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Food Consumption Practices of Women and Obesity in Urban Uganda

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Abstract The last national demographic and health survey in Uganda found that nearly two of every 10 women living in Kampala capital city and the surrounding urban areas in Mukono and Wakiso districts were obese. This study aimed to clarify how food consumption practices are indicated in the obesity of women in urban Uganda. Measurement of weight and height, interviews and intensive 7-day observation of 14 women in August and September of 2018 was complemented by interview data collected between February 2016 and September 2017 among 540 women. Results showed that the number of eating occasions was limited, the timing was later in the day, and both were irregular. This was associated with the difficulties in acquiring food, the time required to prepare a meal, and the chores women needed to accomplish. Daily energy intake varied from one day to the next, but the net average was high–2,430 kcal (SD = 694) and exceeded the daily energy requirements. Most of the energy came from the second main eating occasion and from large portions of the main staple foods and sauces. Perceptions of ideal food consumption practices, and of the drivers of food consumption practices, were influenced by long-standing habits in the individual homes and communities where they were brought up, and by the women's past and present experiences of instability in food availability and access. Efforts to foster stability in food security across the life course could therefore be instrumental in neutralizing the sociocultural risk factors for obesity among women in urban Uganda.

Keywords: BMI; Domestic chores; Eating occasions; Eating time; Energy intake; Perceptions.

Introduction

Body fat is an essential part of human existence. When human existence is characterized by alternate periods of abundance and lack of food, storage of body fat is crucial for survival. In many societies body fat is viewed as a symbol of wealth and health. This is the case in various parts of the so called 'low income' world, particularly in Africa and in Uganda (Janzon et al. 2015; Seera 2019).

With the advent of non-communicable diseases, the issue of body fat has attracted the attention of many scholars. Nonetheless, the 'perfect' definition of what constitutes excessive body fat continues to be elusive. Based on scientific evidence, various indicators that classify body fat levels based on the estimated risk to health have been proposed. One of the commonly-used indicators is the body mass index (BMI). This classifies body fat levels into one of four main groups including underweight (<18.5), normal weight (18.5–24.9), overweight (25.0–29.9), and obese (≥30). These are based on a ratio of an individual's weight in kilograms to the square of their height in meters (WHO 2004).

Over the 30-year period between 1986 and 2016, the global prevalence of obesity

doubled rising from 6 in every 100 people to 13 in every 100 people. In Uganda, there was a 5-fold increase, from 1 in every 100 to 5 in every 100. In women, the obesity prevalence was high, increasing from 2 in every 100, to 9 in every 100 (WHO 2016). In women living in urban areas, the prevalence was as high as 17 in every 100 women by 2016 (UBOS & ICF 2018).

Obesity is understood as the result of the energy intake exceeding the energy expenditure of an individual (WHO 2017). However, obesity is also recognized as a manifestation of a complex relationship involving biological, psychosocial, and behavioral factors—food consumption and activity (Vandenbroeck et al. 2007; Skelton et al. 2011; WHO 2017), based on studies conducted in the UK, US and globally respectively.

Studies agree on the relevance of cultural context in shaping the practices that are related to food and to eating patterns (Dietz et al. 2009). Nonetheless, the role of the sociocultural environment, and the mechanisms through which it affects obesity are less understood (Ball & Crawford 2010). This is an unfortunate oversight because an understanding of the factors that operate at the individual level, together with the cultural norms associated with eating patterns, is essential in facilitating the development of culturally relevant approaches for addressing obesity (James 2004; Airhihenbuwa et al. 2014).

Age, being female, urban residence, physical inactivity, regular use of public transport, education, and wealth are the factors associated with obesity in Uganda (Baalwa et al. 2010; Kirunda et al. 2015). Among women, obesity occurs commonly in those living in urban areas (12.5%), those who are older (those in their 30s: 12.1% and those in their 40s: 12.6%), the wealthier (16.9%), and the more educated (17.5%) (UBOS & ICF 2018).

Overall, existing evidence, indicates that food consumption in Uganda is characterized by the consumption of three meals a day. Meals typically constitute a staple made from plantains, tubers or cereals, and a sauce made from nuts, legumes, or vegetables (FAO 2010). Starchy staples are the most commonly consumed food group. Foods of animal origin and fruits are consumed infrequently (UBOS 2018) because of their high cost (FAO 2010). Portion sizes of the staples make the larger part of the meal, and most energy intake comes from the starchy staples (Harvey et al. 2010). The average energy available for consumption per person per day was estimated as 2,226 kcal (UBOS 2018).

However, it is still not clear how the characteristics of food intake—as opposed to the frequently measured and reported "food availability," are related to the observed trend in obesity (Ngaruiya et al. 2017). The purpose of this paper therefore is to clarify how the food consumption practices of women living in an urban area of Uganda play a role in the observed prevalence of obesity. This paper clarifies how the circumstances surrounding obesity in a group of urban women in Uganda, with limited access to land for cultivation, and with unstable incomes; is different from the mainstream perception of the etiology of obesity as linked with the frequent intake of energy dense refined carbohydrates and high fat fried fast foods.

Research Methods

I. Data collection

The study was conducted in Mukono Central Division (Mukono town), located about 21 km by road east of the capital city, Kampala (Figure 1).

It was selected because the highest prevalence of obesity in Uganda has been reported among women living in the capital city, Kampala, and in urban areas in the neighboring

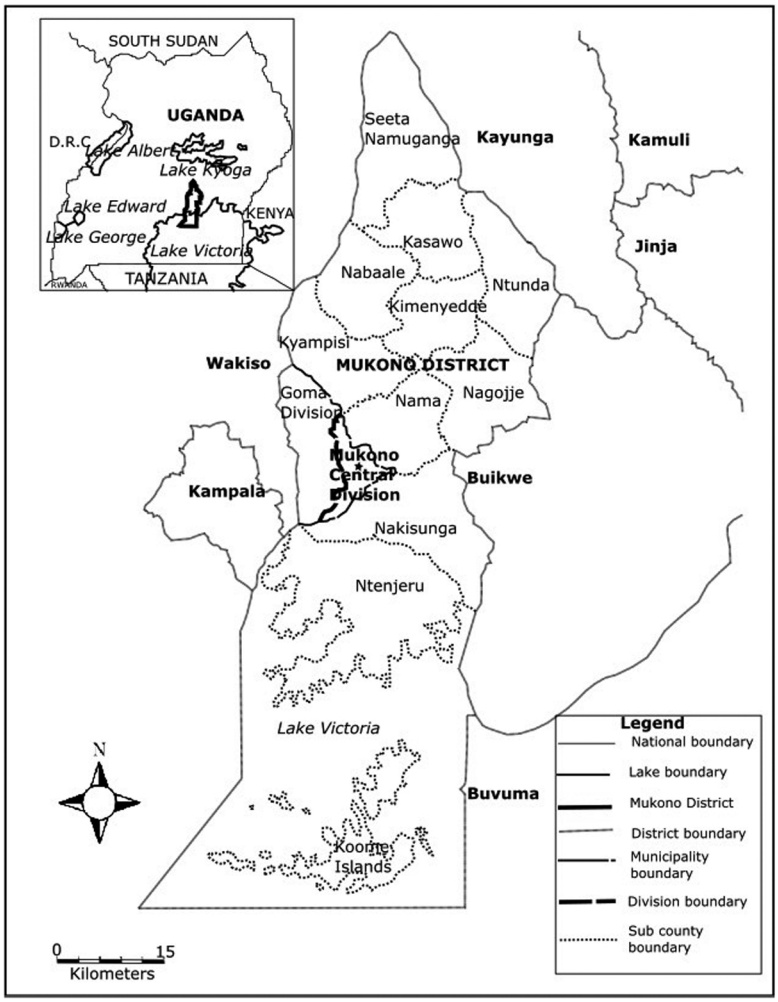

Figure 1 Research area: Mukono Central Division in Mukono District, in Uganda.

