29-39 years (30.2±3.6 kg/m², 94.5±9.5 cm), 40-50 years (34.5±4.7 kg/m², 102.7±10.4 cm), and 51-65 years (36.0±4.0 kg/m², 107.3±6.4 cm), both $p<0.001$ (p. 1480-1486).

**Educational Level and Obesity**

Educational attainment demonstrated a significant inverse association with obesity ($\chi^2=22.172$, $p=0.005$). Among obese women, 54.2% had no formal education, 32.9% had basic education, 13.3% had secondary education, 9.1% had vocational training, and only 11.2% had tertiary education (p. 1160-1168). This gradient suggests that higher educational attainment is protective against obesity. In contrast, women with higher education levels were more likely to have normal or overweight status rather than obesity. Among women with tertiary education, only 11.2% were obese compared to 54.2% of those with no formal education, representing nearly a five-fold difference in obesity prevalence.

**Marital Status and Obesity**

Marital status showed a highly significant association with obesity ($\chi^2=28.394$, $p<0.001$). The majority of obese women (72.0%) were married, while only 7.7% were single, 9.8% were divorced, and 10.5% were widowed (p. 1172-1177). Among single women, only 7.7% were obese compared to 45.8% with normal weight, suggesting that marriage is associated with increased obesity risk.

**Housing Status and Obesity**

Type of housing showed a statistically significant association with obesity status ($\chi^2=18.094$, $p=0.027$). Among obese women, 35.2% lived in owned houses, 32.2% in rented houses, 30.1% in family houses, 1.4% in government housing, and 0.7% were caretakers. This pattern may reflect socioeconomic factors, as home ownership and housing type can indicate economic status and lifestyle patterns (p. 1178-1184).

**Ethnicity and Income**

Neither ethnicity ($\chi^2=2.243$, $p=0.679$) nor monthly income ($\chi^2=13.760$, $p=0.333$) showed significant associations with obesity status in this population, suggesting that these factors may have less influence on obesity risk compared to age, education, and marital status.

**Lifestyle Determinants of Obesity**

**Meal Skipping**

Meal skipping showed a significant association with higher BMI and waist circumference. Women who skipped meals had significantly higher mean BMI (32.0±5.1 kg/m²) compared to those who did not skip meals (30.2±4.7 kg/m²), p=0.008. Similarly, mean waist circumference was significantly higher among meal skippers (97.9±11.0 cm) compared to non-skippers (95.0±11.2 cm), p=0.046 (p. 1496-1498). Among the 184 women who reported skipping meals, the specific meal skipped did not show significant associations with BMI (p=0.116) or waist circumference (p=0.739), suggesting that any form of meal skipping, regardless of which meal, may contribute to obesity risk (p. 1500-1506).

**Physical Activity**

Physical exercise demonstrated a strong protective association against obesity. Women who did not undertake regular exercise had significantly higher mean BMI (32.5±5.1 kg/m²) compared to those who exercised (30.6±4.8 kg/m²), p=0.003. The difference was even more pronounced for waist circumference, with non-exercisers having mean WC of 100.5±10.8 cm compared to 94.3±10.7 cm for exercisers, p<0.001 (p. 1510-1512). This represents a mean difference of approximately 6 cm in waist circumference, indicating substantial clinical significance.

**Work-Related Stress**

Work-related stress showed significant associations with both BMI and waist circumference. Women experiencing work-related stress had higher mean BMI (31.7±5.0 kg/m²) compared to those without work stress (29.7±5.1 kg/m²), p=0.019. Similarly, mean waist circumference was higher among stressed women (97.5±10.9 cm) compared to non-stressed women (93.2±12.2 cm), p=0.043 (p. 1514-1518). These findings suggest that occupational stress contributes to obesity through potential mechanisms including stress-induced eating behaviors and hormonal changes.

**Other Lifestyle Factors**

Main meal source (home-made versus purchased food) did not show significant associations with BMI (p=0.678) or waist circumference (p=0.459). Similarly, energy intake categorization (adequate, inadequate, excess) and fiber intake (adequate versus inadequate) did not demonstrate significant associations with anthropometric measures (p>0.05) (p. 1488-1532).

**Dietary Patterns and Obesity**

**Identification of Dietary Patterns**

Principal Component Analysis of food frequency data identified three distinct dietary patterns explaining 18.4%, 7.5%, and 4.6% of the variance respectively (p. 1539). Dietary Pattern 1 consisted mainly of fruits (pineapple, apple), vegetables (cucumber, lettuce, carrot, cabbage), proteins, and starchy-based foods. Dietary Pattern 2 comprised vegetables and starchy-based foods, while Dietary Pattern 3 consisted of fruit (mango) and stew-based foods (p. 1544-1548).

