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**Contribution of street food to dietary intake of habitual urban consumers: a cross-sectional study in Kampala city, Uganda
Sseguya, W., Matovu, N., Swann, J. and Draper, A.**

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Nutrition and Health

Contribution of street food to dietary intake of habitual urban consumers: A cross-sectional study in Kampala city, Uganda

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Keywords:	Street food, Diet, Meal, Nutrient, Urban, Uganda
Abstract:	<p>Background: Street food has continued to be a more popular food source in urban settings of developing countries and proving a vital urban dietary source. However, its dietary contribution among patronising urban populations is yet to be comprehensively understood.</p> <p>Aim: To assess how street food contributes to dietary intake of habitual street food consumers.</p> <p>Methods: We conducted a community-based cross-sectional study among habitual street food consumers in Kampala city. We defined habitual intake as consumption of a serving of any street food for ≥ 2 days/week regardless of the food group and number of times consumed in a particular day. Questionnaires were used to capture quantitative data on sociodemographic characteristics, anthropometry, 24-hour diet intake and 2-month street food consumption frequency. The Nutritics® diet analysis software version 4.3 and STATA version 13.0 were used for nutrient and statistical analyses respectively.</p> <p>Results: Street food contributed considerably to daily intake of fat (49.1%), sodium (38.4%) and calcium (36.5%) and least towards daily intake of vitamin A (11.3%). Majority of consumers opted for street food at breakfast (50%) whereas lunch and snacks featured the least for overall street food inclusions (all 20%). Overall, men demonstrated more dietary intake and inclusion at meals from street food than women.</p> <p>Conclusion: This study indicates significant contribution of street foods for urban consumers but with men derive more benefit than women in terms of nutrient intake and inclusion in meals from street food.</p>

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3 **Contribution of street food to dietary intake of habitual urban consumers:**
4 **A cross-sectional study in Kampala city, Uganda.**
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6 3 **Abstract**

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51 23 street foods.

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54 24 **Keywords:** street food, diet, meal, urban, Uganda

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1 Introduction

2 Street food vending has been a feature of urban contexts. It is estimated that 2.5 billion
3 people globally consume them (Cardoso et al., 2014). Street food has gone beyond being
4 considered a signal of deprivation and a phenomenon for developing countries. It has become
5 a key form of nourishment and economic prosperity by offering affordable food and a means
6 of income-generation, especially in low-income countries (Draper, 1996; Tinker, 1997;
7 Cardoso et al., 2014). Given the current rate of urbanisation that is being experienced world
8 over (UNDESA, 2014), street food may continue being an embraced part of the food system.
9 Street food entails ready-to-eat foods and beverages sold and sometimes prepared in public
10 places, such as along urban streets, roadsides, and busy squares (FAO, 1989). In Uganda just
11 like many low-income countries, street food vending has become a very common practice in
12 urban areas, with street-vended foods comprising different kinds of meat, cereals, legumes,
13 fruits, vegetables, roots, tubers and beverages that are prepared and delivered in various
14 forms (Draper, 1996; Tinker, 1997; Namugumya and Muyanja, 2011; Hiamey et al., 2013).
15 The nutritional quality of street-vended foods also varies considerably from one street food
16 group to another and this further generally influences their respective purchase prices
17 (Mwangi et al., 2002). For the majority of urban Ugandans, these foods form an integral part
18 of their diets. Street food is considered relatively inexpensive and a more convenient food
19 option that counters the relatively high costs of living and busy work environments associated
20 with urban settings (Steyn et al., 2011). The patronisation of street food has not only been for
21 reasons of economic affordability and convenience, its appealing taste too has turned out to
22 be an important attracting aspect (Draper, 1996; Steyn et al., 2011). The other is the nutrition
23 value, whose role in addressing urban nutrition security challenges has been well documented
24 (FAO, 1991; Draper, 1996; Tinker, 1997; Steyn et al., 2013). However, nutrition value is still
25 not considered an important aspect for majority of consumers while making street food
26 choices (Hiamey et al., 2013).

