

ORIGINAL ARTICLE

Association between breakfast skipping and adiposity status among civil servants in the Tamale metropolis

V. Mogre¹, J. A. Atibilla² and B. N-A. Kandoh²

¹Department of Human Biology, ²Department of Community Nutrition, School of Medicine and Health Sciences, University for Development Studies, Tamale, Ghana

Breakfast meal contributes at least 25% of the daily requirements of an individual making it crucial for healthy growth and development. The aim of this study was to assess breakfast skipping and its association to adiposity among civil servants in the Tamale metropolis. A cross-sectional design was used to assess a sample of 235 civil servants working in the Tamale metropolis. Breakfast eating patterns were assessed by means of a questionnaire that was self-administered. Breakfast consumption was classified into breakfast eaters and skippers. Weight and height was measured to determine participants' adiposity status by means of body mass index cut-off points. Participants were within the age range of 20-60 years. Approximately half of the studied population (50.6%, n=119) were within the 20 - 29 age group. Among the studied population, 52.3% of the participants were breakfast eaters while 47.7% were breakfast skippers. More female participants skipped breakfast (57.8%; n= 52; p=0.016) as compared to males. Almost 30% (33/112) of the studied participants skipped breakfast for lack of time, 32.1% (36/112) for no appetite and 29.5% (33/112) for not feeling hungry. Breakfast skippers were significantly more likely to be overweight (57.3% vs. 42.6%) and obese (59.7% vs. 40.3%) compared to breakfast eaters. Skipping of breakfast was associated with obesity. Health strategies should be put in place by the Ghana Health Service to encourage individuals to regularly eat breakfast.

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INTRODUCTION

Breakfast is crucial to all humans since it is the first meal of the day. It contributes to at least 25% of the daily nutritional requirements of an individual. Consumption of breakfast is essential for cognitive development and performance, as well as healthy growth for both children and adults (Croll *et al.*, 2001; Nicklas *et al.*, 2004; Pollitt *et al.*, 1998; Ramper-saud *et al.*, 2005). Healthy breakfast eating contributes to an overall sense of well-being and is important in preventing a number of diseases (Kushi *et al.*, 2006).

Some individuals perceive breakfast to be less important and time wasting, and thus skip it. This com-

pels them to binge during lunch and supper or snack in between meals predisposing them to obesity. Cross-sectional studies have shown that breakfast skipping is associated with increased prevalence of overweight and obesity (Croezen *et al.*, 2009; Dubois *et al.*, 2009; Ma *et al.*, 2003; Marin-Guerrero *et al.*, 2008). The consumption of breakfast is associated with lower risk of weight gain (Cho *et al.*, 2003). Research has shown that subjects who regularly skipped breakfast had 4.5 times risk of developing obesity than those who consumed breakfast regularly (Mota *et al.*, 2008). However, contradictory findings have also been reported on the association of breakfast skipping to body mass index (BMI) (Williams, 2007) or to overweight/obesity (Mota *et al.*, 2008).

Over 30% of civil servants in Ghana have been found to be either overweight or obese in recent times (Aryeetey *et al.*, 2011; Mogre *et al.*, 2012). Sed-

Correspondence: Mr. Victor Mogre, Department of Human Biology, School of Medicine and Health Science, University for Development Studies, Tamale, Ghana E-mail: mogrevictor@yahoo.com

entary lifestyles, urbanization and nutritional transition (Aryeetey *et al.*, 2011; Popkin *et al.*, 1998) have been attributed to the current situation. Furthermore, there is paucity of data on breakfast consumption patterns of Ghanaians. This study investigated the prevalence of breakfast skipping and its association to adiposity status among civil servants in Tamale, Ghana.

MATERIALS AND METHODS

Participants

This cross-sectional study was conducted between January and July, 2011. Participants comprised 235 adult civil servants within the Tamale Metropolis of the Northern Region of Ghana. All personnel from the 13 civil service departments in the Tamale Metropolis were eligible to participate in the study. Participants who were on medication known to modify serum lipid or carbohydrate metabolism were excluded from the study. Participants were selected using a proportionate random sampling technique that included more participants from larger departments, with the help of random number statistical tables. From each department, a proportionately determined number of participants were selected from the list of potential participants in that department. The inclusion of participants was voluntary and informed consent was obtained from each participant. The study was approved by the Ethics Committee of the University for Development Studies, School of Medicine and Health Sciences.

