Healthy Lifestyle Behaviour and BMI Status Among Ghanaian Women

Abstract

This study assessed the influence of comprehensive healthy lifestyle behaviour (CHLB) on the BMI status of Ghanaian women by employing multinomial logistic regression analysis. A total of 4,832 Ghanaian women aged between 15-49 years with valid BMI values formed the study sample. A comprehensive healthy lifestyle behaviour index was computed to assess lifestyle behaviour among the respondents. Only 1.3% of the respondents had very good comprehensive healthy lifestyle behaviour. Comprehensive healthy lifestyle behaviour was significantly related to BMI status. Respondents who had very poor CHLB were the most likely to be obese, while those with very good behaviour were the least likely to be obese. Living a healthy lifestyle can help reduce the rising prevalence of obesity and its co-morbidities like hypertension which can translate into lower mortality rates. Implementation and promotion of health policies that encourage healthy lifestyles among Ghanaians is very essential to ensuring overall population health.

Key words: Healthy lifestyle behaviour, BMI status, Overweight, Obesity, Ghanaian women

INTRODUCTION

In addition to indicating better access to economic and social resources, socio-economic status has also been viewed as a measure of willingness to invest in human capital. Within this framework, higher socio-economic status suggests a tendency to engage in activities that yield long term rather than imply short term advantages. One category of such activity is engaging in a healthy lifestyle. Research has demonstrated a connection between healthy lifestyle behaviours and an individual's background characteristics including socio-economic status, level of education, age and occupation (Styen and Damasceno, 2006). Furthermore, lifestyle behaviours such as smoking, alcohol consumption, dietary practices and physical activity have been found to be associated with the incidence of obesity (Centre for Disease Control, 2010; World Health Organisation, 2006). Obesity in itself is a disease condition and also a risk factor for non-communicable disease (NCD) conditions such as hypertension, diabetes, cardiovascular diseases, stroke and some cancers. Lifestyle behaviours principally poor dietary practices and physical inactivity are reported to be the main causes of obesity. In order to address mortality associated with NCDs and to reduce the occurrence of NCDs lifestyle behaviours that reduce the risk of obesity must be critically considered. Much of research on obesity in developing countries like Ghana has focused on socio-economic and demographic determinants (Dake et al, 2010; Biritwum et al, 2005; Amoah, 2003). Few studies have looked at the relationship between healthy lifestyle behaviours and obesity without attending to the potential mediating role of healthy lifestyle behaviours. This study uses a nationally representative sample to explore the influence of a combination of healthy lifestyle behaviours on the BMI status of Ghanaian women. The study examines how obesity varies among Ghanaian women who exhibit

differences in comprehensive healthy lifestyle behaviour (CHLB). The implications of these variations in lifestyle behaviour obesity, the prevalence of NCDs and mortality are also discussed.

METHOD

Source of data

The study used data from the 2008 Ghana Demographic and Health Survey (GDHS). The Demographic and Health Surveys are nationally representative sample surveys that collect demographic and health data in developing countries. Ghana's Demographic and Health Surveys have been conducted every five years since 1988 and the 2008 GDHS is the fifth round. In the GDHS demographic, socio-economic and health information are collected on men and women in their reproductive ages and also on children under the age of five years. The 2008 GDHS included a module on health in which questions on regenerative health and nutrition were asked of adult men and women.

Sample design

The 2008 GDHS was a household-based survey implemented in a representative sample of more than 12,000 households selected nationwide. A two-stage probability sample design was used to select clusters and households. The first stage involved selecting clusters from an updated master sampling frame constructed from the 2000 Ghana Population and Housing Census. A total of 412 clusters were selected using systematic sampling with probability proportional to size. The second stage of selection involved a systematic sampling of 30 of the

households listed in each cluster. Men and women in their reproductive ages who were eligible to be surveyed in the selected households were interviewed.

Subjects and sample size

A total of 5,096 eligible women aged between 15 and 49 years were identified for interview at the household level. Interviews were successfully completed for 4,916 of these women, yielding a response rate of 97 percent. Out of the 4,916 women who were interviewed, height and weight measures were available for 4,832 of them; these women formed the final sample on which all analyses for this study were based.