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3 1 The energy and macro-nutrient contribution of street food among consumers has been well
4
5 2 reported in various studies, but with variation by location. For instance, from previous
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7 3 research, we find that geographic variations in energy contribution of street food have been
8
9 4 identified, ranging from 13 – 36% in East Africa (Namugumya and Muyanja, 2011; Van't
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11 5 Riet et al., 2002) and from 46-48.3% in West Africa (Oguntona et al., 1998; Becquey and
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13 6 Martin-Prevel, 2010). Street foods contributed more energy towards men's diets than
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15 7 women's in studies where such variations were assessed (Van 't Riet et al., 2001). Majority
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17 8 of studies have highlighted that street food contribution towards carbohydrate seems highest,
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19 9 ranging from 54-93.4% (Namugumya and Muyanja, 2011; Oguntona et al., 1998; Becquey
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21 10 and Martin-Prevel, 2010); and between 21.9-52% towards fat. There is still dearth of data in
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23 11 Uganda and Africa regarding the micronutrient contribution of street food especially among
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25 12 habitual consumers, which leaves unknown potential risk for nutrient deficiencies or excesses
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27 13 that may be associated with existing trends of street food choices. Notably, habituality in
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29 14 street food consumption may also hinder consumption of foods from diverse sources, limiting
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31 15 intake of certain nutrients in this particular population segment. Additionally, most of the
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33 16 studies reporting dietary contribution of street food within the region were done more than
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35 17 half a decade ago, yet there has been continuing drastic innovations in street food preparation
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37 18 and trends influencing consumption over the years especially among urbanites. In this study
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39 19 therefore, we set out to analyse the overall diet composition, and nutrient contribution of
40
41 20 street food for habitual street food consumers in Kampala city. We also sought to understand
42
43 21 gender-related differences in street food consumption and contribution to dietary intake.

22 **Methods**

23 **Study setting:**

24 The study was conducted in Kampala, the biggest city and capital of Uganda, with a
25 population of more than 1.5 million people (Uganda Bureau of Statistics, 2014). Data were

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3 1 collected in May and June 2017 from the five administrative city divisions namely, Kampala
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5 2 central, Kawempe, Lubaga, Makindye and Nakawa. Major economic activities in Kampala
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7 3 are employment income and small- and large-scale trading, all of which account for more
8
9 4 than 80% of the working population (Uganda Bureau of Statistics, 2002).

5 **Study design and population:**

6 This was a descriptive cross-sectional study that employed quantitative methods of data
7
8 7 collection and analysis. The study population were street food consumers aged 18 years and
9
10 8 above, residing and or working in the five administrative divisions of Kampala capital city in
11
12 9 May and June 2017. Habitual consumption was defined as consumption of a serving of any
13
14 10 street food, for two (2) or more days a week regardless of the food group and the number of
15
16 11 times consumed in a particular day.

12 **Eligibility**

13 Habitual street food consumers aged 18 years and over who had been residing and /or
14
15 14 working within the five city divisions for at least two months prior to the study were
16
17 15 included. All individuals who met the inclusion criteria but declined signing the informed
18
19 16 consent, were operating at more than one station during daytime, were street food vendors,
20
21 17 were having physical, auditory or speech disability were excluded.

18 **Sample size and sampling procedure:**

19 The sample size was calculated using Kish's formula for cross sectional studies (Kish, 1965).
20
21 20 Assuming a standard normal value corresponding to the 95% confidence interval, a margin of
22
23 21 error of 5%, and an estimated proportion of habitual food consumers of 12.0% (in a rather
24
25 22 similar setting of Free town, South Africa) (Steyn et al., 2011) yielded a calculated sample
26
27 23 size of 163 respondents.

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3 1 We purposively identified two major trading centres in each division of Kampala, totalling up
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5 2 to 10 major trading centres. Individuals residing or working within half-mile radius of each
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7 3 selected trading centre meeting the inclusion criteria formed the sampling frame, from which
8
9 4 the final sample was randomly selected. Parking stations were used to select riders and taxi
10
11 5 operators, residential houses to select individuals at home, business buildings to select
12
13 6 traders, and working spaces to select manual labourers. Only individuals who self-reported
14
15 7 eating street food at least two days in a typical week on first contact were listed on the
16
17 8 sampling frame. The interviews were conducted from space of homes and work places
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19 9 deemed comfortable by participants. All divisions in Kampala contributed an almost equal
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21 10 number of respondents (approximately 32 respondents from each division).
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26 11 **Data collection:**

