AJFAND ONLINE
Volume 9 No. 9
December 2009
ISSN 1684 5374
AFRICAN JOURNAL OF FOOD AGRICULTURE NUTRITION AND DEVELOPMENT

CONSUMPTION OF, AND BELIEFS ABOUT FONIO (*DIGITARIA EXILIS*) IN URBAN AREA IN MALI

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Volume 9 No. 9
December 2009
ISSN 1684 5374
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ABSTRACT

The study sought to determine beliefs and practices about neglected crops in West Africa, using fonio (*Digitaria exilis*) as a model to understand how obstacles impede the consumption of this cereal in Bamako, the capital city of Mali. This was a cross-sectional study on food ethnography in three steps: a market survey on availability of fonio, a food consumption survey on utilisation of fonio, and on beliefs on and attributes of fonio. The study covered the pre-harvest and post-harvest periods and involved key informants, food vendors, and women of reproductive age in households. Fonio, as all cereals, is available year-long on markets in Bamako, and is abundant from September to May before most of the common cereals mature. More than two-thirds (68%) of the women reported having consumed fonio one to three times a month. Fonio was more consumed as snack (djouka) on working days (62%) than on weekend and special event days, suggesting that encouraging the development of ready-to-serve fonio-based products would help increase the consumption of fonio among women in urban area. The average individual portion size of fonio was 152g/day, and the contribution to daily energy intake was 16%. A large share of the women was convinced that eating fonio was good for them (95%) and their family members (94%). Also, most of them thought that fonio had good cooking, organoleptic and nutritional qualities and could contribute to diet's variation (91% to 100%). Decision by the women to purchase or prepare fonio in the household could be favourably influenced by factors such as media, household members suffering from anaemia, neighbouring people buying fonio and shortage of other cereals; whereas shortage of fonio products (77%), high cost of fonio products (69%), difficult cooking process (51%), and lack of knowledge about processing and cooking fonio (43%) were likely to limit fonio consumption among the women. Also, in the present study, fonio was perceived to be for rich people by more than half (58%) of the women. Improving cooking process and knowledge of the women about fonio cooking, as well as creating a demand for the women with the household's head and others through media, social and health care services would help increase fonio consumption in Bamako.

Key words: beliefs, fonio, women, Mali, ethnography

INTRODUCTION

Malnutrition and numerous deficiency diseases continue to persist in the developing world as a result of deficiencies of essential nutrients in the daily diet [1]. Women of reproductive age are mostly affected because of increasing needs during pregnancy and lactation. In Mali, a prevalence of 13% has been reported for women of reproductive age suffering from chronic energy deficiency and 50% for anaemic women in Bamako the capital city [2]. Household food insecurity is an important underlying cause of malnutrition and how households cope with scarce food are key determinants in maintaining healthy nutrition [3]. Promotion of local and traditional food has been recommended to improve household food security and further contribute to reduction of malnutrition [4]. Fonio (*Digitaria exilis)*, one of the most ancient indigenous West African cereals is a major part of the diet in some communities in Mali [5,6,7]. Regarded for a long time as a minor crop without economic potential [8], fonio is attracting renewed interest in urban areas of West Africa for its organoleptic and nutritional qualities [9]. Recently, the crop has been listed as priority crop for West Africa [10]. Because of its short growing cycle, fonio can be harvested in the critical shortage season before major food crops [5] and its contribution to food security has been suggested [11]. The food composition table of Mali indicates fonio as second cereal with higher iron content (8.5 mg/100g dry matter) after sorghum (11 mg/100g dry matter) [12]. The grain is also an excellent source of methionine, cysteine and leucine, whose concentrations are slightly higher than those defined for the FAO reference protein [13]. Fonio-based products and modern recipes have been developed in urban areas in Mali [14]. Promoting fonio consumption in urban areas could help improve household food security not only as income source but also as a transition food that could contribute to energy intake of household members during seasonal food shortage. However, fonio consumption is still low, particularly in urban areas. Based on a study in three West African cities, Bamako (Mali), Conakry (Guinea) and Ouagadougou (Burkina Faso), a consumption frequency of less than once a month for 54% of fonio consumers in households has been reported [7]. Average amount consumed per person was estimated at 4.4 kg/ year for Mali [6] with a range of 650 to 840g/year in Bamako [7]. Difficult post- harvest processing, high-quality product demand, time consuming cooking process, and high-cost of fonio products were pointed out to explain the low consumption of fonio in Bamako [5, 7, 8, 9, 15]. However, social factors and cultural beliefs are also important factors influencing food choice and consumption patterns [4,3]. The present study sought to determine the intake of fonio in households and shared beliefs about fonio consumption in urban Mali. The research is part of the FP6/EU/INCO/STREP[1] funded FONIO project, which aimed at upgrading the quality and competitiveness of fonio (*Digitaria exilis*) for improved livelihoods in West Africa.