Mukono and Wakiso Districts i.e., 17.1% (UBOS & ICF 2018: 218).

The study adopted a field research design. Participants were selected by non-probability sampling, using the snowball sampling technique (Bhattacherjee 2012). This technique was applied because the study participants needed to be motivated individuals, to ensure simple and accurate data collection (FAO 2018). The study was conducted over the course of two months between August 1 and September 30, 2018. Intensive observation of 14 women was conducted.

All participants were interviewed about their socio-economic characteristics and measured. The height measurements were taken using the Prestige Stadiometer (model no. T023000201; Prestige, India). The weight measurements were taken using the Tanita Body Composition Meter (model no. BC-202-WH; Tanita, Japan).

In addition to the interviews and physical body measurements, the author used the weighed food record method to collect data on food consumption practices (Figure 2).

This method is regarded as the most precise for estimating the food and nutrient intakes

Figure 2 Interviews, physical measurement, and weighed food record.

of individuals (FAO 2018). The participants were provided with a Digital Kitchen Scale (model no. TANITA KJ-215; Tanita, Japan) that had a measurement range of 0.1–2,000 g and a tare function. The participants were asked to measure everything they ate and drank in real-time, from the time they woke up to the time they went to bed, and to record it in a template. Those who could not write were assigned literate people known to them, to help them with the activity.

Each of the 14 women were observed for seven days—the majority of the 14 women, except only one who was a primary school teacher, were working in the informal sector. They make a living on a daily basis, so the change of diet before and after the monthly paycheck cannot be assumed. Rather, their income is irregular and varies significantly from one day to another even within the span of a week.

As recommended by the FAO (2018), the participants were trained for two days and the observation days included at least one weekend day to account for changes in food consumption on weekends that occur in some societies. This was complemented with routine daily observations to acquire information on the participants' perceptions and any other factors that may be related to their food consumption practices. This was complemented by interview data collected over a span of 204 days between February 1, 2016, and September 30, 2017, among 540 women.

Lastly, to obtain information on how the income, food prices and desirable portion size interact with food choice, the food acquisition practices of one household that was observed between February 28, 2019, and March 8, 2019, were recorded.

II. Data analysis

Based on the BMI, the body sizes of the women were categorized into underweight (less than 18.5 kg/m^2), normal weight (18.5–24.9 kg/m^2), overweight (25.0–29.9 kg/m^2), and obese (greater than or equal to 30.0 kg/m^2). The interview data was summarized to clarify features of their socioeconomic circumstances including age, origins, marital status, number of children, household size, years of formal education completed, livelihood activity and average daily expenditure—as a proxy for income. A description of the socioeconomic characteristics, daily activities, and food consumption practices of one specific obese

woman is presented.

The author summarized the food consumption practices data into information on the daily number of eating occasions, the timing of each of the eating occasions, the time interval between the eating occasions, the perceived degree of hunger before eating, (on a scale of 1–10), the perceived degree of satiety after eating (on a scale of 1–10), the number of staples at an eating occasion and the number of sauces at an eating occasion.

The consumption frequency of specific foods was summarized from the foods consumed throughout the study period for all the women. The portion sizes in grams of each food item consumed by each of the women in the study were combined to obtain the average portion sizes of each food item. The food portion consumption data were converted into energy intake using food composition tables by Hotz et al. (2012). The energy intake from each food item was calculated using the formula:

$$EI = \frac{EC}{100} \times Q.$$

Where EI is the Energy Intake from the specific food item. EC is the Energy Content per 100 g of a specific food item. And Q is the quantity of the specific food item consumed by the women at that eating occasion in grams. The overall energy intake during the study period was determined, and the percentage contribution of each food item was calculated as a proportion of the total energy from the food item to the total energy intake of the entire group over the entire study period.

The energy intake at each eating occasion was determined first, for each of the participants over the seven days, then the averages for each of the women, and for the entire group were calculated. The average daily amount of energy intake from food for each participant was determined from the total daily energy intake for the seven days. Averages were calculated for each of the normal weight, overweight and obese groups of women, as well as the total average for the entire group of women.

The data on the factors influencing food consumption practices, the perceptions of the women on the ideal food consumption practices and the perceptions of the women on the drivers of their food consumption practices, was analyzed by thematic analysis. All the ideas related to each other were grouped together in several small groups, then into increasingly fewer but larger groups until the main themes were identified.

Results

I. Characteristics of the study participants

Among the 14 women, 7 had normal weight BMI values, 4 had overweight BMI values, and 3 had obese BMI values (Table 1).

The average BMI value among the normal weight women was 22.6 kg/m^2 (range: 18.8–24.7). The average BMI value among the overweight women was 27.2 kg/m^2 (range: 26.8–27.7), and the average BMI value among the obese women was 35.1 kg/m^2 (range: 31.1–39.2). Two of the women were in the age range of 18–19, 4 were in the 20–29 age range, 5 were in the 30–39 age range, 2 were in the 40–49 age range and 1 woman was in the 50–59 age range. The average age of the women in the normal BMI category was 29 years old (range: 18–52). The average age of women in the overweight BMI category was 35 years old (range: 28–42). The average age of the women in the obese BMI category was 39 years old (range: 30–49).

Table 1 Study participants: BMI, age, height, weight, ethnic origins, marital status and number of children

ID	Name	BMI (kg/m^2)	Age (years)	Height (meters)	Weight (kilograms)	Ethnic origins	Marital status	No. of child.
Normal weight women								
1	Ms. A	21.9	28	1.63	58.0	East	Separated	1
2	Ms. B	21.2	18	1.49	47.0	West	Separated	0
3	Mrs. C	24.7	38	1.64	66.3	Central	Married	2
4	Mrs. D	22.8	28	1.52	53.0	Central	Married	3
5	Mrs. E	18.8	52	1.64	50.0	Central	Married	5
6	Ms. F	24.2	21	1.51	54.0	East	Single	0
7	Ms. G	24.6	18	1.53	57.0	West	Single	0
Average		22.6	29	1.57	55.0			2
Overweight women								
8	Ms. H	27.3	42	1.51	61.5	Central	Widowed	4
9	Mrs. I	26.8	38	1.63	71.0	Central	Married	4
10	Mrs. J	26.9	28	1.49	60.0	West	Married	1
11	Mrs. K	27.7	32	1.67	76.0	West	Married	3
Average		27.2	35	1.58	67.1			3
Obese women								
12	Mrs. L	31.1	30	1.72	93.0	Central	Married	3
13	Ms. M	35.1	49	1.62	92.2	Central	Widowed	2
14	Ms. N	39.2	37	1.58	97.7	Central	Separated	1
Average		35.1	39	1.64	94.3			2
Total Average		26.6	33	1.58	66.9			2

Source: the author

The average height of the women in the normal BMI category was 1.57 m (range: 1.49–1.64). The average height of the women in the overweight BMI category was 1.58 m (range: 1.49–1.67). The average height of the women in the obese BMI category was 1.64 m (range: 1.58–1.72). The average weight of the women in the normal BMI category was 55.0 kg (range: 47.0–66.3). The average weight of the women in the overweight BMI category was 67.1 kg (range: 60.0–76.0). The average weight of the women in the obese BMI category was 94.3 kg (range: 92.2–97.7).

Eight of the women were Baganda, born and raised in Central Uganda. Four were originally from Western Uganda. Two were originally from Eastern Uganda. Seven of the women were married, three were separated, two were widowed, and two were single. The average number of children per woman was two children (range: 0–5).

The average household size was six people (range: 2–10) (Table 2).