Measures of healthy lifestyle behaviour

Healthy lifestyle behaviours used in this study were alcohol consumption, amount of average daily water intake, average number of hours of rest a day and involvement in vigorous physical activity. Vigorous physical activity was broadly defined as activities that respondents did as part of their economic activities, house work or yard work, as part of their exercise or sport or in moving from one place to another. Activities such as heavy lifting, digging, jogging or fast cycling that made them breathe much harder than normal were also described to respondents as constituting vigorous physical activity. Respondents were asked to report any such activity they had engaged in within the last 7 days that lasted for 15 minutes each time. Physical activity in this study was measured in terms of frequency (number of days respondents engaged in such activity in the last seven days) and duration (whether such activity lasted for 15 minutes each time). One physical activity day means that on one of the days in the last seven days, the respondent engaged in vigorous physical activity that lasted for 15 minutes. Ghana's Ministry of

Health (MOH) recommends that individuals engage in 30 minutes of vigorous physical activity at least three times a week. Rest was assessed in terms of the average number of hours respondents sleep and/or have naps during the day including daytime and night time. Rest was measured as the number of hours respondents reported having rest (including sleep and naps) in a day. The MOH (Ghana) recommends that adults have at least seven hours of rest a day. Water intake was assessed in terms of the average number of glasses of water respondents drank in a day on average. To meet the requirement for water intake respondents were expected to take at least eight glasses of water a day. Respondents were classified as either alcohol consumers (for those who responded YES) or non-alcohol consumers (for those who responded NO).

Variables

- **Dependent variable**

The BMI value of the respondents' was used as a measure for the dependent variable. The respondents were grouped into various BMI categories using the standard WHO cut-off points (underweight = BMI <18.5, normal weight = 18.5≤ BMI ≤ 24.9, overweight = 25.0≤ BMI ≤ 29.9 and obese/obesity = BMI ≥ 30.0).

- **Intermediate variable (comprehensive healthy lifestyle behaviour)**

Healthy lifestyle behaviours were coded based on the recommendations of the MOH. For every healthy lifestyle behaviour considered, the recommended behaviour was given a code of 1 and all other categories were coded 0. For example, six or more days of physical activity per week was coded 1; less than six days of physical activity days per week was coded 0. Seven or more hours of rest a day was coded 1, less than seven hours of rest a day was coded 0.

Consumption of alcoholic beverages was coded 0; non-consumption of alcoholic beverages was coded 1. Drinking at least eight glasses of water a day was coded 1; drinking less than eight glasses of water a day was coded 0. A comprehensive healthy lifestyle index (CHLI) was computed by summing up all the individual healthy lifestyle behaviours. The index ranged from 0 to 4, with 0 being the poorest (very poor or least healthy lifestyle behaviour) and 4 being excellent (very good or most healthy lifestyle behaviour).

- **Independent variables**

The independent variables used in this study were the demographic and socio-economic characteristics of the women. These include age, place of residence, region of residence, ethnicity, religion, marital status, parity, level of education, type of occupation, and wealth status. In order to compare healthy lifestyle behaviour across the different age groups, age was put into four categories of 15-19, 20-29, 30-39, and 40-49 years. Place of residence was categorised as rural and urban, while region of residence was classified according to the ten administrative regions of Ghana (Western, Central, Greater Accra, Volta, Eastern, Ashanti, Brong Ahafo, Northern, Upper West and Upper East regions). The ethnic group of the women was categorized as Akan, Ga-Dangme, Ewe, Mole-Dagbani and Other. The women were also put into three religious groups; Christian, Moslem and Other. In terms of education, the respondents were classified according to the highest level of education they had attained as follows; those with no education, women with primary education, women with secondary education and women with higher education. Occupational categories included professional/technical/managerial/clerical, sales/service, agric-self employed, manual workers and the unemployed. In terms of marital status, the women were categorised into currently

married, living together, formerly married and never married. The wealth index of the household the women belonged to was used as a proxy for their socio-economic status. The categories were poorest, poorer, middle, richer and richest. The women were put into parity categories of 0, 1-2, 3-4, 5-6, 7-8 and 9+ based on the number of children they had.