**Associations Between Dietary Patterns and Obesity**

Dietary Pattern 1 showed a weak but statistically significant positive correlation with BMI (r=0.154, p=0.034) and waist circumference (r=0.163, p=0.026). Dietary Pattern 2 demonstrated a similar weak positive correlation with BMI (r=0.213, p=0.003). Dietary Pattern 3 did not show significant associations with anthropometric measures (p. 1685).

The unexpected positive association between Pattern 1 (which includes fruits and vegetables) and obesity measures may reflect several factors: (1) higher overall food consumption among obese women including both healthy and unhealthy foods, (2) social desirability bias in reporting fruit and vegetable consumption, or (3) recent dietary changes in response to obesity that have not yet resulted in weight loss.

**Correlations Between Age, Nutrients, and Obesity**

Bivariate correlation analysis revealed several important relationships. Age showed strong positive correlations with both BMI (r=0.676, p<0.001) and waist circumference (r=0.635, p<0.001), confirming age as a major determinant of obesity. BMI and waist circumference were strongly correlated (r=0.837, p<0.001), indicating that general and abdominal obesity tend to occur together in this population (p. 1692-1698). Weak negative correlations were observed between energy intake and waist circumference (r=-0.123, p=0.047), and between carbohydrate intake and waist circumference (r=-0.132, p=0.032). These unexpected inverse relationships may reflect underreporting of dietary intake among overweight and obese individuals, a well-documented phenomenon in nutritional epidemiology (p. 1700-1715).

**Discussion**

This study comprehensively examined multiple determinants of obesity among market women in the Kassena Nankana Municipality, revealing complex interactions between socio-demographic, lifestyle, and dietary factors. The findings demonstrate that obesity in this population is influenced by both non-modifiable factors (age) and modifiable determinants (education, physical activity, meal patterns, stress) that can be targeted through interventions.

**Socio-demographic Determinants**

The strong positive association between age and obesity (p<0.001) is consistent with findings from numerous studies worldwide and in Ghana (Mattah *et al.*, 2013, p. 489; Abubakari *et al.*, 2008, p. 489). The progressive increase in BMI and waist circumference with age, peaking at 40-50 years, reflects multiple age-related physiological and behavioral changes including

decreased basal metabolic rate, reduced physical activity, hormonal changes (particularly around menopause), and accumulated effects of lifestyle behaviors over time. The strong correlations between age and both BMI (r=0.676) and waist circumference (r=0.635) underscore age as a primary determinant of obesity in this population. The inverse association between educational level and obesity (p=0.005) aligns with research from other African settings (Ayesu, 2013, p. 547; Ziraba *et al.*, 2009, p. 547; Cleland *et al.*, 2010, p. 550). Education may protect against obesity through multiple pathways: (1) enhanced health literacy and awareness of obesity risks, (2) better access to health information and resources, (3) improved ability to make informed dietary choices, (4) higher income enabling purchase of healthier foods, and (5) occupations requiring more physical activity or less sedentary behavior. The finding that 54.2% of women with no education were obese compared to only 11.2% of those with tertiary education represents a nearly five-fold difference, highlighting education as a critical determinant.

The strong association between married status and obesity (p<0.001), with 72.0% of obese women being married, supports previous research findings (Averett *et al.*, 2008, p. 550). Marriage may influence obesity risk through various mechanisms including changes in dietary patterns, reduced physical activity, pregnancy and postpartum weight retention, and lifestyle modifications associated with family responsibilities. Cultural practices around marriage, including expectations for weight gain as a sign of good care and prosperity, may also contribute to this association in the Ghanaian context.

**Lifestyle Determinants**

The significant associations between physical inactivity and both higher BMI (p=0.003) and waist circumference (p<0.001) underscore the critical role of physical activity in obesity prevention. The 6 cm difference in mean waist circumference between exercisers and non-exercisers is clinically meaningful, as even modest reductions in waist circumference are associated with improved metabolic health outcomes. These findings align with global evidence on the protective effects of physical activity against obesity (Hallal *et al.*, 2012, p. 746; WHO, 2010, p. 746).

For market women specifically, the sedentary nature of their occupation—characterized by prolonged sitting during sales activities—compounds the risk of physical inactivity. The time constraints associated with managing both market and household responsibilities may further limit opportunities for regular exercise. Interventions targeting this population must address these structural barriers, perhaps by promoting brief physical activities that can be integrated into the workday or facilitating access to market-based exercise programs.

The association between meal skipping and higher BMI (p=0.008) and waist circumference (p=0.046) appears counterintuitive but is consistent with research showing that irregular eating patterns may promote weight gain through various mechanisms: (1) compensatory overeating at subsequent meals, (2) metabolic adaptations that promote fat storage, (3) increased consumption of energy-dense snacks, and (4) disrupted circadian rhythms affecting metabolism. The lack of association with specific meals skipped suggests that meal irregularity per se, rather than skipping particular meals, may be problematic.