The average number of education years completed was seven (range: 0–15). Their average daily expenditure was 5,934 UGX (USD 1.6) (range: 500–15,000). Five of the women were domestic workers—two paid (house girls), three unpaid, among whom two worked in their own home (unemployed). The typical monthly income of a person working as a house girl in the area is 50,000 UGX (USD 13.3), 1,613 UGX (USD 0.43) per day on average. However, this is often not paid on time and sometimes not paid at all. Three women were casual workers normally washing clothes for others for pay—two also

Table 2 Study participants: Household size, number of education years completed, daily consumption expenditure, and livelihood activity

ID	Name	House-hold size	Educ. (years)	Daily Exp. (UGX)	Livelihood activity
Normal weight women					
1	Ms. A	10	0	15,000	'Domestic worker'–unpaid and casual work
2	Ms. B	10	10	5,000	'Domestic worker'–paid
3	Mrs. C	6	7	5,934	'Domestic worker'–unpaid, own home
4	Mrs. D	5	8	7,000	Casual work (washing clothes), and farming
5	Mrs. E	9	0	5,000	Casual work (washing clothes), and farming
6	Ms. F	2	12	500	Primary school teacher
7	Ms. G	6	9	714	'Domestic worker'–paid
Average		7	7	5,593	
Overweight women					
8	Ms. H	6	7	5,000	Casual work (washing clothes for people)
9	Mrs. I	6	9	10,000	Grocery shop
10	Mrs. J	3	7	5,000	Food stall, fried cassava, and charcoal
11	Mrs. K	5	5	10,000	'Domestic worker'–unpaid, own home
Average		5	7	7,500	
Obese women					
12	Mrs. L	4	15	5,000	Grocery shop
13	Ms. M	6	7	5,934	Grocery shop
14	Ms. N	2	6	3,000	Food stall, charcoal selling, bar
Average		4	9	4,645	
Total Average		6	7	5,934	

Source: the author

did some farming alongside this, three were grocery shop attendants; two were food stall operators—one also sold fried cassava and charcoal while another also run a charcoal business and a bar; and one was a primary school teacher.

II. Food consumption practices and time allocation of one obese woman, Mrs. L

Mrs. L's BMI was 31.1 kg/m^2 and she was classified as obese. She was 30 years old. She was a Muganda (of Ganda ethnic group) from Central Uganda. She identified as a Pentecostal Christian. She had completed 15 years of formal education—university level. She was married with three children. She was self-employed and she was running a small shop in her neighborhood. Her reported average daily income was 5,000 UGX (USD 1.40). Her reported average daily expenditure was 10,000 UGX (USD 2.8). She lived together with her 32 years old husband who was a businessman, her 11 years old daughter, her four years old son, and her one year old son. She was observed for seven days from Thursday, August 30, 2018, to Tuesday, September 4, 2018, and on Friday, September 7, 2018. Below is a description of her time allocation for one day—Thursday, August 30, 2018:

She woke up at 7:00 am. From 7:00 am to 7:10 am, she was putting clothes outside for some one to wash and switching off the lights. From 7:10 am to 9:00 am, she was sleeping again. From 9:00 am to 10:00 am, she was bathing her baby and her son. From

10:00 am to 10:20 am, she was giving them clothes to wear. From 10:20 am to 11:00 am, she was walking to work with the children. From 11:00 am to 11:05 am, she was greeting the neighbours around the shop. From 11:05 am to 11:10 am, she was opening the shop to start working. From 11:10 am to 11:28 am, she was preparing breakfast—deep fried cassava chips and black tea with sugar. From 11:28 am to 11:37 am, she was standing to stretch and maintain fitness. From 11:37 am to 11:45 am, she was fetching water from the the neighbour's place. From 11:45 am to 12:20 pm, she was washing her babies clothes. From 12:20 pm to 12:40 pm, she was breastfeeding the baby because he was crying.

From 12:40 pm to 12:50 pm, she was conversing with her husband. From 12:50 pm to 1:12 pm, she was sitting in her shop while the baby was asleep. From 1:12 pm to 2:00 pm, she was washing utensils and fetching water. From 2:00 pm to 2:20 pm, she was cooking the baby's food while preparing lunch. From 2:20 pm to 2:57 pm, she was cutting cabbages and other vegetables. From 2:57 pm to 3:10 pm, she was washing the kettle and other saucepans. From 3:10 pm to 3:50 pm, she was fetching water while cooking rice. From 3:50 pm to 4:00 pm, she was preparing to eat her food. From 4:00 pm to 4:10 pm, she was starting to eat her food – rice and cabbage. From 4:10 pm to 4:20 pm, she was sleeping—taking a nap. From 4:20 pm to 5:30 pm, she was sitting while feeding the baby with yoghurt. From 5:30 pm to 5:50 pm, she was walking to the salon to make her hair. From 5:50 pm to 6:30 pm, she was greeting people in the salon and having her hair done.

From 6:30 pm to 6:46 pm, she was coming back from the salon. From 6:46 pm to 6:52 pm, she was breastfeeding the baby while sitting down. From 6:52 pm to 7:50 pm, she was conversing with people around, while giving the baby food. From 7:50 pm to 8:00 pm, she was closing the shop and going back home. From 8:00 pm to 9:00 pm, she was bathing her children and after she bathed herself. From 9:00 pm to 10:00 am, she was inside the house doing other things and she eventually went to bed.

From her example, we can observe that she normally had two or three eating occasions per day (Table 3).

The first was in the late morning, the second in the late afternoon and the third (if any), was in the early evening. Her main eating occasion was in the late afternoon where she ate cooked food and sauce (*emmere n'enva*). In the morning, she had sugar-sweetened tea and 'escort' i.e., something to eat such as deep-fried cassava, *chapati* or bread that was purchased from the shop—not made at home by herself. When she did have something in the evening, it was normally just sugar-sweetened tea without anything to eat with.

The main carbohydrate foods at her main meals were rice, steamed and pressed green cooking bananas (*matooke*), and maize flour meal (*posho*). The main sauces were cabbage, beef, groundnuts sauce, chicken, beans, silver fish (*mukene*), and other fish stews. Occasionally, she'd have fresh juice made from mixed fruits, purchased from a nearby shop. Her main cooking methods were boiling, frying, steaming, stewing, and mingling in the case of *posho*. Overall, her average daily energy intake was 2,425 kcal, SD = 897 kcal.

The first eating occasion was consumed at around 11:00 am because she prioritized getting to work and accomplishing several chores in the morning, before making the meal. The second and main eating occasion of the day was consumed at around 4:00 pm, similarly because she juggled childcare, business work and domestic chores before and while acquiring and preparing the meal. It took her about two hours in total to make the meal. When she made *matooke* it took even longer to get the meal ready, i.e., around four hours. The last eating occasion was eaten at around 7:00 pm.