[1] Project number 0015403

METHODS

A cross-sectional food ethnographic study [3,4] was performed in Bamako, the capital city of Mali, during the pre-harvest (August-September) and post-harvest (February-July) periods. The study was carried out in three steps: 1) a market survey on availability of fonio, 2) a food consumption survey on utilisation of fonio and 3), a beliefs and attributes study on fonio among women of reproductive age [4].

Informants and respondents

Food vendors

Three categories of food vendors were selected: the street food vendors, the supermarkets food vendors and the markets food vendors. Street food vendors are those who sell ready-to-serve food either at fixed places (restaurants) or at non determined places (road sides). The supermarket food vendors are those who sell food at fixed prices in supermarket. The market food vendors are those who sell foods at bargaining base prices in markets. In total, 40 street food vendors, 15 in restaurants and 25 on road sides were randomly sampled. Five supermarkets were randomly selected, according to geographical position. Three of the most frequented markets of Bamako were visited: Medine, Fadjiguila and Sabalibougou. A total of 63 market food vendors were randomly selected according to the type and diversity of foods sold.

Households

A household was considered as any person or group of persons who share the same living accommodation, who pool some or all of their income and wealth and who take food prepared from a common kitchen or cooking pot [16]. A total of 30 households were selected by a convenient sampling [17] based on discussion with key informants (agriculture and demography services staff, community leaders). The average size of the households was 11±6.8 members, and 33.7% of the households had more than 11 members. One food preparer was conveniently selected in each household based on discussion with the members. The preparers are the persons in the households who play a key role in the preparation of the food for all household members.

Women of reproductive age

A total of 108 women of reproductive age (15-49 year-old) were randomly selected in 12 quarters of Bamako using three-stage cluster sampling [18] and the random walk method [19]. The women were involved in the survey based on verbal agreement.

Availability study

Availability study was carried out in the pre-harvest period to identify available and consumed fonio products in Bamako. This included market survey and interviews in households.

The market survey was done by discussion with the selected food vendors in markets, supermarkets, restaurants and at road sides. Data such as fonio product names,

attributes, seasonality, units sold, price per unit sold, were collected. Interviews were carried out with the food preparers in the selected households. They gave information on the size of the household, the meal pattern, the main fonio dishes cooked in the household, and the seasonal availability of fonio products.

Food consumption survey

A food consumption survey including a 24-hr recall and a food frequency focused on fonio products were performed with the 108 women of reproductive age during the post-harvest period. Data were collected by welltrained local assistants through semi-structured interviews based on standard questionnaires.