Statistical analysis

Descriptive statistics (frequencies and percentages) were used to explore the socio-economic, demographic and healthy lifestyle behaviours of the respondents. The socio-economic and demographic variations in comprehensive healthy lifestyle behaviour (CHLB) of the study sample were examined using bivariate techniques (cross-tabulations). The significance of the association between each of the socio-economic and demographic characteristics and CHLB was assessed using the chi-square test statistic. Significance was set at an alpha value of 0.05.

To assess the influence of CHLB on the BMI status of the respondents, CHLB was used as a single predictor variable to predict the BMI status of the respondents while controlling for their demographic and socio-economic characteristics. Two multinomial logistic regression models were fitted. The first model used CHLB as the only independent variable and BMI status as the dependent variable. The second model used CHLB as an independent variable while controlling for the socio-economic and demographic characteristics of the women. BMI status was again used as the dependent variable. Normal weight was used as the reference category for the dependent variable in both models.

In order to obtain substantial counts that will allow for multivariate analysis and also to avoid obtaining infinite odds ratios, CHLB was put into three categories of “poor”= very poor + poor,

"fair" and "good"= good + very good. Good was used as the reference category for the CHLB. For each of the demographic and socio-economic variables, one category was selected as the reference. The results were interpreted using the odds ratios which represent the chances of a respondent being underweight, overweight or obese as opposed to the person being of normal weight. Respondents in every category of the demographic and socio-economic variables other than the reference category were compared to those in the reference category.

RESULTS

Very poor and poor CHLB increased directly with age from age 15 to 39 years. At the same time very good behaviour also increased with age within the same age bracket (Table 1). Rural dwellers who exhibited very good CHLB (1.6%) were almost twice that of their urban counterparts (0.9%). While there were no respondents from the Central region who had very good CHLB close to 6 percent of women from the Upper East region reported very good CHLB. The Volta region had the highest proportion of women who had very poor CHLB. Ga-Danmges had the highest proportion (4.8%) of women who had very poor CHLB while Mole-Dagabni's on the other had the highest proportion (2.4%) of women who exhibited very good CHLB. Formerly married women exhibited the most unhealthy lifestyle behaviour while currently married women generally exhibited the healthiest behaviour. The percentage of respondents who exhibited very good CHLB decreased as level of education increased. Unhealthy lifestyle behaviour was highest among sales/service personnel and lowest among those who were not in any employment. Healthy lifestyle behaviour was highest among manual workers and lowest among those who were not working. The proportion of respondents from the poorest households who had very good CHLB was twice that of those form the poorest households.

Table 1: Percentage distribution of respondents by comprehensive healthy lifestyle behaviour and selected socio-economic and demographic characteristics

Socio-demographic characteristic	Comprehensive healthy lifestyle behaviour					Number of women
	Very poor (%)	Poor (%)	Fair (%)	Good (%)	Very good (%)	
Age						
15-19	0.7	11.8	76.6	10.2	0.8	994
20-29	1.7	20.1	61.4	15.6	1.2	1,689
30-39	3.8	22.5	55.6	16.2	2.0	1,269
40-49	2.5	24.2	56.1	16.0	1.1	880
Place of residence						
Urban	2.3	20.3	60.4	16.0	0.9	2,348
Rural	2.1	19.2	63.5	13.6	1.6	2,485
Region of residence						
Western	0.9	11.7	69.6	16.2	1.6	444
Central	1.0	19.4	67.5	12.2	0.0	418
Greater Accra	3.8	23.5	54.6	16.6	1.5	839
Volta	5.0	16.9	62.1	14.6	1.4	419
Eastern	1.7	16.8	71.8	9.5	0.2	475
Ashanti	0.5	17.2	64.1	16.9	1.3	1,001
Brong Ahafo	0.9	16.6	66.4	15.6	0.5	422
Northern	4.2	35.3	47.4	12.1	1.1	456
Upper East	1.7	14.3	59.9	18.6	5.5	237
Upper West	3.3	29.8	56.2	9.1	1.7	121
Ethnic group						
Akan	1.3	18.3	64.3	15.1	1.1	2,464
Ga-Dangme	4.8	23.2	57.1	14.0	0.9	336
Ewe	4.5	19.8	60.1	14.1	1.4	622
Mole-Dagbani	0.7	22.6	58.8	15.6	2.4	765
Other	3.9	20.0	61.7	13.6	0.8	645
Religious group						
Christian	2.0	18.9	63.0	14.9	1.1	3,753
Moslem	0.1	19.1	63.1	16.1	1.5	726
Other	8.5	30.0	49.3	9.6	2.5	353
Marital status						
Never married	1.1	14.8	69.3	13.9	0.9	1,554
Married	2.5	22.9	57.3	15.6	1.8	2,197
Living together	2.8	18.7	64.1	14.0	0.5	637
Formerly married	3.7	23.1	57.8	14.2	1.4	438