Table 3 Food consumption practices and energy intake of Mrs. L for seven days

Day	Date	Time	Name of item	Weight (g)	Preparation	Energy/100 g	Energy (kcal)
1	30/08/2018 (Thursday)	11:07 AM	Tea (Sugar)	24	Boiled	387.0	93
			Cassava	180	Deep fried	377.4	679
		4:00 PM	Rice	809	Fried	163.5	1,323
			Cabbage stew	253	Fried	148.4	375
							2,470
2	31/08/2018 (Friday)	11:00 AM	Tea (Sugar)	24	Boiled	387.0	93
			Bread	196	Baked	266.0	521
		4:00 PM	Rice	886	Fried	182.0	1,613
			Matooke	290	Steamed	134.0	389
			Beef stew	167	Fried	391.0	653
		6:50 PM	Tea (Sugar)	32	Boiled	387.0	124
							3,393
3	01/09/2018 (Saturday)	10:00 AM	Tea (Sugar)	24	Boiled	387.0	93
			Bread	196	Baked	266.0	521
		2:30 PM	Rice	853	Fried	182.0	1,552
			Matooke	310	Steamed	134.0	415
			Groundnut stew	263	Boiled	283.0	744
							3,325
4	02/09/2018 (Sunday)	12:56 PM	Tea (Sugar)	24	Boiled	387.0	93
			Bread	196	Baked	266.0	521
		4:00 PM	Matooke	855	Steamed	134.0	1,146
			Chicken stew	21	Fried	268.1	56
							1,816
5	03/09/2018 (Monday)	11:30 AM	Tea (Sugar)	24	Boiled	387.0	93
			Bread	101	Baked	266.0	269
		3:00 PM	Posho	103	Mingled	97.4	100
			Beans stew	93	Fried	357.0	332
			Tea (Sugar)	32	Boiled	387.0	124
		7:30 PM	Tea (Sugar)	32	Boiled	387.0	124
							1,042
6	04/09/2018 (Tuesday)	12:00 PM	Tea (Sugar)	32	Boiled	387.0	124
			Chapati	86	Fried	275.0	237
		3:40 PM	Rice	569	Fried	163.5	930
			Juice	369	Sieved	3.0	11
			Mukene stew	108	Fried	357.6	386
		6:10 PM	Tea (Sugar)	32	Boiled	387.0	124
							1,812
7	07/09/2018 (Friday)	10:00 AM	Tea (Sugar)	32	Boiled	387.0	124
			Bread	227	Baked	266.0	604
		2:00 PM	Matooke	864	Steamed	134.0	1,158
			Fish stew	316	Fried	389.3	1,230
							3,116

Source: the author

III. Food consumption practices and energy intake of the women

The average number of eating occasions per day was three times (SD = 0.6). Women typically had between 2–4 eating occasions per day (Table 4).

Snacking between the main eating occasions was unusual. The average time of the first main eating occasion of the day was 11:09 am (range: 8:30 am–4:07 pm). The average time of the second main eating occasion was 4:03 pm (range: 1:00 pm–10:30 pm). The average time of the last main eating occasion was 8:23 pm (range: 5:00 pm–11:14 pm). The timing of each of the eating occasions was typically later in the day. Both the number and timing of eating occasions varied from day to day. The average value of daily energy intake among the women in the study was 2,430 kcal per day. There was a lot of variation in the energy intake of women over the course of several days (SD = 694 kcal).

The average interval between eating occasions during the day was four hours and 41 minutes (range: 6 minutes–13 hours and 20 minutes) (Table 5).

The average time of the first snack of the day (for those who had it), was 11:55 am (range: 10:30 am–3:21 pm). The average time of the second snack of the day was 4:10

Table 4 Average number of eating occasions, average timing of each of the three main eating occasions of the day, and average energy intake per day for all women (7-days)

ID	Name	Average eating occasions (times/day)	Average time of first main eating occasion	Average time of second main eating occasion	Average time of third main eating occasion	Average energy intake from food (kcal/day)
			Normal weight women			
1	Ms. A	4.0 ± 1.2	10:47 AM	3:32 PM	9:49 PM	2,506 ± 351
2	Ms. B	3.6 ± 1.2	10:05 AM	2:39 PM	8:59 PM	2,246 ± 651
3	Mrs. C	3.0 ± 0.0	11:15 AM	4:06 PM	7:38 PM	2,623 ± 525
4	Mrs. D	2.7 ± 0.5	10:45 AM	3:31 PM	7:15 PM	1,677 ± 889
5	Mrs. E	2.9 ± 0.4	10:20 AM	3:37 PM	8:15 PM	1,932 ± 947
6	Ms. F	2.0 ± 0.8	12:44 PM	4:14 PM	8:02 PM	2,391 ± 1,219
7	Ms. G	2.7 ± 0.5	10:23 AM	4:21 AM	10:31 PM	2,676 ± 723
Average-Normal		3.0 ± 0.9	10:54 AM	3:42 PM	8:38 PM	2,293 ± 803
			Overweight women			
8	Ms. H	2.6 ± 0.5	12:02 PM	4:52 PM	7:39 PM	2,749 ± 412
9	Mrs. I	2.0 ± 0.6	11:14 AM	5:23 PM	10:00 PM	1,412 ± 339
10	Mrs. J	2.9 ± 0.4	10:22 AM	3:12 PM	10:00 PM	3,137 ± 627
11	Mrs. K	3.7 ± 1.1	11:00 AM	3:44 PM	8:36 PM	2,329 ± 419
Average-Overweight		2.8 ± 0.6	11:09 AM	4:17 PM	9:03 PM	2,407 ± 457
			Obese women			
12	Mrs. L	2.4 ± 0.5	11:13 AM	3:18 PM	6:50 PM	2,425 ± 897
13	Ms. M	2.3 ± 0.5	12:37 PM	6:24 PM	5:37 PM	2,939 ± 852
14	Ms. N	2.9 ± 0.3	11:16 AM	3:49 PM	8:23 PM	2,977 ± 863
Average-Obese		2.5 ± 0.5	11:42 AM	4:30 PM	6:56 PM	2,780 ± 890
Average-all women		2.8 ± 0.6	11:09 AM	4:03 PM	8:23 PM	2,430 ± 694

Source: the author

pm (range: 12:01 pm–7:03 pm). The average time of the third snack of the day/ 'evening tea', was 7:02 pm (range: 5:30 pm–9:00 pm). Meals commonly included several types of staples (*emmere*) or sauces (*enva*) in a single meal whenever possible. The average number of staples was 1.1 (range: 1–3). The average number of sauces was 1.1 (range: 1–3). Women also reported relatively high subjective values of perceived hunger and satiety before and after meals respectively. The average reported degree of hunger before meals was 6.4 (range: 1–10). The average reported degree of satiety after meals was 7.7 (range: 1–10).

Overall, up to 79 different types of food items were consumed by the women during the study. This number was achieved by summarizing all the different types of food items that were consumed by the women during the time of the study. The total number of times any item was recorded at mealtimes was 594. This number was achieved by counting all the different numbers of times that the women recorded a food they had eaten during the time of the study. The food items frequently consumed in the study were sugar, that was added to tea or porridge (129; 21.7%), steamed and pressed green cooking bananas (*matooke*) (59; 9.9%), fried dried red beans stew (*ebijanjaalo ebisiike*) (39; 6.6%) and mingled but not steamed maize flour meal (*posho/akawunga ka kasooli akatali kazeeko*) (36; 6.1%) (Table 6).

These are what commonly comprise the second and main eating occasion of the day as the main carbohydrate food and what is eaten with it, typically a legume stew or a fried

Table 5 Average time interval between eating occasions, average snack timing, average number of staples and sauces in meals and average degree of hunger and satiety

No.	Characteristic	Overall (N = 14)
1	Average interval time between meals (range)	4:41 (0:06–13:20)
2	Average time of the first snack of the day (range)	11:55 AM (10:30 AM–3:21 PM)
3	Average time of the second snack of the day (range)	4:10 PM (12:01 PM–7:03 PM)
4	Average time of the evening tea of the day (range)	7:02 PM (5:30 PM–9:00 PM)
5	Average number of staples at meals (range)	1.1 (1–3)
6	Average number of 'sauces' at meals (range)	1.1 (1–3)
7	Average reported degree of hunger before meals (range)	6.4 (1–10)
8	Average reported degree of satiety after meals (range)	7.7 (1–10)

Source: the author

Table 6 Food items commonly consumed–total frequency and average portion sizes

No.	Name of food item	Total (Freq)	Average portion size (g)
1	Sugar in tea or porridge – boiled	129 (21.7%)	25
2	Matooke – steamed and pressed	59 (9.9%)	450
3	Dried red beans stew – fried	39 (6.6%)	288
4	Maize flour meal – mingled	36 (6.1%)	417
5	Maize flour porridge – boiled	29 (4.9%)	478
6	Bread – baked, bought	28 (4.7%)	141
7	Cassava – deep-fried, bought	23 (3.9%)	166
Other foods		198 (33.3%)	
Total		594 (100%)	