The 24-hr recall was performed to assess the mean energy intake of the women, the daily portion size of fonio and the contribution of fonio to energy intake. The recall was performed on two non consecutive days following a standardized format [19]. Weekends and special event days were excluded. Amount of ingredients eaten from mixed dishes and snacks with unknown amounts of ingredients (gifts or foods purchased outside the household) were determined using the standard recipe method [19]. Amounts consumed were estimated in household utensils and monetary values. Conversion factors from household measures and monetary value to weight equivalent (grams) were determined. Weights were measured using digital dietary scales (Soehnle, Plateau Art, Germany) Nr 65086 (22lb), maximum range 10 kg, nearest to 2 g (0.1oz). Food intake was computed by the VBS Food Calculation System version 3[2] using primarily the Mali food composition table TACAM [12], and secondarily the USDA nutrient database release 18 [20] and 20 [21]. The International Mini List (IML), version 2.0[3] and the McCance & Widdowson's composition of foods [22] were used when USDA nutrient values were different from TACAM or when no suitable food match was found. USDA Retention factors release 6 was used to determine nutrient losses during cooking, [23].

Foods were classified into 13 groups: starchy staples; dairy; legumes and nuts; small fish eaten whole with bones; all other flesh foods and miscellaneous small animal protein; vitamin A-rich dark green leafy vegetables; vitamin A-rich deep yellow; orange and red vegetables; vitamin C-rich fruits; vitamin C-rich vegetables; vitamin A-rich fruits; eggs; all other fruits and vegetables; and all other foods (including sugars, fats, and stimulants such as tea and coffee). The food groups were taken from the standardized analytical research protocol of the Women's Dietary Diversity Project [24]. The frequency questionnaire focused on fonio and fonio products, and was completed to estimate the usual frequency of fonio products consumption in a period of one month. The questionnaire included a list of 15 fonio dishes with associated frequency categories.

[2] Bas Nutrition Software, Arnhem, The Netherlands, www.bware.nl
[3] Available from: http://www.fao.org/infoods/

Beliefs and attributes study

The beliefs and attributes study consisted of a questionnaire survey with the 108 women of reproductive age. Topics to be included in the questionnaire were identified by a food attribute and pile sort study [4]. For this latter study, 26 women different from the 108, were randomly selected from the households involved in the food consumption survey described above. The main selection criteria were to be willing to participate and to have basic knowledge on fonio. The study on food attributes and pile sort was carried out in three steps: pile setting, food difference and food attribute [4]. The questionnaire was structured in topics such as knowledge of iron deficiency; diabetes and fonio; outcomes of fonio consumption; fonio attributes; perceived barriers to fonio consumption; information source; people and factors that could enhance fonio consumption; and subjective beliefs about fonio. To determine the perceptions of the women, the questions were reflected as statements and the women were asked to indicate if they agree, disagree, or are neutral. For each question, each response corresponds to a one-point score.

Data analysis

Incomplete data of 6 women were dropped. Descriptives were used to determine average portion size of fonio, mean energy and macronutrients intake, and contribution of fonio to the mean energy intake. Descriptives were also performed to determine the most consumed fonio dishes and the consumption frequency. Beliefs about fonio were reported as the proportion of women who agree with the statements of the questionnaire. All analyses were performed using SPSS 14.0.1 (2005) for windows.

RESULTS

Fonio availability and consumption frequency

Overall, 11 food groups were available on Bamako markets: 1) cereals and cereal products, 2) roots and tubers, 3) legumes, nuts and seeds, 4) fruits and sweets, including beverages, 5) vegetables including leafy vegetables; 6) meat and poultry; 7) fish and fisheries; 8) dairy and eggs; 9) oils and fats; 10) spices; 11) stimulants and others (Table 1). Wheat, rice, millet, maize, sorghum and fonio were the most common cereals available in Bamako. Like all cereals in Bamako, fonio is available year-long but is abundant before all other cereals from September (one of the typical shortage months in Mali) to May. On markets, fonio is sold either as whole grain, husked grain, precooked grain, or washed and dried. Two main fonio dishes were sold at the road sides: foyo (fonio couscous) and djouka (mixture of fonio, vegetables and groundnut). The most common fonio products available in supermarkets were dried precooked fonio, djouka and dèguè (mixture of fonio and curdled milk). In restaurants, fonio is served either as foyo supplemented with various sauces, or as djouka. At home, the most common fonio dish cooked is foyo, supplemented with various sauces.