Table 1 continued

Socio-demographic characteristic	Comprehensive healthy lifestyle behaviour					Number of women
	Very poor (%)	Poor (%)	Fair (%)	Good (%)	Very good (%)	
Parity						
0	1.1	15.5	68.3	14.3	0.9	1,619
1-2	2.1	21.2	61.1	14.2	1.4	1,305
3-4	3.4	21.5	57.9	15.6	1.6	1,012
5-6	3.7	20.1	57.9	17.0	1.3	546
7-8	2.4	25.1	57.4	13.9	1.2	251
9+	1.0	35.0	50.0	11.0	3.0	100
Level of education						
No education	3.0	25.8	56.5	12.8	1.9	1,024
Primary	2.7	18.6	64.0	13.3	1.4	973
Secondary	1.6	17.7	64.0	15.6	1.1	2,649
Higher	2.7	21.0	54.3	21.5	0.5	186
Occupation						
Not working	1.1	14.1	72.4	12.0	0.4	1,124
Prof/Tech/Man/Clerical	2.1	24.2	55.4	17.5	0.8	240
Sales/Service	2.7	20.9	58.8	16.0	1.6	1,928
Agric-self	2.5	21.8	59.3	14.9	1.6	1,129
Manual workers	1.9	21.4	60.3	14.4	1.9	411
Wealth status						
Poorest	2.5	25.8	55.5	14.1	2.2	761
Poorer	1.7	17.0	67.5	12.5	1.3	878
Middle	1.7	16.2	66.9	14.7	0.5	963
Richer	2.3	19.0	61.1	15.9	1.7	1,113
Richest	2.5	21.5	59.1	15.8	1.1	1,115
Total	**2.2**	**19.7**	**62.1**	**14.7**	**1.3**	**4,832**

The results in Table 2 shows that respondents who reported very good CHLB had the lowest percentage of obese women (6.3%) while those who reported very poor CHLB had the highest percentage of obese women (19.8%).

Table 2: Percentage distribution of respondents by comprehensive healthy lifestyle behaviour and BMI status

	Percentage in BMI category				
Comprehensive healthy lifestyle behaviour	Underweight	Normal weight	Overweight	Obese	Number of women
Very Poor	8.5	49.1	22.6	19.8	106
Poor	6.8	58.6	22.7	11.8	954
Fair	9.2	63.5	19.5	7.8	2,998
Good	5.5	57.9	25.0	11.7	712
Very Good	3.2	63.5	27.0	6.3	63
Total	**8.1**	**61.4**	**21.1**	**9.4**	**4,832**

Comprehensive healthy lifestyle behaviour as the only predictor of BMI status revealed that respondents with fair or average CHLB were significantly more likely to be underweight and less likely to be overweight or obese compared to those with good CHLB (Table 3). The adjusted model showed that having a fair CHLB was associated with a 52 percent higher chance of being underweight. Fair CHLB was also associated with a 23 percent lower chance of being overweight. Women in all the older age groups were more likely to be overweight compared to those in the youngest age group. Women from the Eastern Region were about 1.5 times more likely to be overweight compared to women from the Greater Accra Region while those from the Northern Region were less likely to be overweight (OR= 0.574). Women with primary education and those with higher education were more likely to be overweight compared to those who had no education (OR=1.370 and 2.181 respectively). Compared to those who were

not working, sales and service personnel were more likely to be overweight (OR=1.659). Women belonging to the richest households were almost three times more likely to be overweight compared to those from the poorest households.