Source: the author

Table 7 Percent contribution of foods to energy intake

No.	Name of food item	NW	OW	OB	Total
1	Dried red beans stew – fried	21.3	15.4	8.8	16.5
2	Matooke – steamed and pressed	15.5	9.6	21.3	15.2
3	Maize flour meal – mingled	9.4	7.6	2.0	7.0
4	Cassava – deep-fried, bought	3.9	6.9	7.6	5.7
5	Rice – boiled	3.6	9.3	2.7	5.0
6	Sugar – boiled	4.0	4.6	4.6	4.3
7	Bread – baked	2.8	3.0	4.1	3.2
8	Rice – fried	1.9	0.0	9.2	3.2
Other foods		37.6	43.6	39.8	39.9
		100	100	100	100

NW = Normal weight, OW = Overweight, OB = Obese.
Source: the author

vegetable (*emmere n'enva*). This would be the equivalent of lunch (*eky'emisana*), but as women hardly cook food and eat again in the late evening (*eky'eggulo*), replacing it with sugar-sweetened tea, this is the main eating occasion of the day where the most calories are consumed. Maize flour porridge (29 times, 4.9%), bread (28, 4.7%) and deep fried cassava (23, 3.9%) were also consumed fairly frequently. These are what typically constitute the first main eating occasion of the day, and often, the last main eating occasion of the day.

The average portion sizes of food items consumed at meals were relatively large, contributing significant amounts of dietary energy intake. For instance, the average portion size of sugar was 25 g corresponding to an energy intake value of 97 kcal. The average portion size of *matooke* was 450 g, or 603 kcal. The average portion size of beans stew was 288 g, or 806 kcal. The average portion size of *posho* was 417 g, or 838 kcal. The average portion size of maize flour porridge was 478 g, or 115 kcal. The average portion size of bread was 140 g, or 372 kcal. The average portion size of deep-fried cassava was 166 g, or 626 kcal.

The main food energy sources by percent contribution to energy intake were dried red beans stew (16.5%), steamed, pressed green cooking bananas (*matooke*) (15.2%), mingled but not steamed maize flour meal (*posho*) (7.0%), and deep fried cassava (5.7%) (Table 7).

Overall, the average number of calories consumed at the first main eating occasion was 663 (21.9%), the average number of calories at the second main eating occasion was 1,363 (46.6%), the average number of calories at the last main eating occasion of the day were 879 (28.7%). Overall, the most calories of the day were consumed at the second main eating occasion (Table 8).

IV. Time allocation, food access, and food consumption practices of the women

A key determinant of the food consumption practices was the chores a woman needed to accomplish, and the time it takes to prepare food. They usually made the first main eating occasion of the day after completing a few morning chores. After eating, they continued to engage in different chores particularly fetching water, washing clothes, washing utensils, mopping, and going to the shop or stall to acquire food for lunch. After this, they started to prepare the second main eating occasion. The preparation time of the first main eating occasion was short because it involves lighting the charcoal stove and boiling water for

Table 8 Energy intake at the different eating occasions of the day

Eating Occasion	NW (kcal)	OW (kcal)	OB (kcal)	Total (kcal)
Average energy intake at the first main eating occasion	620 (22.2%)	643 (21.1%)	792 (22.5%)	663 (21.9%)
Average energy intake at the second main eating occasion	1,292 (49.1%)	1,294 (42.9%)	1,624 (45.8%)	1,363 (46.6%)
Average energy intake at the third main eating occasion	704 (25.3%)	987 (32.5%)	1,142 (31.7%)	879 (28.7%)
Average energy intake at the first snack	53 (2.0%)	166 (6.1%)	—	91 (3.4%)
Average energy intake at the second snack	41 (1.6%)	—	—	41 (1.6%)
Average energy intake at evening tea	222 (8.4%)	222 (8.2%)	—	222 (8.3%)

NW = Normal weight, OW = Overweight, OB = Obese
Source: the author

the tea then drinking tea and eating something that was bought from the shop. However, the preparation time for the second main eating occasion was relatively longer because it involved cooking what the women described as 'actual food'. They continued with the rest of the chores as the food was cooking and ate much later on in the day.

The women's food consumption practices were also much influenced by availability and access as indicated by this one woman who says: "The food that was to be for supper was brought late and it arrived at home at 7:30 pm" (Ms. B, 18 years old, normal weight). And so, they ate supper at 10:16 pm on that day. On another day she said: "There was no food to eat for supper due to scarcity of money and insufficiency of money"—she took tea with 'escort' instead. Her energy intake on this day was 1,333 kcal—the lowest that week.

In addition, the consumption of snacks between the main meals was not usual for the women. About a day that she ate some things between her main meals, she commented that: "I rarely eat snacks but today has been unusual" (Ms. B, 18 years old, normal weight). On this day she had a banana snack, a cake snack, and porridge before her last main meal. Overall, the consumption of fresh fruits and vegetables was not common. These were costly and were a luxury that most people could not regularly afford.

Women liked to include a variety of food items in their diet as much as possible and they found it regrettable when they could not achieve that. For instance, this one woman says she usually prefers not to use the same sauce (*enva*), for lunch and supper but only did it that day because of insufficient funds (Ms. B, 18 years old, normal weight). Also, women preferred to eat *matooke*, which is synonymous with the word 'food' (*emmere*).

When the least preferred foods were the only ones available; women sometimes skipped the meal or took tea with 'escort' instead. For instance, one woman decided not to have supper because the only food she had available that day was cassava. She took tea with sugar instead (Mrs. K, 32 years old, overweight). Occasionally, they skipped a meal or took tea in the place of a meal, because they felt that they had eaten lunch late and they still felt satisfied (Mrs. H, 42 years old, overweight).

V. Perceptions on the ideal food consumption practices

As illustrated above, the women typically had two or three main eating occasions a

day. One in the morning and another in the late afternoon or evening. The morning eating occasion usually comprised tea (*chai*), or porridge (*obuugi*) with sugar and sometimes milk (*amatta*), and something to eat such as bread, a fried item such as deep-fried cassava (*muwogo omusiike*) (Figure 3), or food left over from the previous night (*amawolu*).

Tea was considered 'just water' unless it was taken with something to eat, also called 'escort' (*ekyokunywela ku chai*). Tea was not something that one took with the intention of getting satisfied; perhaps just to avoid having an empty stomach or to feel warm on a rainy day, but not to get satisfied in the truest sense of the word (*okukuta*). It was perceived to give a false sense of satiety, and sometimes to even increase the feeling of hunger.

The afternoon or late evening eating occasion was the most important eating occasion of the day as it comprised cooked food; a staple (*emmere*), which was usually *matooke*, a cereal, root or stem tuber crop, and a sauce (*enva*) which was a stew made from pulses,

Figure 3 Deep-fried cassava with avocado with a cup of sugar-sweetened black tea (top left), bread, margarine and sugar in cup (bottom left), and maize flour porridge (right).

Figure 4 Rice and beans (left), posho (top right–left) and beans with egg plants (top right–right), matooke, posho, and avocado (bottom right–left) with beef stew (bottom right–right).

legumes, nuts, meat, fish, or poultry, but could also be a vegetable (Figure 4).

Figure 5 shows the preparation process of matooke, the dominant choice for the staple food.

Figure 6 shows the preparation process of beans stew. The dominant choice of a sauce.

The afternoon/evening eating occasion was also the eating occasion that most family

Figure 5 Preparation of matooke: peeling (top left), covering in banana leaves (top right), pressing (bottom left) and serving (bottom right).