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29 12 Interviewer-led pretested semi-structured questionnaires were used to collect information
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31 13 from respondents. Two nutritionists, previously trained on the study and data collection tools,
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33 14 led the interviews in supervision of the first author. The questionnaires had been translated
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35 15 into the commonly used language 'Luganda' prior to data collection to ensure that similar
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37 16 questions were asked without alteration in meaning, which consequently reduced on
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39 17 interviewer bias. The questionnaires collected information on sociodemographic
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41 18 characteristics, dietary intake, food consumption frequency, and anthropometric data.
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46 19 **Study Variables and their measurements:**

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49 20 Sociodemographic characteristics of participants that were captured by the interviewer-led
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51 21 questionnaire included; age, marital status, religion, education, socioeconomic status,
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53 22 monthly income.

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56 23 Weight and height were recorded from which body mass index (BMI) was computed. These
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58 24 were measured using a Seca[®] scale and a standardised height meter tape respectively with
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1 participants in light clothing and shoes off while following steps in the anthropometric
2 procedure manual (CDC National Center for Health Statistics, 2007). The measurements
3 were respectively repeated for each participant and the average taken. The weight was
4 recorded to the nearest 0.1kg while the height was recorded to the nearest 0.1cm. BMI was
5 then computed for each participant in kg/m².

6 Dietary intake was assessed using a single 24-hour diet intake recall questionnaire, which
7 captured data on foods and beverages consumed by the participants in the previous day
8 (between midnight and midnight). To allow for maximum recall and improved accuracy of
9 intake estimates among participants, the 5-step multiple-pass approach (Robertson et al.,
10 2005) and a copy of 'food album' ([supplementary material](#)) were incorporated into the
11 interview procedure. This study specifically focused on assessing dietary intake of the
12 following nutrients: protein, carbohydrates, total fat, saturated fat, fibre, calcium, sodium,
13 vitamin A, folate, vitamin C, and iron.

14 A 2-month semi-quantitative food frequency questionnaire (FFQ) was used to assess the
15 frequency and portions of street food consumption, which information was also used to
16 validate analyses from the 24-hour recall thus reflecting usual intake. Participants were
17 required to recall within the previous two months, the number of times each food listed in the
18 FFQ was usually consumed, indicating the approximate portions (thereafter converted to
19 grams) eaten at each specified time.

20 *Statistical analysis*

21 Dietary intake data from the 24-hour recall questionnaire of each participant was entered into
22 the Nutritics[®] software version 4.3 (Dublin, Ireland) to obtain individual energy and nutrient
23 values. The analysis was made for total energy, protein, fat, carbohydrate, fibre, calcium,
24 sodium, vitamin A, vitamin C, folate, and iron. These were selected owing to their public
25 health importance regarding major deficiency concerns and epidemiological links to chronic

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3 1 diseases in adult populations (IFPRI, 2014). Food composition tables for Uganda HarvestPlus
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5 2 (Hotz et al., 2012), and Tanzania (Lukmanji et al., 2008) were used to add the missing food
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7 3 items and recipes to the *Nutritics* software. Analyses for the different nutrients were
8
9 4 expressed as percentage energy (%E) and grams (g) for the macronutrients as appropriate,
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11 5 and as milligrams (mg) and micrograms (μg) for the micronutrients. Nutrient values for all
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13 6 participants were later transferred to STATA version 13.0 (Collage Station, TX, USA) and
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15 7 merged with the existing variables from the sociodemographic and anthropometric
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17 8 characteristics.

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21 9 To obtain proportions of individuals that included street foods at different meal occasions, we
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23 10 employed a scoring approach using MS[®] Excel (version 2016). An individual was to be
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25 11 assigned a score of either 1 or 0 for each meal occasion (breakfast, lunch, supper and snack)
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27 12 depending on whether he/she included any street food or not, that is, for every meal occasion
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29 13 where a street food was reported to be consumed, a score of 1 was assigned, and a score of
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31 14 0/zero where street food was not consumed. For instance, if an individual included any kind
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33 15 of street food for breakfast, he/she would earn a score of 1 for breakfast, and if street food
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35 16 was not included, he/she would earn a score of zero for breakfast. The same would apply for
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37 17 Lunch, supper and snack. Every meal occasion was scored independently for each
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39 18 participant. Participants who missed a meal occasion were excluded from this analysis as
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41 19 scoring could only be done for a fulfilled meal occasion. Gender-based proportions were
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43 20 derived based on the total number male and female participants as a denominator.