With respect to obesity, the significant variation observed in Model 1 for those with fair CHLB disappeared when other background characteristics were controlled for. Examination of the socio-economic and demographic characteristics suggest that women in their mid-adult (30-39) years and older women (40-49 years) were more likely to be obese (OR= 4.144 and 4.537 respectively) compared to the youngest group (15-19 years). Women from the Ashanti, Brong Ahafo and the Northern Regions were less likely to be obese compared to women from the Greater Accra Region. Ewe women were more likely to be obese (OR= 1.510) compared to Akan women. Married women, formerly married women and women who were living together with their partners were more likely to be obese compared to never married women. Women with some level of education were also more likely to be obese compared to those with no education. Women with primary education had a 58 percent higher chance of being obese compared to those who had no formal education. Those with up to secondary level of education also had a 52 percent higher chance of being obese compared to those who had no education. Respondents with higher than secondary level education were 3 times as likely to be obese as those who had no education. Similarly women from the richer (OR= 3.738) and richest (OR= 6.524) households were more likely to be obese compared those from the poorest households.

Table 3: Multinomial logistic regression model showing the association between BMI status, comprehensive healthy lifestyle behaviour and background characteristics of the respondents

	Model 1 BMI category Odds ratios		
Variable	Underweight	Overweight	Obese
Comprehensive healthy lifestyle behaviour §†††			
Poor	1.323	0.914	1.130
Fair	1.598**	0.710***	0.628**
Good (RC)	1.000	1.000	1.000
Nagelkerke R^2=0. 013, P-value= 0.000			
	Model 2 BMI category Odds ratios		
Variable	Underweight	Overweight	Obese
Comprehensive healthy lifestyle behaviour §††			
Poor	1.460	0.905	1.106
Fair	1.518**	0.770*	0.764
Good (RC)	1.000	1.000	1.000
Age§†††			
15 - 19 (RC)	1.000	1.000	1.000
20 - 29	0.731	1.711**	1.456
30 - 39	0.706	2.687***	4.144***
40 - 49	0.906	3.008***	6.583***
Place of residence			
Urban	0.998	1.214	1.311
Rural (RC)	1.000	1.000	1.000
Region of residence §†††			
Western	1.110	1.258	0.733
Central	1.220	1.338	0.786
Greater Accra (RC)	1.000	1.000	1.000
Volta	2.016*	1.117	0.755
Eastern	1.024	1.452*	0.997
Ashanti	1.508	1.116	0.691*
Brong Ahafo	0.963	0.722	0.369**
Northern	1.529	0.574*	0.337**
Upper East	2.665**	0.674	0.625
Upper West	1.240	0.541	0.382