Figure 6 Preparation of beans: main ingredients—cooking oil, onion, tomato (top left), frying the ingredients (top right), adding boiled beans and soup (bottom left), adding salt and leaving to simmer on fire (bottom right).

members could be present for—the meal that they could all eat together. There were no specific times for having the morning, afternoon, or evening eating occasions, respectively. The women prepared food and ate when they finished their chores, when they were hungry and when the food became available.

There was large variety of options for the staple foods (*emmere*), but the commonly eaten foods were: green cooking bananas (*matooke*), maize flour meal (*posho*), rice (*omuceere*), sweet potatoes (*lumonde*), cassava (*muwogo*), and Irish potatoes (*obumonde obuzungu*), in decreasing order of frequency. This is further reflected in the comment of K243 who says: "We only have one type of food now that is always in the saucepan, rice, rice, and maybe *posho*" (K243, 37 years old, obese). Staples were thus the most consumed food group because they were a central component of every main eating occasion.

Although food items from the cereals and tubers food group were now commonly consumed, they were not the preferred food item for most people. *Matooke* was the most preferred food item to use as *emmere*. *Matooke* was preferred by most people because it has been the main staple for people in the Central region of Buganda for a very long time. Likewise, *posho* is not liked because it's a 'foreign' food that was not always part of the *Kiganda* food culture. As one 80 years old woman put it: "In our culture could we eat those things of *posho*? Those were just brought to us. How could one have eaten *posho*?" (K301, 80 years old, obese).

The food items commonly used as the sauce (*enva*) were dried red beans (*ebijanjaalo*), groundnut sauce (e*binyebwa*), green leafy vegetables (*nakati/bbuga/gobe*), cabbage (*emboga*), dried smoked fish (*ebyenyanja ebikalu*), silver cyprinid fish (*mukene*), and beef (*enyama*), in decreasing order of frequency. This *enva* was typically prepared by stir-frying onions and tomatoes in oil before adding the food item. Often, this took the form of vegetable oil, mostly from maize, palm, and sunflower; marketed as 'cooking oil', or animal fat extracts such as cow ghee (*omuzigo*), or pork lard. The major cooking oil brand names are '*Mukwano*', '*Bidco*' and '*Sun Seed*'. These oils were sold in budget packs of 25 ml, 50 ml and bigger ones of 500 ml and 1,000 ml. Usually, people bought the smaller budget packs of 25 ml and 50 ml, respectively. These were used all at once in one food preparation occasion.

Oils, fats, and sugars were thus the second commonly consumed food group. First because sugar was an indispensable component of the morning meal and, secondly, because oils and fats were an indispensable component in meal preparation—but not necessarily in large quantities as they were perceived as being quite costly and were a luxury since one might as well have tea without sugar or prepare a stew without frying it, if the main food items were available.

The desirable situation, as illustrated above, was to have at least three main eating occasions in a day. The morning meal (*ekyenkya*), the afternoon meal (*ekyemisana*), and the evening meal (*ekyeggulo*). Two of these meals were typically cooked food and one meal, usually the morning meal, consisted of tea and 'escort'. However, the most common behaviour was to have one main eating occasion of cooked food, and one or two eating occasions of tea and something to eat.

For many, this was managed by having one main eating occasion later in the day, as a composite of the afternoon and evening meals, at which large portion sizes of food were consumed, and taking some tea with something to eat earlier in the day and later in the day, if possible, to avoid feeling hungry. In the words of one woman "*mukibuga tulya lumu eky'emisana n'eky'eggulo*"— "In town (the urban area), we eat the afternoon meal and the evening meal at once (the same time)" (K140, 40 years old, overweight).

For many participants, this translated into eating a lot of bread and occasionally fried

foods, if they could afford it, while they waited for the food to get ready, or a few hours after the meal. These bread and fried foods were understood as eaten to keep off the hunger pangs while waiting for the main meal to be ready, and not as a main meal. Still, the women were usually extremely hungry by mealtime. One day one woman jokingly said: "*enjala ennumye nyo ndabika nyinza okulya essepiki yona obw'omu*"—"I am so hungry, it is possible that I will eat the whole saucepan of food by myself" (Maama N, 39 years old, obese).

To eat and get satisfied (*okukuta*), it was perceived as necessary for the women to cook food or acquire cooked food—as opposed to just eating bread or fried snacks with tea. They had to 'eat 'real' food' or 'actual' food (*okuliila ddala emmere*), and not just tea with snacks. Furthermore, having one main eating occasion in a day was characterised by cooking a lot of food, whenever possible, and serving equally large amounts of food on the plates at mealtimes. It was preferred that people ate their fill and leave some food for later, rather than to risk not having enough food at mealtimes.

In fact, it is said that traditionally in Buganda, and even today in some rural areas, it was the norm to prepare much larger amounts of food, than one's family was likely to need, so that there was enough food to cater also for visitors that might show up unannounced. The phrase '*jjangu tulye*'—was a classic invitation extended to people who happened to pass by when the family was having one of their main eating occasions. And it was expected that the invited person would honour the invitation.

This practice is almost non-existent in urban areas now, but still people prefer to prepare more food when possible than to prepare less. This leads to overall high amounts of food consumption, through large portion sizes at mealtimes, usually served on large dinner plates; and second servings or consumption of leftover foods.

For this same reason, women preferred to make their own food at home rather than to buy pre-prepared cooked food from restaurants, because the latter was more expensive and yet they got less food than they would have if they used the same amount of money to buy food and cooked at home for themselves. It was appreciated that even if some food was left over, it could be eaten later in the day when someone felt hungry again, in the case of lunch, or as part of breakfast the next day in the case of supper, or between meals. In fact, it was not uncommon to find people serving leftovers of the previous meal as part of the next meal. However, overnight leftovers i.e., *amawolu* were perceived as incapable of making one satisfied.

In addition, one was expected to eat and finish all the food on one's plate. It was common to find mothers urging their children to eat up all the food they had been served and 'not to waste the food'—'*okwonoona emmere*'. This habit programs most people from childhood against 'wasting food' and people will normally endeavour to eat up all the food that they have been served on the plate. Drinking water was preferably done after one had eaten one's fill, rather than before, because it gave a false sense of satiety and hindered one eating as much as one needed to.

Overall, eating a cooked meal at mealtime, eating food when one was hungry, sitting upright on a chair while eating—not with folded legs on a mat as was traditionally done in Buganda, mixing the *emmere* and *enva* in the same plate, eating one's preferred food are just some of the many factors that were understood to make sure that one enjoyed the eating experience and got satisfied by the food.

The Baganda traditionally ate in a fashion described as e*kijjulo*, where the whole family gathered at mealtime and sat around the served food and ate together from the same mound of food, each person dipping the staple in their own plate of soup/sauce. Emphasis was placed on folding one's legs properly and not leaning against the hand as good manners for

eating. This has gradually disappeared especially in urban areas.

Women said it was more difficult to eat more in this style because one was being watched by others and the sitting position was not comfortable enough to allow 'overeating'. Meanwhile, 'overeating' was perceived as bad, and most women did not consider themselves as those who 'overeat'—this was understood as having too many eating occasions and was not necessarily the same thing as having a lot of food at one eating occasion.

VI. Perceived drivers of food consumption practices

The most apparent reason for eating only one main eating occasion in a day was to cope with the challenges of acquiring food. In the words of one woman: "*Embeera kati weyatuuka mufumba lumu eky'emisana bwesigalawo n'emujilyako n'ekyeggulo*"—"Where now the situation has reached you only cook lunch and if there is some food left over you can have it for dinner" (K250, 49 years old, overweight). The habit of skipping meals therefore was an effort to intentionally reduce food intake and to guard against the risk of lacking something to eat.