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49 21 Sociodemographic characteristics were presented as means and standard deviation for
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51 22 continuous variables, and as percentages for categorical variables. All outputs from the
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53 23 analyses were further stratified by gender.
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1 **Results**

2 Data from 160 habitual street food consumers (40% men and 60% women) were analysed,
3 leaving the three (03) who had incomplete data on key variables. The characteristics of the
4 study population disaggregated by gender are summarised in **Table 1**. The mean age of the
5 participants was 29.6 years (SD: 11.5 years) with no significant difference between men and
6 women. Women had a significantly higher mean BMI compared to men (26.1 vs. 23.2;
7 $p<0.001$). Gender was also associated with marital status ($p=0.028$), employment ($p<0.001$),
8 individual income ($p=0.004$), and street food consumption frequency ($p=0.044$), whereas
9 majority of men were single, manual labourers, earned more and had a higher street food
10 consumption compared to women.

11 **Street food contribution towards the daily nutrient intake of habitual consumers**

12 The nutrient contribution of street foods towards total daily intakes is presented in **Table 2**.
13 Overall, for macronutrients, highest contribution was to fat intakes (49.1%) and lowest to
14 carbohydrate intakes (25.6%). Only 30% of overall daily energy intake came from street
15 food. For daily micronutrient intakes, the highest contribution was to sodium (38.4%) and
16 calcium (36.5%), contributing more than a third of daily intake. Vitamin A (11.3%) and
17 vitamin C (24.1%) on the other hand recorded less than a quarter of daily intake contribution.
18 The amount of all nutrients obtained from street foods was significantly higher in men than
19 women, and so were percent nutrient contributions from street food across all nutrients. Street
20 food contribution across all nutrients ranged from 27.9% - 52.1% in men and 4.6% - 38.4% in
21 women. In men, the contribution of street food towards the diet was highest for fat (52.1%),
22 sodium (50.8%) and calcium (50.6%), whereby slightly over a half of the total dietary intake
23 of these nutrients was derived from street food. On the other hand, in women, street food
24 contribution towards the diet was similarly highest for fat (38.4%), sodium (27.7%) and
25 calcium (23.2%).

1 **Proportion of participants including street foods at various meal occasions**

2 Regarding how street food featured in the different meal occasions as shown in Figure 1,
3 majority of participants opted to include street food at breakfast (50%), whereas lunch and
4 snacks featured the least overall street food inclusions from participants (all 20%). Men had a
5 higher proportion of street food inclusion than women for all meal occasions.

6 **Discussion**

7 **Contribution to daily energy and micronutrient intake from street food**

8 This study set out to assess the contribution of street food to the diets of habitual street food
9 consumers. Street food contributes a substantial amount of energy (30.1%) towards the daily
10 intake of habitual consumers. Compared with 22.4%-25.6% energy intake reported among
11 street food vendors in central and eastern urban regions of Uganda (Namugumya and
12 Muyanja, 2011), these findings may imply that urban habitual street food consumers have
13 higher intakes of energy from street foods than street food vendors. Noteworthy in this
14 population segment is the significant variation between men and women regarding street food
15 energy contribution, with men recording about twice as much as women (41.6% vs 19.9%
16 respectively). Similar findings were reported by Van't Riet, et al (2002) in Kenya, and
17 Oguntona, et al (1998) in Nigeria, who also found higher energy intake in men than women,
18 although figurative differences were reported (26-35.4% vs 16.7-22.1% in Kenya and 50.3%
19 vs 48.3% in Nigeria). The energy intake figure observed in this study may be attributed to the
20 high fat intake from street food that tends to be influenced by high demand for appealing
21 deep-fried foods (Steyn et al., 2011). The recorded near half (49.1%) of the total fat intake
22 from street food in this study shows fat to have been the main energy contributor compared to
23 protein (29.7%) and carbohydrate (25.6%). The higher fat intake from street food recorded in
24 men than women may also be attributed to the high consumption frequency of street foods
25 observed among men than women in the current study. Similar results where street food