Table 3 continued

	Underweight	Overweight	Obese
Marital status §††			
Never married (RC)	1.000	1.000	1.000
Married	0.632	1.300	2.742***
Living together	0.432**	1.140	1.994*
Formerly married	0.643	1.260	2.839***
Parity			
0 (RC)	1.000	1.000	1.000
1-2	0.845	1.241	1.070
3-4	1.180	1.133	1.337
5-6	1.074	1.231	1.213
7-8	1.101	1.584	1.597
9+	1.271	1.251	0.790
Religion			
Christian (RC)	1.000	1.000	1.000
Moslem	1.527*	1.046	1.482
Other	1.009	1.181	0.797
Ethnic group			
Akan (RC)	1.000	1.000	1.000
Ga-Dangme	0.934	1.112	1.150
Ewe	0.685	0.968	1.510*
Mole-Dagbani	0.545	1.102	0.685
Other	0.631	1.065	1.046
Level of education §††			
No education (RC)	1.000	1.000	1.000
Primary	1.126	1.370*	1.578*
Secondary	0.952	1.290	1.524*
Higher	0.467	2.181**	3.154**
Occupation §†††			
Not working (RC)	1.000	1.000	1.000
Prof/Tech/Mang/Clerical	0.743	1.347	1.797
Sales/Services	0.676	1.659***	1.408
Agric-self employed	0.933	0.956	0.674
Manual workers	0.629	1.143	0.821
Wealth status §†††			
Poorest (RC)	1.000	1.000	1.000
Poorer	1.341	1.097	1.110
Middle	0.849	1.411	1.347
Richer	0.623	2.747***	3.738***
Richest	0.680	2.902***	6.524***
Nagelkerke R^2=0. 285, P-value= 0.000			

§ Significant predictor variable,† and * Likelihood ratio test significance ***/††† P<0.001 **/††P<0.01 */†P<0.05

DISCUSSION

The results indicate that respondents who had very poor and poor CHLB had the highest proportions of obese women (Table 2). Table 1 also shows that very poor and poor CHLB generally increased with increasing age. The chances of a woman being overweight or obese also increased with increasing age (Table 3). Further analyses also revealed that among those who exhibited very poor comprehensive healthy lifestyle behaviour, women in their mid-adult years formed the highest proportion (39.7%). Steyn and Damasceno (2006) and the Disease Control Project (2007) report that obesity and other related co-morbidities such as hypertension, diabetes and heart diseases occur in the mid-adult years after years of living with unhealthy lifestyle behaviours. Having very poor CHLB and being older probably explain why older women were more likely to be overweight or obese compared to women in the youngest age group. Rguibi and Belahsen (2004) report a similar finding among Moroccan Sahraoui women.

Other factors apart from lifestyle behaviours, including marital status and number of pregnancies have been found to influence the risk of obesity among older women (Batnitzky, 2008; Weng et al, 2004; Holdsworth et al, 2004). Being married also increases the risk of obesity among women especially in sub-Saharan African countries due to certain socio-cultural perceptions such as fat women being considered as beautiful. Men who have fat wives are also considered as being wealthy. Weight gain associated with pregnancy and subsequent retention after delivery also increases the chances of women being obese.

Obesogenic cultural practices associated with pregnancy and the immediate post partum period also increases the risk for obesity among most African women. Results of this study show that majority (90.4%) of the women in the youngest age group were not married while about 70 percent of the older women (i.e. those aged between 30-49 years) were married. Also, about 90 percent of the women in the youngest age group did not have children while about 30 percent of those in the oldest age group had seven or more children. The risk of obesity associated with being married and having children and also the effect of ageing probably explains why older women were more likely to be obese compared to women in the youngest age group.

Results of the analysis revealed that almost four in five (78.3%) women resident in the Volta Region were Ewes. The Volta region also recorded the second highest proportion of women who had very poor CHLB after Ga-Dangmes at the bivariate level (see Table 1). At the multivariate stage, Ewe women were more likely to be overweight compared to Akan women. Inferring from the results obtained it can be deduced that majority of the women resident in the Volta region were Ewes who had very poor CHLB and this probably explains why they were also more likely to be obese. The Ashanti Region had the lowest proportion of women with the most unhealthy lifestyle behaviour. Women from the Ashanti region were also less likely to be obese. This pattern suggests that CHLB does offer protection from the risk of obesity.

Contrary to what has been found in other studies (Yannakoulia, 2008; Batnitzky, 2008), this study found that there were more married and formerly married women who had unhealthy lifestyle behaviours compared to never married women. Also, although they were more

married women who had very good CHLB than there was among never married women, the proportion of married women with very poor CHLB was more than the proportion that reported very good CHLB. Married women were also found to be more likely to be obese compared to never married women. A cross tabulation of marital status against parity carried out in this study revealed that while almost 90 percent of never married women had no children, more than 90 percent of currently married and formerly married women had at least one child. Also, while about 70 percent of those aged 30-39 were married only 3.7 percent of those aged 15-19 were married.