Work-related stress showed significant positive associations with both BMI (p=0.019) and waist circumference (p=0.043), supporting research linking chronic stress to weight gain and obesity. Stress may promote obesity through multiple pathways including: (1) increased cortisol levels promoting visceral fat accumulation, (2) stress-induced eating behaviors and preferences for energy-dense comfort foods, (3) disrupted sleep patterns affecting hunger hormones, and (4) reduced motivation for physical activity. For market women, sources of stress may include financial pressures, long working hours, competition, and balancing work-family responsibilities.

**Dietary Determinants**

The identification of three distinct dietary patterns provides insights into food consumption patterns among market women. The positive associations between Dietary Patterns 1 and 2 with BMI, although weak (r=0.154 and r=0.213), were unexpected given that Pattern 1 included fruits and vegetables typically associated with healthy diets. Several explanations are possible: First, obese women may have recently increased fruit and vegetable consumption in response to their weight status or health advice, but insufficient time has elapsed for weight loss. Second, social desirability bias may lead to overreporting of healthy food consumption among obese women. Third, overall higher food consumption (both healthy and unhealthy) among obese women may explain these associations.

The weak negative correlations between energy and carbohydrate intake with waist circumference likely reflect underreporting of dietary intake among overweight and obese individuals, a well-documented phenomenon in nutritional epidemiology. Individuals with higher BMI often underestimate portion sizes and forget or omit certain foods when reporting dietary intake, leading to apparent inverse associations between energy intake and obesity measures.

**Implications for Interventions**

The findings from this study have important implications for obesity prevention and management among market women:

First, interventions should be age-specific, with particular focus on women in the 40-50 year age group who showed the highest obesity prevalence. Prevention efforts should begin earlier, targeting younger women before significant weight gain occurs.

Second, educational interventions are crucial, particularly

for women with limited formal education who showed substantially higher obesity rates. Health education programs should be culturally appropriate, delivered in local languages, and utilize multiple channels including community health workers, market associations, and mass media.

Third, promoting physical activity among market women requires addressing structural barriers. This might include: (1) encouraging brief activity breaks during the workday, (2) promoting active transportation to and from the market, (3) facilitating access to market-based exercise programs or facilities, and (4) creating supportive policies and environments for physical activity in market settings.

Fourth, interventions should promote regular meal patterns and address meal skipping behaviors. Practical strategies might include encouraging breakfast consumption, promoting healthy portable foods that can be consumed during work hours, and providing nutrition education about the importance of regular meals for weight management.

Fifth, stress management programs tailored to market women's specific occupational stressors could be beneficial. These might include stress reduction techniques, time management strategies, and support groups for dealing with work-related challenges.

Finally, comprehensive interventions addressing multiple determinants simultaneously may be most effective, given the complex, multifactorial nature of obesity in this population. Such interventions should be sustainable, culturally appropriate, and involve market women in their design and implementation.

### Study Strengths and Limitations

Strengths of this study include the relatively large sample size, comprehensive assessment of multiple potential determinants, use of standardized anthropometric measurements, and application of Principal Component Analysis to identify dietary patterns. The study provides valuable data on a previously understudied population—market women in rural Ghana.

However, several limitations should be noted. The cross-sectional design precludes causal inferences about the relationships between determinants and obesity. Dietary intake assessment using 24-hour recalls and food frequency questionnaires is subject to recall bias and social desirability bias, potentially affecting the accuracy of dietary pattern analyses (p. 1859). The study was conducted in a single municipality, which may limit generalizability to other regions of Ghana or other countries. Finally, the study did not assess some potentially important determinants such as genetic factors, detailed hormonal profiles, or longitudinal weight changes.

## CONCLUSION

This study demonstrates that obesity among market women in the Kassena Nankana Municipality is determined by multiple interacting factors. Non-modifiable determinants include age, which showed the strongest associations with obesity measures. Modifiable determinants include educational level, physical activity patterns, meal skipping behaviors, and work-related stress all of which represent potential intervention targets.

The high obesity prevalence (54.2%) combined with the identification of multiple modifiable risk factors underscores the urgent need for comprehensive interventions tailored to market women's specific occupational and lifestyle contexts. Such interventions should address physical activity promotion, regular meal patterns, stress management, and health education, with particular focus on older women and those with limited formal education.

Future research should employ longitudinal designs to establish temporal relationships between determinants and obesity development, assess the effectiveness of interventions targeting identified determinants, and explore additional potential determinants not examined in this study. Understanding and addressing the complex determinants of obesity among market women and similar vulnerable populations is essential for reducing the burden of obesity and its associated health consequences in Ghana.

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