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3 1 contributed more to fat than any other macronutrient have been reported in Kenya (Van't Riet
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5 2 et al., 2002) and Burkina Faso (Becquey and Martin-Prevel, 2010) but not in Nigeria
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7 3 (Oguntona et al., 1998). These studies still reported higher intakes among men than women.
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9 4 The fact that in the present study only habitual consumers and all participants from various
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11 5 circles of employment were considered unlike the studies in Kenya, Burkina Faso and
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13 6 Nigeria, could explain the observed figurative variations. But still, it is worthy to note that
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15 7 energy and macronutrient intake among street food consumers in Uganda is similar to other
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17 8 African countries. High energy intake is a risk for overweight and obesity (World Health
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19 9 Organization, 2014). Whereas the energy contribution from street foods with this status quo
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21 10 may appear safe, caution needs to be exercised regarding the choices of the energy sources
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23 11 especially fat, which has been shown to be a dietary risk factor for non-communicable
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25 12 diseases (World Health Organization, 2014). In this regard, men ought to exercise more
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27 13 caution on energy intake from street food, because a substantial contribution was recorded
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29 14 from street foods.

15 **Contribution to daily micronutrient intake from street food**

16 The six micronutrients we focused on were, calcium, sodium, iron, vitamin A, vitamin C and
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18 17 folate. Street food proved a considerable source of dietary sodium and calcium but low
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20 18 vitamin A. More than a third of dietary sodium and calcium for this population segment of
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22 19 consumers comes from street food. There is dearth of information on micronutrient
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24 20 contribution of street food in Africa, thus providing just a few studies to compare, most of
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26 21 which are based on reference intake values. Studies on sodium and folate intake among street
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28 22 food consumers in Africa are still scanty and barely conducted among adults. However,
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30 23 studies that have assessed calcium, vitamin A, vitamin C and iron have reported varying
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32 24 figures. For example, Oguntona et al (1998) reported 46.2% for calcium, 35.2% for iron,
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34 25 55.3% for vitamin A, 57.3% for vitamin C among adults in Nigeria, all of which are higher
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3 1 than those reported in the current study. Moreover, higher intake of these micronutrients in
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5 2 the latter were recorded in women than men (Oguntona et al., 1998). Contrariwise, in
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7 3 neighbouring Kenya (Van't Riet et al., 2002), among iron, calcium and vitamin A that were
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9 4 assessed, all but vitamin A were reportedly lower than observed in this study. Moreover, a
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11 5 similar finding of men having a higher micronutrient intake from street food than women was
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13 6 reported by the same study as was observed in this current study. This variation may indicate
14
15 7 that street food consumers within east Africa may differ from their West African counterparts
16
17 8 in regard to their street food choices. This could be due to differing cultural and geographical
18
19 9 influence on kind of street foods available and population choices that may be associated with
20
21 10 the two regions. Women in this street food consuming population also have very low intake
22
23 11 of vitamin and mineral sources from street food. This may be due to having limited access
24
25 12 and affordability of these foods because of their cultural confinement in homes and the
26
27 13 relatively high cost associated with such foods (Sasson, 2012; Mwangi et al., 2002).
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29 14 Therefore, micronutrient deficiencies may likely occur among habitual street food consumers
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31 15 especially women if additional dietary sources do not provide adequate micronutrients to
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33 16 compensate for the low intake from street food
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40 **Street food inclusion in daily meals**

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43 18 Street foods among this habitual consuming population are popularly included at breakfast
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45 19 compared to other meals. Similar findings have been reported by Nago et al (2010) who
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47 20 found high consumption of street food at breakfast among school-going children in Benin
48
49 21 (Nago et al., 2010). This may be attributed to the limited time available to prepare or settle
50
51 22 for home-made breakfast meals vis-a-vis typical morning work rush associated with urban
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53 23 dwellers that drives them to opt for more convenient ready-made street foods (Johnson and
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55 24 Yawson, 2000). Most foods consumed as or accompanying a breakfast beverage can take
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57 25 considerable time and cost to prepare especially for a small portion, which will normally go
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3 1 above the cost off the street or the time it takes to have it on the street (Osei Mensah et al.,
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5 2 2013). Foods observed to be commonly included in breakfast were chapatti, mandazi,
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7 3 Ugandan pancakes, deep fried cassava, rolex (chapatti roll), katogo (mixed combination of
8
9 4 matooke and sauce). The big proportion of unmarried men in our study may explain the
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11 5 observed high inclusion of street foods in most meals among men than women. Food
12
13 6 preparation is a role that is attached to women in the cultural confines of Uganda, and
14
15 7 therefore men who are not married will opt for out of home sources of food/meals. Majority
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17 8 of foods observed from reported intake for breakfast are oil-rich (deep fried casaava, sweet
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19 9 potatoes, chapattis, mandazi, samosas,), and this may explain the high contribution of fat
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21 10 from street foods. Men who in this population are seen to have a relatively higher street food
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23 11 intake at breakfast than women stand risk for excess fat intake should the observed trend of
24
25 12 street food patronisation carry on. Moreover, the likelihood of underreporting of fat intake
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27 13 among participants that is commonly reported (Macdiarmid and Blundell, 1998) may mean
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29 14 the value indicated in our study is likely lower than the actual value. This could imply that
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31 15 more fat may likely have been consumed than reported pointing to a bigger threat than our
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33 16 study may have indicated.
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40 **Strengths and limitations**

