

Is Wild Food Utilized by Primary School Children in Urban and Semi-urban Areas of Tanzania? In Relation to Their Diet and Health from a Survey in Dar es Salaam and Pwani Regions

SAKAMOTO Kumiko, Eugenia KAFANABO^{*}, Eliud KABELEGE^{**}, OHMORI Reiko^{***},
KIKUCHI Yukiko^{****} and TSUDA Katsunori^{*****}

Introduction

To what extent is wild food utilized by children in urban and semi-urban areas of Tanzania? How does this relate to their diet and health in general? It is important to understand the comprehensive diet of children including wild food to understand its potential implication on their health status. While there are a relatively large number of studies on health and food in developing countries as well as in Tanzania concerning children under five and women, there are only a limited number of studies on primary school children. There have been reports on malnutrition in Northern Tanzania (Teblick et al. 2017), iodine deficiency in inland (Kulwa et al. 2006), infectious diseases along Lake Victoria (WHO 2004, Munisi et al. 2016), and lifestyle-related diseases in Dar es Salaam (Muhihi et al. 2013, 2018), the largest city in Tanzania, but the full picture is not yet clear. Therefore, a pilot questionnaire survey was administered to 96 primary school students in Lindi, a regional town along the southeastern coast, with the following research questions: 1) frequency of intake of foods and food groups during the rainy and dry seasons; 2) frequency of intake of wild foods; 3) health status; and 4) relationship between frequency of intake of food groups and wild foods and health (Sakamoto et al. 2021). The results showed that: 1) fish, oil, salt, sugar, and vegetables were consumed more in the dry seasons, and fruits in the rainy season were consumed more frequently; 2) high consumption of wild foods, especially seasonal wild fruits, despite being in town; 3) primary school students' perceptions do not clearly distinguish between "wild foods" and cultivated species; 4) many students feel unwell, anorexic, and tired in the morning; and 5)

the frequency of pulses in the dry season and oil, salt, and sugar in the rainy season and the frequency of intake of pulses in the dry season and oil and sugar in the rainy season was found to correlate with morning sickness.

While the pilot survey portrayed that children highly utilized wild food in Lindi town, is the situation similar in other areas? To what extent do children utilize wild food in other areas, and how are their food balanced and healthy? Of particular interest is the situation in the urban center for example, Dar es Salaam and its neighboring region Pwani. In this paper, we will report preliminary results of a survey that was conducted in Dar es Salaam and Pwani regions with a larger number of participants regarding the same research questions.

I. Survey and Analysis Method

1. Survey method

A Kiswahili translated questionnaire survey was administered in December 2020 at 16 primary schools in Dar es Salaam region (hereafter D) and Pwani Region (hereafter P), 4 primary schools in each of the four districts. The questionnaire included questions on health, and intake of food in general and wild foods.

Food groups consisted of staple food, vegetables, fish, milk, beans, nuts, fruit, wild food, oil, salt, and sugar with reference to the *Tanzanian Food Composition Table* (Tanzania et al. 2008). The following explanations were supplemented in the questionnaire: Staple food includes grains, tuber, or bananas. Fish includes small fish (*dagaa*). Pulses include kidney beans, pigeon peas, cowpeas, etc. Nuts include peanuts, seeds of vegetables, etc. Sugar includes sugar cane.

^{*}Professor, University of Dar es Salaam, Tanzania; ^{**}PhD student, Bielefeld University, Germany; ^{***}Professor, School of Regional Design, Utsunomiya University (UU), ^{****}Research assistant, School of International Studies, UU; ^{*****}Researcher, Center of Multicultural Public Sphere (CMPS), UU

Explanation of wild food has been supplemented in Kiswahili before the questionnaire as: anything you eat but not cultivated or grown at by people or industrial products; They come from a variety of indigenous and natural sources like bush, forest, or normal environment but no one is growing or keeping them. They are incorporated into your diet as raw or cooked. Any additional questions asked during entering the questionnaire were also answered.