Anthropometric variables

Anthropometric measurements such as height and weight were taken. The weights of subjects were measured to the nearest 0.1 kg using the UNICEF electronic scale manufactured by SECA. All scales used were calibrated with a standard weight prior to use. The heights of participants without shoes on were measured using a wall-mounted microtoise calibrated to the nearest 0.1 m. The adiposity status of participants was determined using Body Mass Index (BMI) which was obtained by dividing their weights in kilogram (kg) by the square of their heights in metres (m). The WHO normative standards for the adult classification of body weight were followed in which underweight was considered to be a BMI <

18.5 kg/m², normal weight: BMI 18.5–24.9 kg/m², overweight (pre-obese): BMI 25–29.9 kg/m² and Obese: BMI > 30 kg/m² (WHO, 2000)

Breakfast eating patterns

A semi-structured, self-administered, 25-item questionnaire was employed to assess socio-demographic data and breakfast eating patterns. Breakfast was defined as “the first meal of the day that was taken in the morning, before going to work or at the workplace before 12:00 pm (Gajre *et al.*, 2008)”. The breakfast eating patterns of participants were classified into breakfast eaters and breakfast skippers. Breakfast eaters were participants who ate breakfast at least 4 days in a week. Breakfast skippers were participants who skipped breakfast at least 4 days in a week. Type of breakfast consumed by participants was classified into “light” breakfast and “heavy” breakfast. Light breakfast included food considered to be low in energy e.g. tea, coffee, vegetables and fruits. Heavy breakfast included high energy foods such as rice and beans (Waakye), Tuo-zaafi, Banku and Kenkey.

Statistical Analysis

The results were expressed as proportion and compared using Fischer’s exact test. A p-value of <0.05 was considered as statistically significant. GraphPad Prism version 5.00 (GraphPad software, San Diego California USA, www.graphpad.com) for windows was used for all statistical analysis.

RESULTS

Table 1 indicates the general characteristics of the studied population stratified by gender. This comprised of 145 males and 90 females with ages ranging between 20 to 60 years. Approximately half of the studied population (50.6%, n=119) were within the 20 - 29 age group. Among the studied population, 52.3% of the participants were breakfast eaters while 47.7% were breakfast skippers. More female participants skipped breakfast (57.8%; n= 52; p=0.016) as compared to males.

Among the breakfast skippers, 29.5% (33/112) skipped breakfast for lack of time, 32.1% (36/112)

for no appetite and 29.5% (33/112) for not feeling hungry. When reasons for skipping breakfast were stratified by gender however, the differences were not significant.

Table 2 assesses participant’s knowledge on the

health benefits of breakfast consumption in which 64.7% said the consumption of breakfast provides one with energy and 8.9% said the consumption of breakfast prevents one from getting ulcer. A few respondents 11.5% (27/235) said they did not have any knowledge on the health benefits of breakfast

Table 1: General characteristics of the studied population

Variable	Total (n = 235)	Male (n= 145)	Female (n= 90)	P value
Age (years)				
20-29	119 (50.6%)	70 (48.2%)	49 (54.4%)	0.421
30-39	61 (26.0%)	41 (28.3%)	20 (22.2%)	0.359
40-49	26 (11.1%)	14 (9.7%)	12 (13.3%)	0.399
50-59	25 (10.6%)	17 (11.7%)	8 (8.9%)	0.664
60+	1 (0.4%)	1 (0.7%)	0 (0.0%)	1.000
Breakfast eating patterns				
Breakfast Eaters	123 (52.3%)	85 (58.6%)	38 (42.2%)	0.016
Breakfast Skippers	112(47.7%)	60(41.4%)	52(57.8%)	
Participants’ reasons for Skipping breakfast	n = 112	n = 60	n = 52	
Lack of time	36 (32.1%)	22 (36.7%)	14 (26.9%)	0.314
Lack of appetite	33 (29.5%)	20 (33.3%)	13 (25.0%)	0.408
Not feeling hungry	33 (29.5%)	20 (33.3%)	13 (25.0%)	0.408
Too early to eat	5 (4.5%)	3 (5.0%)	2 (3.8%)	0.622
Religious reasons	3 (2.7%)	2 (3.3%)	1 (1.9%)	1.000
Health Reasons	2 (1.8%)	2 (3.3%)	0 (0.0%)	0.498

Data was presented as proportion and analyzed using Fischer’s exact test

consumption. There was no significant difference when the participant’s knowledge on the health benefits of breakfast consumption was stratified based on gender.

Majority of the breakfast eaters took light food (71.5%) largely within the hour of 4-8 am (59.3%) as shown in Table 2. The estimated mean BMI was 27.7 kg/m², with the mean BMI of males being 26.9 kg/m² and 29.1 kg/m² for female participants. The prevalence of obesity was 28.5% (67/235) and high-

er (p=0.017) in females (37.8%) than in males (22.8%).