Of the 15 fonio- based dishes, djouka, foyo and fini zamé (fried fonio) were eaten by 73 out of 102 women (71%). Among those consumers, foyo and djouka were eaten by 41% and 55%, respectively (Table 2). Among those consuming foyo and djouka, 68% reported a consumption frequency of one to three times per month. Few women (8%) reported consumption of more than 10 times per month (Table 2). Fonio was more frequently consumed as snack (djouka) on working days (62%) than on weekend (26%) and special event (baptism and wedding) days (13%).

Fonio intake and contribution to energy intake

Starchy staples, vitamin C-rich vegetables, all other fruits and vegetables, other flesh foods and miscellaneous small animal protein, and legumes and nuts were the food groups mostly consumed by the women (Table 3). Among starchy staples, rice (38%), wheat products (33%) and millet products (20%) were the most commonly consumed, the least consumed being fonio (5%). Tomato (36%), cabbage (19%) and hot pepper (15%) were the most often consumed vitamin C-rich vegetables, used mainly as ingredients of sauces (percent not shown in table). Mean daily energy intake of the women ranged from 525 to 4150 kcal, averaging 2054 kcal (Table 4). With 35% sourced from animal foods, mean protein intake of the women contributed 11% of the daily energy intake, being in the range recommended by (WHO [25]. Energy intake was mostly provided by starchy staples, with cereal-based dishes being the largest contributors to energy intake, and legumes and nuts groups the largest contributors to fat intake (Table 4). Protein intake was mostly provided by starchy staples group (36%), other flesh foods and miscellaneous small animal protein group (27%), and legumes and nuts group (17%). Based on the proportion of women consuming fonio products, individual portion size of fonio ranged from 113 to 208 g/day, averaging 152 g/day. The average energy intake from fonio was 321.6±74.6 kcal/day, giving a contribution of 16% to mean daily energy intake.

Beliefs and attributes about fonio

According to their background, more than half of the women reported that fonio contains iron and its consumption could help prevent anemia and treat diabetes (Table 5). A large share of the women (94%) was convinced that eating fonio is good for them and their family members. Further, most of them thought that fonio had good cooking, organoleptic and nutritional qualities and could contribute to diet's variation. However, some barriers to fonio consumption have been identified. These are: 1) seasonal shortage (or frequent unavailability) in restaurants (77%) and on markets (74%); 2) high cost of fonio products (69%); 3) lack of knowledge about processing (43%); time consuming processing and difficult cooking process (51%); and 5) small size, dirtiness and dark colour (some varieties) of fonio grains (63%). The size of the household (52%) and the apathy of the household head for fonio consumption (45%) were additional barriers reported by the women. Decision to buy or prepare fonio for the household could be favourably influenced by factors such as media (94%), household members suffering from anaemia (91%), neighbouring people buying fonio (85%) and food shortage (82%). The women also reported that they ate fonio mostly in restaurants or when they have guests for dinner at home (74%) and during important celebrations like weddings, baptism (92%). Paramedical staff, friends,

husband and family members are persons who could positively or negatively influence fonio consumption. Beliefs such as "fonio is for rich people" were also reported by 58% of the women as factors likely to influence fonio consumption.

DISCUSSION

Food ethnography was performed to determine the contribution of fonio to the dietary pattern, and to identify shared beliefs about fonio consumption in urban Mali.

Fonio is available in shortage season before the most common cereals are harvested. The usual diet is based on cereal, mainly rice, and fonio was reported as consumed by 5% of the women. The same trend has been earlier described for a rural area in Mali, but the main cereal dishes were based on maize and sorghum, and fonio consumption reported by 12% of men and women [26]. This difference could be linked to the relative abundance of almost all common cereals during the food consumption survey period (post-harvest), and also to the contrast of urban vs. rural areas, where dishes are still mostly based on indigenous cereals [8].