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43 18 One of the key strengths of this study is that it incorporates gender-based analysis of street
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45 19 food contributions to the daily diets of habitual consumers in regard to both macro and micro
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47 20 nutrients, which has not been well studied in the region. Studies that incorporated gender-
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49 21 based comparisons have mainly focused on macronutrient differences. Additionally, we
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51 22 present results from a habitual street food consuming population given that our urban settings
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53 23 are increasingly adopting street food as a major and accessible food source, which we believe
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55 24 could impact nutritional status. However, our study is limited by the fact that it was based on
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57 25 individual intake recall that may not reflect actual intake. Whereas we believe that analysis of
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1 saturated fat would add more strength to our study findings, this was limited by failure of
2 study participants to discern and report on kinds of fat/oil consumed as these were not be
3 provided for by vendors. The fact that there may be variation of street food types across the
4 different parts of the country and across different countries could limit generalisation of our
5 findings to a broader population. Furthermore, whereas food tables that we used had most of
6 the common foods and recipes used within Uganda, we cannot rule out food vendors that may
7 have employed recipes which may be slightly different from the documented. Nonetheless,
8 our findings highlight public health nutritional implications relating to an apparent urban
9 nutrition transition indicative of habituality in street food consumption.

10 **Conclusion**

11 Street food offers considerable nutrition benefits towards the diet of habitual consumers,
12 although these benefits are much more enjoyed among men than women. There is however
13 concern regarding low dietary supply of micronutrients from street food choices of this
14 habitual consuming urban population. Without inclusion of micronutrient-rich foods from
15 other diet sources, this population can stand a micronutrient deficiency risk should future
16 patronising of street food exceed what we observed in our study period. It is therefore
17 important that this population, particularly the physiologically at-risk women to constantly
18 include adequate amounts of food rich in iron, folate, calcium and vitamin A in their daily
19 homemade meals or any other sources to boost their intake. Otherwise the micronutrient
20 profile of street foods needs to be enhanced, which can be through promoting use of
21 micronutrient-fortified ingredients in street food preparation. Men on the other hand need
22 caution on fat and salt intake, since a substantial portion comes from their street food choices.

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5 article.

6 **Availability of data and materials**

7 Datasets generated and analysed during the study are not publicly available due to terms of
8 participant consent but are available in anonymised form from the corresponding author on
9 reasonable request. Supplementary visual material used in diet assessment associated with
10 this article can be found at <https://1drv.ms/p/s!AuEGGCK-vzsSs3zpnw5B5LpbAl8d>

11 **Conflict of interest**

12 None

13 **Authors' contributions**

14 W.S, J.S. and A.D. contributed in formulating the research question and designing the study.

15 W.S. and N.M. contributed in carrying out the study and analysing the data. W.S, J.S, A.D.

16 and N.M. contributed in writing and reviewing the final manuscript.

17 **Consent for publication**

18 Not applicable

19 **Ethical approval**

20 This study was conducted in accordance with guidelines laid down in the Declaration of
21 Helsinki and all procedures involving research study participants were approved by the
22 University of Westminster research ethics committee [ETH1617-1153], and in Uganda by St.
23 Francis Hospital Nsambya REC [UG-REC-020]. Written informed consent was obtained
24 from all participants.