The comparison between breakfast eating patterns, remedy for skipping breakfast and body weight are presented in Figure 1. Participants who skipped breakfast were significantly more likely to be overweight (57.3% vs. 42.6%) and obese (59.7% vs. 40.3%) compared to participants who ate breakfast. With regards to remedy for skipping breakfast, participants who snacked were significantly more likely

Table 2: General Characteristics of the studied population

Variable	Total (n = 235)	Male (n= 145)	Female (n= 90)	P value
Knowledge on the health benefits of breakfast (n = 235)				
Has no idea	27 (11.5%)	17 (11.7%)	10 (11.1%)	1.000
Gives me energy and boost attention	152 (64.7%)	94 (64.8%)	58 (64.4%)	1.000
Promotes good health and development	35 (14.9%)	22 (15.2%)	13 (14.4%)	1.000
Prevents Ulcer	21 (8.9%)	13 (9.0%)	8 (8.9%)	1.000
Kind of breakfast taken (n = 123)				
Light	88 (71.5%)	60 (70.6%)	28 (73.7%)	0.830
Heavy	35 (28.5%)	25 (29.4%)	10 (26.3%)	
Time of breakfast (n = 123)				
4am-8am	73 (59.3%)	50 (58.8%)	17 (44.7%)	0.173
8am-12pm	50 (40.7%)	35 (41.2%)	21 (55.3%)	
Adiposity status (n = 235)				
Normal	67 (28.5%)	46 (31.7%)	21 (23.3%)	0.183
Overweight	101 (43.0%)	66 (45.5%)	35 (38.9%)	0.345
Obesity	67 (28.5%)	33 (22.8%)	34 (37.8%)	0.017

Data was presented as proportion and analyzed using Fischer’s exact test

to be overweight and obese compared to those who overeat during lunch ($p=0.0232$).

DISCUSSION

From this study, 47.7% of the studied participants skipped breakfast. Although the range of definitions used for breakfast skipping as well as the paucity of data in Sub-Saharan Africa may complicate comparisons, the rate of breakfast skippers in this study is among the highest reported in literature. A study among Taiwanese adults estimated a breakfast skipping rate of 8% (Huang *et al.*, 2010). In a study of free living adults in the US, 20.05% skipped breakfast (Mezrich *et al.*, 2003). Another survey in Finland reported a breakfast skipping rate of 40.2% and 29% in men and women respectively (Keski-Rahkonen *et al.*, 2003). About 30% of breakfast skipper’s did not eat breakfast because of lack of time, appetite or not feeling hungry. These reasons coincide with several other studies in adults (Letsa, 2011; Moy *et al.*, 2009; Nicklas *et al.*, 2004). The observed 52.3% breakfast eaters from this study is in agreement with the 53% observed among an adult population in Turkey

(Memis *et al.*, 2010) and the 51.2% and 48.8% reported in Taiwanese men and women respectively (Huang *et al.*, 2010).

Another important finding from this study is the higher rate of obesity among breakfast skippers as compared to the breakfast eaters. These results are in agreement with data from Spanish adults (Marin-Guerrero *et al.*, 2008); Taiwanese (Huang *et al.*, 2010) and several other populations where skipping breakfast has been associated with a higher BMI and obesity (Cho *et al.*, 2003; Keski-Rahkonen *et al.*, 2003; Ma *et al.*, 2003). Also, the prevalence of obesity was found to be higher among females as compared to the male participants. This could probably be attributed to the findings that more females skipped breakfast, which has been shown to be associated with obesity in this study. Data on breakfast skipping and obesity in sub-Saharan Africa is limited, however; studies in developed countries have shown a decreasing trend in breakfasting but an increasing trend in the prevalence of obesity (Kant *et al.*, 2006). It is therefore not surprising that