Consumption frequency (one to three times a month) and average daily individual portion size of fonio (152g) were higher in the study compared to the frequency of less than once a month and the individual amount of 650 to 840 g/person/year reported earlier in the study on fonio consumption in urban areas [7]. This suggests an increase in fonio consumption since 2004. However, because of the low proportion of women consuming fonio dishes (5%) and small size of daily portion consumed (152g/day) compared with those of rice (38% and 489g/day, respectively), the contribution of fonio was about the fifth of the daily energy intake of the women consuming fonio dishes. This small portion size of fonio compared to rice could be explained by the fact that fonio was mostly consumed as snack. No previous studies reported contribution of fonio to energy intake, thus hampering comparisons, but under same conditions (equivalent proportion of consumers and daily portion size), fonio (steam-cooked) would better contribute to energy intake than rice, due to its higher energy content: 223 kcal/100g for cooked fonio as compared to 102 kcal/100g for cooked rice [12].

Fonio has often been reported as a food mostly cooked and consumed during weekends and special events [5, 7, 8, 9, 15]. A previous study in Bamako also reported that fonio was often consumed outside and cooked in households mostly when there are guests [7]. The availability study confirmed that fonio products are mostly served in restaurants and most of the women are likely to consume fonio outside. The food frequency survey revealed that fonio is more often consumed on working days than on event days. This suggests that encouraging development of ready-to-eat fonio-based products would help increase the consumption of fonio among women, especially in urban areas.

Difficult post-harvest processing, time consuming cooking process, and high-cost of fonio products were often reported as common barriers to fonio consumption [7,8,9,

15]. The results of the present study not only supported previous studies but revealed other factors that were also likely to hamper fonio consumption in Bamako. One of the perceived barriers was the lack of knowledge about processing and cooking fonio. Due to its very small size, fonio is contaminated with sand and dust during post-harvest processing and needs to be carefully washed for several times using a traditional sedimentation method to get a cleaned product, which must be steam-cooked two to three times at least to get a soft-in-mouth and easy-to-digest product [9]. This cleaning and cooking process needs some basic ability and knowledge that might not be common among all women, especially in the context of urban areas. Another reported obstacle was the size of the household. This might be linked either to the high cost of fonio products which could not allow purchasing large amounts when the size of the household is large, or to the difficult cleaning and cooking process that might increase cooking time in large size households. Furthermore, the apathy of the household head for fonio consumption (perceived barrier for 45% of the women) might be related to the low quality of cooked fonio served by the women in the households due to their lack of knowledge and skills. On the other hand, factors like food shortage, media, family members suffering from anaemia, neighbourhood opinion, and paramedical staff, family members and friends are likely to influence fonio consumption among the women. Association between these factors and consumption of fonio needs to be tested in further studies. Finally, in the present study, fonio was perceived to be for rich people by more than half of the women. This viewpoint contradicts previous reports on fonio which often postulated fonio to be for poor people [5, 9]. These discrepancies in results might be due to the fact that this study was carried out in an urban context and women could have linked their opinion to the high cost of fonio products.

CONCLUSION

The purpose of this study was to determine shared beliefs that could positively or negatively influence fonio consumption. Results showed that fonio is available year-long on markets in Bamako, as all cereals, but is abundant before most of the common cereals. More than two-thirds (68%) of the women reported consuming fonio one to three times per month. Fonio was more consumed as snack on working days than on weekend and special event days, suggesting that encouraging development of ready-to-eat fonio-based products would help increase consumption of fonio among women in urban areas. Energy intake was mostly provided by starchy staples, with cereal-based dishes being the largest contributors to energy intake. The average individual portion size of fonio was 152g/day, and its contribution to daily energy intake was 16%. A large share of the women was convinced that eating fonio is good for them and their family members. Further, most of them thought that fonio had good cooking, organoleptic and nutritional qualities and could contribute to diet's variation (91% to 100%). The decision to buy or prepare fonio by women in households might be favourably influenced by factors such as media, household members suffering from anaemia, neighbouring people purchasing fonio and shortage of other cereals; whereas shortage of fonio products, high cost of fonio products, difficult cooking process, and lack of knowledge about processing and cooking fonio are likely to limit fonio

consumption among women in urban area. Further, fonio was perceived to be for rich people by more than half of the women. Improving cooking process and knowledge of women about fonio cooking, as well as creating a demand for the women with the husband and others through media, social and health care services would help increase fonio consumption inside households in Bamako. Further research should be designed to examine the effect of these factors on consumption of fonio in urban areas in Mali.