In sub-Saharan African countries like Ghana socio-cultural perceptions about fatness and marriage does exist especially among women. The results thus indicate that older women are more likely to be married than younger women. Research also indicates that the risk for obesity increases with increasing age. The risk of obesity associated with ageing, being married, having children and also having the most unhealthy lifestyle behaviours are the likely reasons why married and formerly married women were more likely to be overweight or obese compared to their never married counterparts. Similar to the results of this study some studies have found married women to be heavier than single women (Lowe and Gibson, 1955; Amoah, 2003; Biritwum et al, 2005).

This study found that while the proportion of respondents with very good CHLB decreased as level of education increased, the chances of a woman being obese increased as her level of education increased. The results also revealed that respondents resident in rural areas were more likely to have healthy lifestyle behaviours. The results also indicate that the proportion of

respondents resident in urban areas increased as level of education increased. While about a quarter of women with no formal education resided in urban areas, approximately 84 percent of women with higher than secondary level education lived in urban areas. Living in an urban area has been reported to be characterised by several unhealthy lifestyle behaviours including reduced physical activity, consumption of unhealthy foods such as fast foods and energy dense fatty snacks (Swinburn et al, 2004).

Nutritional transition (which is characterised by a shift from the consumption of local staple foods rich in coarse grains and unpolished cereals to the consumption of diets high in refined carbohydrates, oils, red meat and low in fruits and vegetables) is also a common phenomenon in urban areas. People with higher education are also more likely to be employed in high status jobs most of which are found in urban areas as a result of rapid rates of economic transition in urban areas of developing countries (Popkin, 1998). Most of these high status jobs also tend to be sedentary in nature. The results of this study show that women with some level of formal education are more likely to be employed in sedentary kinds of jobs and they are also more likely to be urban residents and thus are more likely to be faced with the problem of nutritional transition. These lifestyle characteristics of women with some level of education makes them more prone to becoming obese and probably explain why they were more likely to obese compared to their counterparts who had no formal education. This association between level of education and obesity found in this study is aligned with what was found by Biritwum et al. (2005) and Amoah (2003) in Ghana. However, opposite findings are reported in South Africa and Morocco. Kruger et al. (2005) found that South Africans with low education had higher

rates of obesity. Among Moroccan Sahraoui women, Rguibi and Belahsen (2004) found a negative association between education and BMI.

Women from rich (richer and richest) households were more likely to be overweight or obese compared to their counterparts from the poorest households. Women from rich households were also more likely to be resident in urban areas as well as have at least up to secondary level education. They were also more likely to be professional/technical/managerial/clerical workers or sales/service personnel. Their jobs involve minimal physical activity and thus tend to be more sedentary compared to that of manual workers and agric-self employed workers whose jobs tend to be more physically tasking. The richer and richest households also had the highest proportions of respondents with very poor CHLB. These characteristics of women from rich households put them at risk of becoming overweight or obese and probably explain why they were more likely to be overweight or obese compared to their counterparts from the poorest households.

The analysis revealed significant variations in healthy lifestyle behaviour by socio-economic and demographic characteristics. The likelihood ratios test also showed CHLB as a significant predictor of BMI. Even after controlling for the other socio-economic and demographic variables CHLB was still significant in predicting BMI status. The findings of this study have implications the rising burden of non-communicable diseases in Ghana and also health policy formulation. Obesity is a risk factor for chronic disease conditions like diabetes, hypertension, cardiovascular diseases, stroke and some cancers. These disease conditions especially hypertension are among the top-ten causes of death in Ghana. This study provides empirical

evidence that having a good comprehensive healthy lifestyle provides protection against the risk of obesity. Reducing the risk of obesity by having good comprehensive lifestyle behaviour can also go a long way to reduce the prevalence of NCDs such as hypertension and the high rates of mortality associated with such disease conditions. This will help reverse the trend of rising mortality patterns currently prevailing in Ghana. In light of this, encouraging policies and educational programs that promote healthy lifestyle behaviours among the Ghanaian population could help address the problem of rising prevalence of obesity and NCDs and high rates of mortality associated with these disease conditions. Healthy policies currently running in Ghana like the Regenerative Health and Nutrition Program that seeks to promote healthy living should be encouraged.