Taking tea instead of a meal is described as 'punishing oneself'—'*okwelumya*' or 'sleeping hungry'—'*okusula enjala*', because such things could not satisfy a person. For instance, another woman said: "*Amazima go gali nti jjo twasuze njala ... twaguzeyo ebindazi netugabana netunywela ko ne chai*"—"The truth is yesterday we slept hungry .... We bought some donuts and shared and took them with some tea" (K262, 40 years old, overweight); And another woman said: "*Ffe tulya byona, eky'enkya, n'eky'emisana, n'eky'eggulo, tetwelumya*"—"For us we eat all the meals, breakfast, lunch, and supper. We do not punish ourselves" (K346, 29 years old, obese).

Similarly, the reason that rice and *posho* were commonly consumed was because of their affordability in comparison to *matooke*. Beans and groundnut sauce are the sauces that were frequently consumed by most people, although beef and fish were the most preferred food items to use as the sauce for the same reasons, that is, affordability: One woman said: "We mostly eat rice and *posho* because they are the affordable ones" (K342, 51 years old, obese).

Rice and *posho* were perceived as more affordable than *matooke*, because the amount obtainable per unit price could satisfactorily serve more people than *matooke*: Another woman clearly said: "If we eat *matooke* it costs more money" (K318, 27 years old, pregnant, not fat). In one 5 person household (Mrs. O) the average cost per edible portion size was 1,050 UGX (USD 0.3) per person when they ate matooke, compared to 638 UGX (USD 0.17) per person when they ate rice or even 140 UGX (USD 0.04) per person, when they ate *posho* respectively (Table 9).

The expenditure on food in this household ranged from 6,600 UGX (USD 1.63) per day when they ate boiled rice (not fried), boiled cabbage stew (not fried) and avocado; to 20,200 UGX (USD 5.39) per day, when they ate boiled *matooke*, *posho*, fried rice (fried with cooking oil, onions, and tomatoes), beef stew (boiled with onions, tomatoes, carrots, and green peppers) and even had some passion fruit juice. This is the most preferable situation of eating in the area,—one which includes various types of staples and sauces and fresh fruits and vegetables at the same eating occasion. However, it is unaffordable for most people, and is a preserve for Sundays and other celebratory days in most households.

People felt that they ate only out of obligation, when they could not eat the food items that they preferred, because other food items could not take away the feeling of hunger and make them truly satisfied. This is partly because it is difficult for someone to eat as much of the food as is necessary to become satisfied when they eat a kind of food that they do

Table 9 List of items consumed by a 5-person household (Mrs. O), by cost per portion

No.	Food item name	7-day average number of times eaten	Average cost per edible portion-uncooked (UGX)	SD	CV (%)	Average weight of edible portion-uncooked (g)	SD	CV (%)
Staples								
1	Matooke	4	1,050	383.4	36.5	507	159.5	31.5
2	Rice	5	638	157.1	24.6	151	50.9	33.8
3	Spaghetti	1	600			90		
4	Irish potatoes	2	367	57.7	15.7	258	44.6	17.3
5	Pumpkin	2	300	0.0	0.0	308	59.7	19.4
6	Posho	4	140	42.4	30.3	95	16.9	17.8
Sauces								
1	Beef	1	2,400			205		
2	Fish	3	1,100	200.0	18.2	83	10.9	13.2
3	Cowpeas	1	680			166		
4	Beans	1	560			111		
5	Groundnuts paste/powder	1	300			50		
6	Cabbage	3	140	49.0	35.0	112	62	55.1
7	Silver fish	2	100	0.0	0.0	7	0.1	2.0
Ingredients								
1	Tomatoes	7	58	20.8	35.5	28	13.5	47.5
2	Eggplants	3	50	27.6	55.1	30	19.6	65.1
3	Green pepper	4	40	26.2	65.5	7	3.8	53.2
4	Cooking oil	4	40	0.0	0.0	6	3.2	52.7
5	Onions	7	38	44.1	117.1	8	6.1	76.1
6	Garlic	2	33	11.5	34.6	1	0.2	33.3
7	Carrots	5	27	10.4	37.6	13	6.3	48.7
8	Royco	1	20			1		
9	Curry powder	1	20			1		
Teas and porridges								
1	Milk	1	200			109		
2	Maize flour porridge	2	80	0.0	0.0	27	0.4	1.5
Fresh fruits and vegetables								
1	Avocado	1	140			56		
2	Mizabibu-fruit	1	0 (gift)			70		

SD = Standard Deviation of Mean, CV = Coefficient of variance = SD/Mean
1 USD = 3,744.5 UGX at the time of the study
Source: the author

not like: One elderly woman clarifies this by saying: “I like *matooke*. I do not feel satisfied when I eat other things” (K301, 80 years old, obese).

Fruits and vegetables were recognised as good for one’s health, yet they were one of the

least consumed food groups. Many participants stated that it was difficult to get them in town (urban area). Another common understanding was that it was important to eat from all types of food sources—variety, but again the constraint was that of the 'town (urban) situation—'*embeera y'omukibuga*'. One woman said: "..... they say that not changing the diet is bad but what shall we do? It is the situation we are in; you eat even what you do not want to eat" (K299, 61 years old, normal weight).

The study site was considered as much of an urban area as the capital city, Kampala, and it appeared as a 'common understanding' that people in urban areas did not 'dig'—cultivate land or could not dig. According to one Ms. K305: "In Kampala we do not dig ..... even here is Kampala" (K305, 46 years old, normal weight). This was for reasons as explained by one Ms. K250, 49 years old, overweight, who used to live in Ngogwe, a nearby area, which is rural compared to Mukono. She said she had moved to Mukono 10 years ago 'when things got bad'—'*embeera bweyatabuka*'. Although, she said, she used to dig in Ngogwe, she said it was difficult to dig in Mukono. The reason was because they were 'renting'—'*tupangisa*' a small room from a landlord and had nowhere to dig. Like her, many other women reported that although they used to 'dig' before, 'they could not engage in food crop production anymore because they had nowhere to dig—'*tetulima, tetuyina wetulima*' (K140, 40 years old, overweight).

Even those who had managed to buy a piece of land in the study site still found it difficult to engage in food crop production because they were living in just a 'plot of land' as one K166 said: "*tetuyina wetulima tuli mu poloti*." Many people living here were tenants or migrants from other parts of the country who had bought land and settled here, thus had a limited amount of land which is not enough to grow food crops on, particularly the preferred food crop types i.e., *matooke*.

Consequently, and as represented in the above expressions, most people needed to acquire their food by buying it, which makes them susceptible to food insecurity from instability of access due to the high food prices and price fluctuations. As one woman said: "Food is very expensive these days" (K244, 57 years old, normal weight).

A plot of land in the study site could cost as much as 15 million shillings due to its proximity to the capital city and the presence of a major university and private schools. Many natives to the study site had therefore sold off most of their land such that they were also left with a *polooti* (small 'plot' of land). So even the landowners did not have much land left for growing food crops. Ms. K301, a landlord said: "We sold off the lands for agriculture a long time ago" (K301, 80 years old, obese). The transition from a rural area to an urban area was thus inevitably characterised by a change from subsistence farming as a main source of livelihood, to income-generating activities at home and away from home.

This means that for both landlords and tenants, the main way of accessing food was through purchase. Therefore, the daily food intake characteristics of the women varied greatly depending on the money available to them, and the prices of foods in the market. This meant that the food and by implication, the amount of dietary energy available to women on different days in a week, a month, a season, and year, varied greatly. In addition, the difficult circumstances encouraged the purchase of the more affordable energy dense carbohydrate foods, to meet their energy needs.