ACKNOWLEDGEMENTS

We acknowledge European Union project N° 0015043 for funding the project. We are also grateful to the late Guindo Doré (Institute or Rural Economics, Mali) for giving the opportunity to conduct the field work; Jean-François Cruz (CIRAD, general manager of Fonio project) for institutional support; all the women for their willingness to participate and their important contribution to the study. We thank Bianca Van Dam (Division of Human Nutrition, Wageningen University) for her contribution to study design, data collection and data entering.

Table 1:Food availability on Bamako (Mali) markets

Food groups	Foods
Cereals	Wheat, maize, rice, millet, sorghum, fonio
Starchy roots and tubers	Potato, sweet potato, cassava, yam (white and yellow), plantain
Legumes/nuts/ seeds	Cashew nuts, groundnut, bambara groundnut (white and red), coconut, cocoa, African locust bean seeds, cowpea (white and red), Hibiscus seed, green peas, baobab seeds, tamarind seeds
Fruits and sweeties	Orange, lemon (yellow and green), tangerine, avocado, Pineapple, melon, Pear, Liana fruit, apple (green, yellow and red), Papaya, plum (yellow and red), nectarine, grape fruit (red and green), dates, banana (yellow and green), Mango, shea fruit, sugar powder, Chocolate, Honey, guinea sorrel juice, orange juice, soft drinks,
Vegetables	Cucumber, tomato (fruit and paste concentrated), okra, onion, shallot, shallot leaves, Hot pepper, sweet pepper green, Egg plant, Bitter tomato, cabbage, lettuce, Parsley leaves, Turnip, Carrot, Beet root, french bean, baobab leaves, Hibiscus leaves, Green leaves,
Meat/poultry	Beef, veal, goat, lamb, pork, chicken, Duck
Fish and fisheries	carp (red and grey), pink trout, grouper, sardine, catfish, threadfin, shrimp, freshwater fish, sea crab, gamba
Dairy/eggs	cow milk, yoghourt, cheese, chicken eggs
Oil and fats	sunflower oil, olive oil, palm oil (white and red), peanut oil, soya oil, butter, Shea butter,
Spices	pepper grain, aniseed, garlic, curry, ginger, clove, laurel leaves, vinegar, maggi cube, mustard
Stimulants	Coffea, tea, colanut

Table 2:Frequency of consuming fonio among women in Bamako (n = 73)

	Times / month									
	1	2	3	4	5	6	8	10	13	Total
Number of women consuming all fonio dishes	31	12	7	6	3	6	2	4	2	73
	Number of women consuming by dish									Total
Djouka fonio	14	5	4	4	3	3	2	3	2	40
Foyo	15	6	3	2	0	3	0	1	0	30
Fini zamé	2	1	0	0	0	0	0	0	0	3
Days of consumption	Number of women									
	Working days			Weekend days			Event days			Total
	45			19			9			73

Table 3: Number of women consuming food groups and contribution to mean macronutrients intake (n=102)