The weekly frequency of intake was asked for the above food groups in the rainy and dry seasons respectively with reference to Japanese studies (Tsunda et al., 2015; Mizoguchi et al. 2004). The scores for the frequency of intake content were as follows: for carbohydrates, vegetables, oil, salt, and sugar, a score of 4 was given for “more than twice a day,” 3 for “once a day,” 2 for “4 to 6 days a week,” 1 for “3 days a week or less,” and 0 for “do not eat”. For meat, fish, milk, pulses, nuts, fruits, and wild foods, 4 points were given for “every day,” 3 points for “4-6 days a week,” 2 points for “2-3 days a week,” 1 point for “less than once a week” (Tsunda et al. 2015; Mizoguchi et al. 2004), and 0 for “never eat”.

For children’s health, the questionnaire was designed to fit the actual situation in Tanzania, referring to the Health Examination Manual for Children of the Japan School Health Association and the Survey Manual for the Report on Dietary Information of Children and Students. For each health problem, three points were given for “always,” two points for “often,” one point for “rarely,” and zero for “never”.

2. Analysis method

The self-evaluation of health of primary school students was tested for differences between the two population means by calculating the overall and regional means and standard deviations. The above was done with the original scale, along with the analysis of gender differences. Percentage with students with each health problem was calculated based on availability of the health problem as well. Range of the total and each region was confirmed for additional information.

The main staple foods and side dishes were simply tabulated and cross-analyzed by region, and significant differences were confirmed by Pearson’s chi-square test. For frequency of intake by food group, the overall and

regional means and standard deviations were calculated for the dry and rainy seasons respectively, and the difference between the two means for each season and region was tested. For the frequency of intake of each food group, the corresponding samples for the rainy and dry seasons were tested to confirm the difference. Range of the total and each region was confirmed for additional information.

To understand the combination of food group intake patterns, seasonal principal component analysis and factor analysis were conducted. Factor analysis scores with better explanations were also tested for differences between the population means of the two regions with method with reference to Keding et al. (2011). Since the differences of food intake and health were prevalent between the two regions most probably influenced by socio-economic factors, analyses were conducted for each region.

Wild food mentioned to be eaten has been compiled, obvious domestic food which does not fall under the previous definition has been omitted, and the major common wild food mentioned is presented. Correlation between frequency of wild food intake has been analyzed against other food groups.

All statistical analyses were performed using IBM SPSS Version 25.

3. Location and participants

D region is the largest city and business capital of Tanzania. Located along the coast of the Indian Ocean with five administrative districts namely: Ubungu, Kinondoni, Temeke, Kigamboni, and Ilala. For this study, Temeke and Ilala districts were selected. Dar es Salaam region is habited by people from different ethnic groups from Tanzania (a cosmopolitan city) and most of them are engaged in business, industrial activities, and trading. On the mainland, D is surrounded by Pwani region.

P region which is occupied by rural areas where people are engaged in fishing, agriculture, small industries, and trading. There are seven administrative districts which are: Rufiji, Kibaha Town Council, Kibaha District Council, Mafia, Bagamoyo, Mukuranga, and Kisarawe. For this study, Mukuranga and Kisarawe districts were selected for the study. In terms of population and size of the area, D has a small area of 1,393 km² with a high population of

4,364,541 compared to P region with an area of 32,547 km² and a population of 1,098,668 (NBS, 2022).

In this survey, eight primary schools in Ilala (4) and Temeke (4) districts were targeted. Also, 8 primary schools were selected in P region from two districts Kisarawe and Mkuranga. The primary schools under this survey are indicated in Figure 1.

In these primary schools, questionnaires were administered to 719 girls (58%), 401 boys (41%), and 13 unknowns, with a total of 1,233 primary school students. The grades ranged from 2 to 7 (mean 5.7 ± 0.7), and the ages ranged from 5 to 19 (mean 12.2 ± 1.3).



Figure 1. Location of researched school

III. Survey Results

1. Health Issues

According to the primary school children's self-assessment, headache, stomachache, no appetite, and diarrhea were more common. All the health problems were more frequently reported by primary school students in P, and the regional differences are statistically significant except for diarrhea, dizziness, and not being able to see far (Table 1).