At the same time, there was a stigma and negative feelings towards eating greens and vegetables. In the rural areas where most of the women came from, vegetables, particularly a kind of local eggplant known as *entula*, were literally the only kind of *enva* available in most cases, although in limited amounts. So, they have become associated with 'struggle' and 'poor standards of living'. To illustrate this, one woman says: "We should eat greens but people like meat. If you tell them, it is necessary to eat some egg plants (*entula*) they

say, ... 'hey, leave me alone why should I eat egg plants? Do I not have money?'..... You need to mix up that is how they make a balanced diet when even the food you change it up a bit" (K53, 23 years old, overweight).

Furthermore, beyond triggering the coping strategies described above, the difficulties in accessing food, influenced perceptions about what foods were considered good or bad. For instance, although excessive use of oils and fats and the consumption of fried foods, sugars, meats, and raw salt was frequently mentioned as bad for one's health because they could make one sick, many people felt that they did not eat these frequently enough for them to make them sick.

Also, since the consumption of sugars and fried foods was perceived as a 'pleasurable experience', synonymous with finally being able to live a good life, the idea of avoiding them when they became available was almost inconceivable as illustrated by one K50: "Sugar, if it is available, how can I not add it to my tea? ..... Cooking oil, who can leave cooking oil? ..... If a man does not buy cooking oil can't the woman run away saying: 'who can be made to eat boiled (not-fried) food?"—"*ani gw'oliisa boilo?*" (K50, 51 years old, overweight). The same applied to the eating of vegetables as it was considered 'eating badly' and for those who did not have money; unless they were 'fried well' (K87, 39 years old, normal weight).

The knowledge on the health risks of the excessive consumption of sugars, fats and meats, and the benefits of eating vegetables, was therefore not sufficient to dissuade one from a risky diet lifestyle. On the other hand, the long standing food habits that people are introduced to in their childhood seem to present a great opportunity for cultivating healthier lifestyles throughout the life course. As one participant put it: "*Nze ndya nga bwe na kuzibwa, sifaayo oba gwe ogamba kibi*"—"For me I eat as I was raised to, I do not care if you say it is bad" (Ms. NG, 50 years old, normal weight). People eat what they must eat to survive, but when they have a choice, they naturally tend to either eat more of the things they didn't have access to in the past, or as they have always eaten since childhood.

There were other circumstances that could lead a household to have less than the ideal number of eating occasions per day. One of these was if no one else was at home during the day. This was particularly true for women who stayed at home while the children went to school and the husband went to work. The main reason for this was that they felt it was too much trouble to prepare a meal just for one person. Even those who worked sometimes found themselves being too pre-occupied with work to cook especially if they were alone. Skipping meals was also done to avoid wastage of food if the previous meal was eaten late. In other instances, it was a matter of personal preference for reasons such as to avoid the uncomfortable feeling of going to bed while feeling too satisfied, while still, others adopted it as a strategy to reduce their body size.

Discussion

Pot et al. (2016) suggested that "eating meals irregularly is associated with a higher risk of the metabolic syndrome and cardiometabolic risk factors, including BMI ...." Moreover, existing evidence from other countries shows that skipping the morning meal or having it late, having a late lunch, and a late dinner, in particular, have been associated with obesity and being overweight, in Spain (Lopez-Minguez et al. 2019), Sweden (Berg et al. 2009), and Japan (Kutsuma et al. 2014). From the case of China, the US, and the UK, Xiao et al. (2019) also point to a negative relationship between obesity and a high proportion of energy intake at the first meal, and a positive relationship between obesity and a high proportion

of daily energy intake at the last meal later in the day. The limited number, later timing, and irregularity of eating occasions as well as of the consumption of a larger amount of energy later in the day, by the women in urban Uganda is therefore likely associated with the observed prevalence of obesity.

In addition, cycles of food restriction or deprivation have been shown to potentially lead to metabolic changes that promote fat storage (Bove & Olson 2006; Laraia et al. 2015) in women in the US. This means that the ups and downs in the daily energy intake of women also potentially triggers a metabolic response in them that favors fat storage. Existing research further asserts that those who eat less or skip meals to stretch food budgets may overeat when food becomes available, resulting in chronic ups and downs in food intake that can contribute to weight gain (Olson et al. 2007; Dammann & Smith 2010; Bruening et al. 2012), in the US. Owing to strong feelings of hunger after going for an extended period without food because of constrained access and because of prioritizing the accomplishment of some chores, women consumed large portion sizes at mealtime, which implied a high amount of energy intake. The role of portion size in increasing the amount of energy intake from food has been documented (Benton 2015; Steenhuis & Poelman 2017).

Furthermore, this pattern particularly manifested in a net positive energy balance value for 12 of the 14 women compared to the 2,021 kcal/day requirement of Ugandan women by FAO (2010), (six of seven normal, three of four overweight, and three of three obese women). Energy intake of more than the energy requirement is a well-known risk factor for obesity in review studies (Hruby & Hu 2015; Hruby et al. 2016). Particularly noteworthy is the fact that most energy intake from food did not yet come from energy dense-nutrient-poor-low-fiber-fried fast foods and sugar-sweetened beverages as is often documented among other groups, such as in reviews by Saklayen (2018) and Popkin et al. (2012), but mostly from large portion sizes of the daily staples of beans, *matooke* and *posho*, that made up the women's main meals.

Women waited to feel hungry before eating because they needed to do other chores, because it took a lot of time to make a proper meal, and because of the difficulties in acquiring food. Additionally, perceptions of ideal food consumption practices, and of the drivers of food consumption practices, were influenced by long-standing habits and attitudes in the individual homes and communities where they were brought up, and by the women's past and present experiences of instability in food availability and access. This was in turn associated with the women's inability to grow their own food owing to the living circumstances of the urban area i.e., limited land and space.

Conclusion

This study aimed to clarify the how food consumption practices are indicated in the obesity of women in urban Uganda. The food consumption practices of the women were characterized by a limited number of eating occasions, the timings of the meals were characteristically later in the day and that both the meal number and timing varied from day to day, as did the energy intake from food. Women normally waited to feel hungry, before contemplating food acquisition and preparation, and food preparation was done later in the day. This was related to both their need to accomplish several other domestic and income generating activities in the morning time, as well as to the constrained food access characteristics.

These practices in turn translated in a high net amount of average daily energy intake which exceeded the typical energy requirements of urban Ugandan women. This is known

to be associated with obesity. Notably, the majority of the energy intake of the women came from consuming large portion sizes of the typical food items used as "*emmere* (staple food)" —main carbohydrate foods usually cooking bananas, tubers, or cereals, and "*enva* (sauce)" —whatever is eaten with the main carbohydrate food usually legume or vegetable, and not yet from energy-dense nutrient-poor fried fast-food items as is normally documented elsewhere.

To facilitate moderate net daily energy intake from food and manage the emerging obesity epidemic among women in urban Uganda therefore, it is recommended that the factors that cause fluctuations in the timing and quantity of food consumption of women—namely constrained food access, be addressed. In addition, experiences of food access over the life course, and the habits that people learn as children are key. Also, the fact that most energy is still coming from staples and predominantly nutrient-rich sauces, and not yet from nutrient-poor energy-dense fried fast foods or ultra-processed foods is one that is worth consolidating.

Ethical Considerations The study was approved by the Makerere University School of Public Health, Higher Degrees Research Ethics Committee (HDREC 408) and the Uganda National Council of Science and Technology (HS 2057). With the two approval letters, permission was obtained from the local authority, that was the Local Council Chairpersons of the study Villages. The research study was introduced to the participants, based on the approved consent form, detailing their importance to the research and their freedom to withdraw at any point during the study, or even to decline to participate in some aspects of the study. Confidentiality was maintained by carefully keeping the field notes and interview data in a secure location and refraining from disclosing the participants' identities. Anonymity was attained by using different name and location identifiers in lieu of the participants' real names and location.

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