Food groups	Most consumed foods	Number of women	Contribution to intake		
			Energy	Protein	Fat
All starchy staples	Rice, wheat, millet, fonio, sorghum, yam, cassava, potato, sweet potato, plantain	102	45.7	36.0	12.1
Vitamin C-rich vegetables[a]	Green sweet pepper, tomato, cabbage, dried onion, fried dried shallot, hot pepper	102	1.6	2.4	0.3
All other fruits and vegetables	Cucumber, okra, onion, garlic, tomato paste, bitter tomato, eggplant, pumpkin, courgette, french bean, garlic, ripe banana, pineapple juice unsweetened	101	3.2	4.2	0.3
Flesh foods and miscellaneous small animal protein	Beef, large fish (Nile perch, catfish mudfish)	100	6.7	27.3	11.3
All legumes and nuts	African locust bean, groundnut, cowpea	74	10.5	16.8	23.2
All dairy	Milk	49	4.6	9.0	7.6
Vitamin A-rich dark green leafy vegetables[b]	Lettuce, amaranth leaves, green leaves, shallot leaves, sweet potato leaves, fakouhoye leaves, bean leaves, parsley/celery leaves	42	0.4	1.2	0.1
Vitamin A-rich deep yellow, orange and red vegetables[b]	Carrot	17	0.1	0.1	0.0
Vitamin C-rich fruits[a]	Orange, ripe papaya	9	0	0	0
Eggs	Hen egg	8	0.3	0.9	0.6
Vitamin A-rich fruits[b]	Ripe mango, red palm oil	8	0.5	0.0	1.4
Small fish eaten whole with bones	Small fish	6	0.1	0.4	0.0

[a] Vitamin C-rich fruits and vegetables are defined as those with >18 mg/100g in the form eaten

[b] Vitamin A-rich fruits and vegetables are defined as those with >130 RAE/100g in the form eaten.

Table 4:Mean daily macronutrient intake of women (n=102)

	Mean nutrient intake			
	Mean	Standard Deviation	Range	% kcal
Energy (kcal)	2054.0	716.5	525-4150	
Protein (g)	57.7	25.6	12.6-136.0	11
Animal protein source (g)	20.1	20.0	0-8.6	4.6
Plant source (g)	38.7	20.8	9.2-109.9	8.8
Total carbohydrate (g)	310.1	112.3	106.6-605.6	57
Total fat	73.2	34.8	1.7-181	32
Fonio consumption				
Individual portion size of fonio (g)	152.4	35.3	113-208	
Energy intake from fonio (kcal)	321.6	74.6	238.4-438.9	

Table 5:Beliefs about fonio consumption

Topic	Questions	Percent
Knowledge	Fonio is important to treat diabetes	88
	Fonio can prevent anaemia	70.4
	Fonio contains iron	64.8
Outcomes from fonio consumption	Eating fonio is good for my household members	95.4
	Eating fonio is good for me	94.4
Fonio attributes	Fonio has good taste, swells up well during cooking, is pleasant in mouth	99.6
	Fonio is a traditional food and diversifies meals	94.5
	Fonio stimulates appetite, easy digestible, nutritious, healthy, good for weight loosing	92.8
	Eating fonio helps to treat diseases and to prevent stomach problems	91.2
Perceived barriers	Fonio not available throughout the year	76.9
	Fonio not available on markets and restaurants	73.5
	High cost of fonio products	69.4
	Fonio contains impurities, not white, has small size grain, low quality variety	62.8
	Not knowing how to cook fonio	42.6
	Household size too large to prepare fonio	51.9
	Time consuming, hardness of cooking	51.4
	Head of the household does not like fonio	45.4
Information source, people and factors enhancing fonio consumption	The media favourably affect decision to eat fonio	93.5
	Nurse, social workers, favourably affect decision to eat fonio	93.5
	Fonio consumed mostly during important ceremonies, like weddings, funerals or baptism	92.1
	Household members suffering from anaemia favourably affect decision to buy fonio	90.8
	Friends, members of my association, neighbours favourably affect decision to eat fonio	85.8
	People around me buying fonio makes me want to eat fonio	85.2
	Husband, household members, mother-in-law favourably affect decision to eat fonio	83.9
	A shortage of food favourably affects decision to eat fonio	81.5
	Fonio sellers favourably affect decision to buy fonio	79.7
	Fonio consumed mostly in restaurants and when guests in household	74.1
Subjective beliefs	Fonio is for rich people	58.3
	Fonio is for poor people	35.2

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