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For Peer Review

Table 1: Sociodemographic, Anthropometric, Street Food Consumption Characteristics of Study Participants

Parameter	Overall	Men	Women	P value
No. (n%)	160 (100%)	64 (40.0)	96 (60.0)	
Age (mean ± SD)	29.6 ± 11.5	28.9 ± 9.9	30.1 ± 12.5	0.785
BMI (mean ± SD)	24.9 ± 4.8	23.2 ± 3.0	26.1 ± 5.3	<0.001*
Marital Status, n (%)				0.028*
Married	68 (42.50)	40.63	43.75	
Single	62 (38.75)	50.00	31.25	
Widowed	10 (6.25)	1.56	9.38	
Divorced/separated	20 (12.50)	7.81	15.63	
Education level, n (%)				0.435
No formal education	8 (5.00)	3.13	6.25	
Primary	53 (33.13)	29.69	35.42	
Secondary	87 (54.38)	56.25	53.13	
Tertiary	12 (7.50)	10.94	5.21	
Socioeconomic status (SES), n (%)				0.123
Highest category (2 nd quantile)	48 (30.00)	35.94	26.04	
Lower category (1 st quantile)	112 (70.00)	64.06	73.96	
Employment category, n (%)				<0.001*
Transport	5 (3.13)	7.81	0.00	
Sales	47 (29.38)	15.63	38.54	
Manual Labour	51 (31.87)	53.13	17.71	
Unemployed	49 (30.63)	17.19	39.58	
Office-based	8 (5.00)	6.25	4.17	
Individual Monthly income, n (%)				0.004*
Less than \$60	90 (56.25)	40.63	66.67	
Between \$60 – \$120	39 (24.38)	32.81	18.75	
Between \$120.1 – \$180	15 (9.38)	9.38	9.38	
More than \$180	16 (10.00)	17.19	5.21	
Frequency of street food, n (%)				0.044*
High (5 or more times a week)	102 (63.75)	73.44	57.29	
Low (2-4 times a week)	58 (36.25)	26.56	42.71	

BMI, body mass index; SD, standard deviation. Data are presented as (mean ± SD), and frequencies (%) as described. p-values are for comparison between men and women obtained by Mann Whitney U test for continuous variables and by Fisher exact test for categorical variables. * Significant association

12 **Table 2:** Street food contribution towards the daily nutrient intake of habitual consumers

Nutrients	Overall			Men			Women			P value [†]	P value [‡]
	Total Intake (mean ± SD)	Street food (mean ± SD)	% street food	Total intake (mean ± SD)	Street food (mean ± SD)	% street food	Total intake (mean ± SD)	Street food (mean ± SD)	% street food		
Energy /kcal	2104 ± 805.8	632.3 ± 738.9	30.1	2457.3 ± 834.4	1022.9 ± 910.1	41.6	1868.5 ± 696.3	371.8 ± 439.6	19.9	<0.001*	<0.001*
Protein (g)	55.5 ± 25.8	16.5 ± 21.3	29.7	62.8 ± 24.7	26.0 ± 24.9	41.4	50.7 ± 25.5	10.2 ± 15.7	20.1	0.001*	<0.001*
Carb (g)	370.4 ± 145.5	94.8 ± 121.9	25.6	431.1 ± 151.2	159.8 ± 155.0	37.1	329.9 ± 127.0	51.4 ± 64.8	15.6	<0.001*	<0.001*
Fat (g)	40.1 ± 28.1	19.7 ± 23.5	49.1	48.4 ± 32.0	25.2 ± 14.3	52.1	34.6 ± 23.7	13.3 ± 17.6	38.4	0.004*	<0.001*
Fibre (g)	37.7 ± 24.8	10.9 ± 18.5	28.9	39.3 ± 14.8	18.9 ± 26.10	48.1	36.5 ± 29.7	5.7 ± 7.3	15.6	0.024*	<0.001*
Calcium (mg)	351.0 ± 296.3	128.2 ± 250.8	36.5	426.2 ± 374.4	215.8 ± 366.6	50.6	300.9 ± 218.3	69.8 ± 87.2	23.2	0.001*	<0.001*
Sodium (mg)	1425.9 ± 782.5	548.0 ± 612.1	38.4	1643.1 ± 787.8	835.1 ± 692.5	50.8	1281.0 ± 748.5	354.7 ± 463.1	27.7	0.005*	<0.001*
Iron (mg)	14.1 ± 6.5	4.2 ± 5.3	29.7	15.8 ± 6.4	6.8 ± 6.6	43.0	13.0 ± 6.4	2.3 ± 3.1	17.7	0.005*	<0.001*
Vit.C (mg)	103.8 ± 89.0	25.1 ± 42.7	24.1	101.3 ± 85.9	41.1 ± 55.8	40.6	105.4 ± 91.4	14.4 ± 26.4	13.7	0.740	<0.001*
Vit.A (µg)	1011.4 ± 3077.6	113.9 ± 261.1	11.3	722.5 ± 907.2	201.3 ± 371.0	27.9	1203.8 ± 3887.6	55.7 ± 119.35	4.6	0.911	<0.001*
Folate (µg)	267.1 ± 160.6	67.0 ± 89.4	25.0	261.3 ± 127.1	106.0 ± 108.3	40.6	271.0 ± 180.1	41.0 ± 62.5	15.1	0.925	<0.001*