REFRENCES

Amoah, G.B.A. 2003. "Socio-demographic variations in obesity among Ghanaian adults" Public Health Nutrition, 6(8):751.

Batnitzky, A. 2008. "Obesity and Household Roles: Gender and Social Class in Morocco". Sociology of Health and Illness, 30(3):458-461.

Biritwum, R. B., Gapong, J. and Mensah, J. 2005. "The Epidemiology of Obesity in Ghana" Ghana Medical Journal, 39(3):83.

Centre for Disease Control and Prevention. 2010. Physical Activity for a Healthy Weight. Available at http://www.cdc.gov/healthyweight/physical_activity/ Accessed on 24/05/2010.

Dake, F.A., Tawiah, E.O. and Badasu, D.M. 2010. "Sociodemographic correlates of obesity among Ghanaian women. Public Health Nutrition, 1-7. doi:10.1017/S1369890010002879.

Holdsworth, M., Gartner, A., Landias, E., Maire, B. and Delpeuch, F.2004. "Perceptions of Healthy and Desirable Body Size in Urban Senegalese Women". International Journal of Obesity, 28: 561-1568.

Kruger, S.H., Puoane, T., Seneka, M. and Theresa van der Merwe, M. 2005. "Obesity in South Africa: Challenge for Government and Health Professionals" Public Health Nutrition: 8(5), 491-500.

Lowe, C.R. and Gibson, J.R. 1955. "Changes in Body Weight Associated with Age and Marital Status" British Medical Journal, 2(4946):1006-1008.

Popkin, B.M. 1997. "The Nutrition Transition and its Health Implications in Lower-Income Countries" Public Health Nutrition: 1(1), 5-21.

Rguibi M. and Belahsen, R. 2004. "Overweight and Obesity Among Urban Sahraoui Women of South Morocco" Ethnicity & Disease, 14: 542-547.

Steyn, K., and Damasceno, A. 2006. "Lifestyle and Related Risk Factors for Chronic Diseases", in Jamison, D.T., Feachem, R.G., Makogoba, W.M., Bos, R.E., Baingana, K.F., Hofman, J.K. and Rogo, O.K. (ed), Disease and Mortality in Sub-Saharan Africa. The World Bank, Washington, DC. 247-264.

Swinburn B.A., Caterson, I., Siedell, J.C. and James, W.P.T. 2004. "Diet, Nutrition and the Prevention of Excess Weight Gain and Obesity" Public Health Nutrition: 7(1A), 123-146.

Weng, H.H., Bastian, L.A., Taylor, H. D., Moser, B.K. and Ostbye, T. 2004. "Number of Children Associated with Obesity in Middle–Aged Women and Men: Results from the Health and Retirement Study". Journal of Women's Health, 13(1): 85-89.

World Health Organisation. 2006. Obesity and Overweight. Available at http://www.who.int/mediacentre/factsheets/fs311/en/ , Accessed on 17/10/2008.

Yannakoulia, M., Panagiotakos, D., Pitsavos, C., Skoumas, Y. and Stafanadis. 2008. "Eating Patterns May Mediate the Association Between Marital Status, Body Mass Index and Blood Cholesterol Levels in Apparently Healthy Men and Women from the ATTICA Study" Social Science and Medicine, 66:2230-2239.

Further analysis

The next stage of this research will look at categorising the healthy lifestyle variables beyond just recommended and non-recommended behaviour. I will explore the variations among those who fully meet the recommendation, those who partially meet the recommendation and those who do not meet the recommendation at all. I will also examine how the background characteristics of the respondents predict their healthy lifestyle behaviour. The influence of healthy lifestyle behaviour on weight status and the influence of healthy lifestyle behaviour together with background characteristics on BMI status will also be explored.