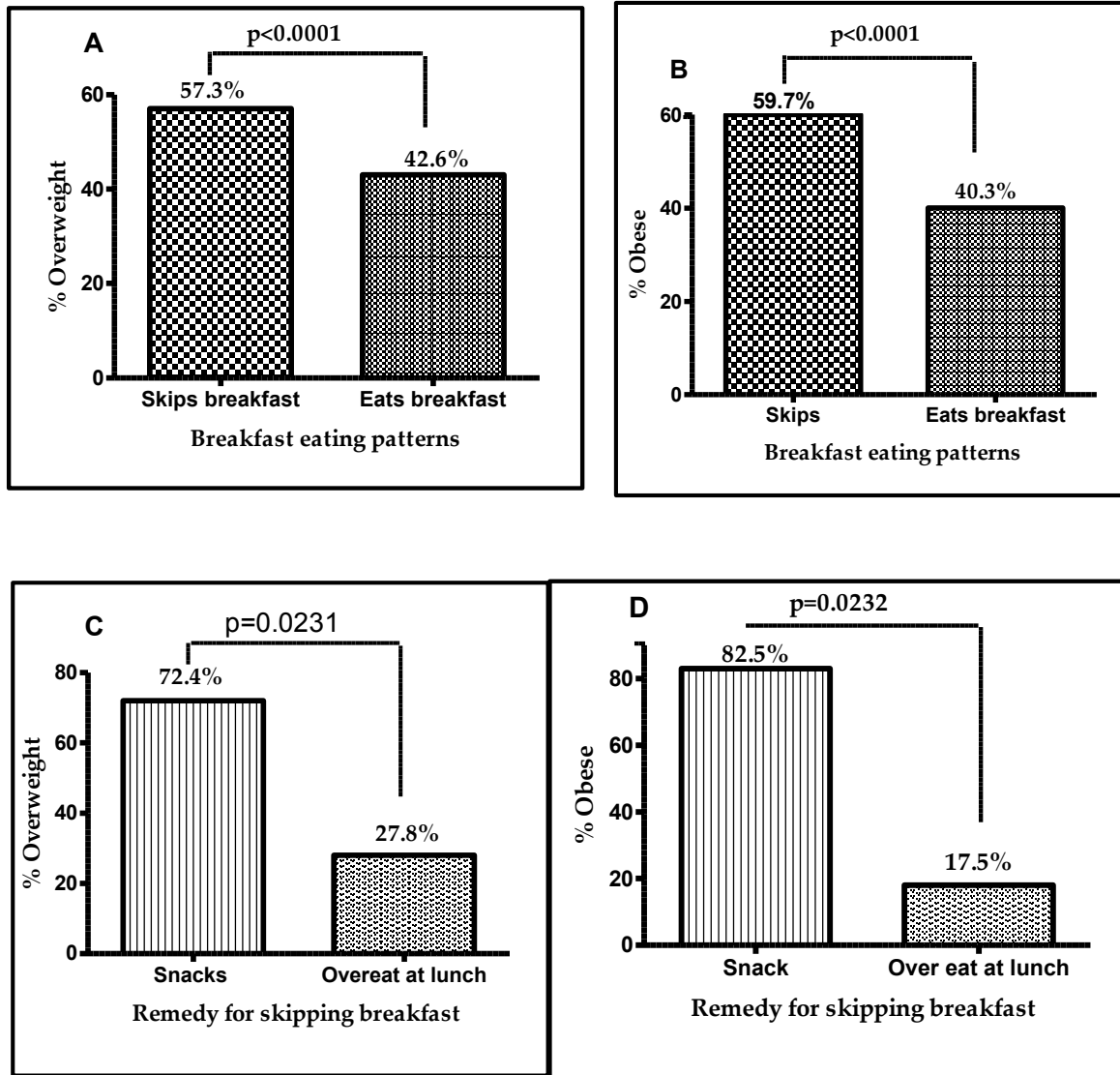


Figure 1: Comparison between breakfast eating patterns and overweight (A), between breakfast eating patterns and Obesity (B), between remedy for skipping breakfast and overweight (C) and between remedy for skipping breakfast and obesity (D). Data was analyzed using Fischer's exact test.

a high prevalence of 28.5% of obesity have been found in this study with a breakfast skipping prevalence of 47.7%. Promotion of regular breakfast consumption should be included in the development of programmes to address obesity.

It is unclear the mechanisms by which breakfast skipping contributes to the development of obesity

from this study. However, several potential mechanisms have been suggested including decreased energy expenditure, increased daily total energy intake and increased energy storage (Gwinup *et al.*, 1963; Jenkins *et al.*, 1989; Wadhwa *et al.*, 1973; Young *et al.*, 1972).

One limitation of this study is that it did not consider other factors such as physical activity levels, total daily energy intake and dieting that are known to influence body weight. However, the study has demonstrated an association between breakfast skipping and BMI status.

CONCLUSION

The prevalence of both overweight and obesity was higher in breakfast skippers than in breakfast eaters. Female participants were more likely to skip breakfast and more likely to be obese than their male participants. Further research is needed to determine whether breakfast skipping has a causal relation to overweight and obesity. Family health promotion strategies should be put in place by the health authorities to encourage individuals to eat breakfast regularly to help reduce the high prevalence of obesity.

COMPETING INTERESTS

The authors declare that they have no competing interests.

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