[†]Comparison of total intake of men and women, [‡]Comparison of street food consumption of men and women. *Denotes significant difference between men and women. P values obtained by Mann Whitney U test

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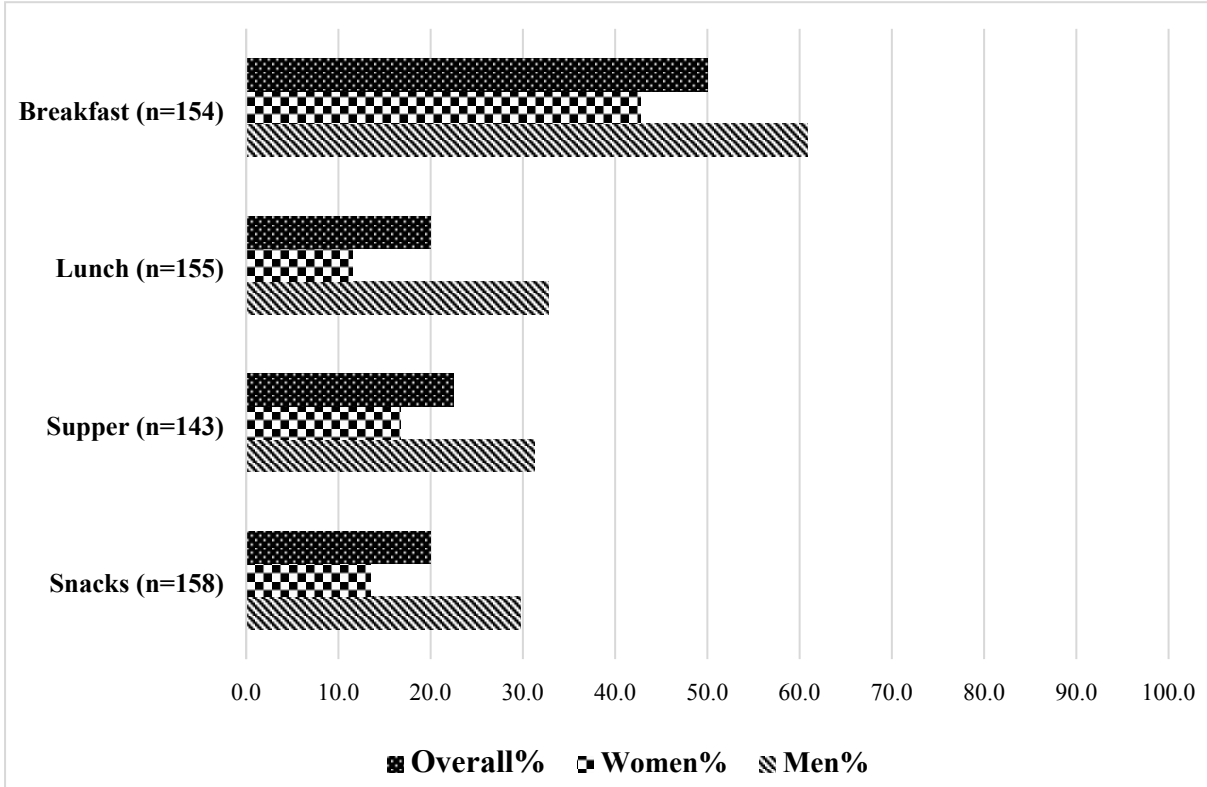


Figure 1: Proportion of Participants that included street food at different meals