Table 2 indicates the percentage of students with health problems. Over 95% of students in both regions experienced headaches and stomachaches. Over 87% of the students experience diarrhea in both regions, slightly

more in Dar es Salaam as percentage of students. Around 63% to 84% students experience no appetite and tired for no reason, more in Pwani as seen in other health problems and comparison in scale.

Sex/gender differences are indicated in Table 3. More girls had no appetite ($M=1.06$, $SD=0.728$ in total; $M=1.01$, $SD=0.702$ in Dar es Salaam) and diarrhea ($M=1.104$, $SD=0.566$ in Dar es Salaam), but more boys were hyperactive/irritated for no reason in Dar es Salaam ($M=0.59$, $SD=0.80$) and no appetite in Pwani ($M=1.16$, $SD=0.829$). Other problems did not have statistically different results.

Table 1. Primary school students' self-health-evaluation and regional differences (scale)

Health problem	Total		Dar es Salaam		Pwani		Regional difference
	Mean value	Standard deviation	Mean value	Standard deviation	Mean value	Standard deviation	<i>p</i>
Headache	1.23	0.596	1.18	0.559	1.28	0.626	0.000
Stomachache	1.19	0.586	1.14	0.524	1.25	0.635	0.000
No appetite	1.05	0.767	0.97	0.739	1.13	0.784	0.003
Diarrhea	1.03	0.604	1.01	0.565	1.06	0.638	0.000
Tired for no reason	0.87	0.780	0.81	0.756	0.94	0.797	0.251
Toothache	0.78	0.768	0.67	0.704	0.89	0.811	0.678
Difficulty getting up in the morning	0.77	0.747	0.72	0.734	0.82	0.755	0.615
Dizziness	0.69	0.721	0.65	0.692	0.72	0.746	0.171
Don't feel like doing anything	0.64	0.790	0.58	0.742	0.70	0.830	0.075
Constipation	0.64	0.771	0.57	0.755	0.71	0.780	0.512
Irritated for no reason	0.60	0.795	0.51	0.720	0.68	0.853	0.001
Difficulty seeing far away	0.58	0.898	0.56	0.912	0.60	0.884	0.783

Note: The responses ranged from 0 to 3 in total and both regions.

Table 2. Self-evaluation of health among primary school students by region (yes/no)

Region	Dar es Salaam			Pwani		
	%	N	Std. Deviation	%	N	Std. Deviation
Headache	96%	586	0.198	97%	617	0.164
Stomachache	95%	577	0.215	96%	620	0.197
Diarrhea	88%	571	0.324	87%	612	0.341
No appetite	78%	577	0.416	84%	618	0.367
Tired for no reason	63%	580	0.482	71%	605	0.456
Difficulty getting up in the morning	58%	574	0.493	64%	609	0.480
Toothache	56%	574	0.496	66%	611	0.474
Dizziness	55%	575	0.498	57%	599	0.495
Don't feel like doing anything	46%	575	0.499	52%	599	0.500
Constipation	45%	574	0.498	54%	604	0.498
Irritated for no reason	41%	575	0.492	49%	606	0.500
Difficulty seeing far away	34%	575	0.474	40%	602	0.490

Table 3. Gender Differences in Health Problems

Location	Sex Health problem	Boys		Girls		Sex difference
		Mean value	Standard deviation	Mean value	Standard deviation	<i>p</i>
Total	No appetite	1.04	0.814	1.06	0.728	0.041
	Diarrhea	1.02	0.646	1.04	0.566	0.046
Dar es Salaam	No appetite	0.90	0.775	1.01	0.702	0.010
	Irritated for no reason	0.59	0.801	0.47	0.659	0.002
Pwani	No appetite	1.16	0.829	1.10	0.751	0.021

2. Food group intake

The main staple foods reported to be consumed were rice, cassava, maize, cooked bananas, and potatoes (Table 4). Though there were variations among regions, for instance; Rice, cooked bananas, and potatoes were more common in D, while maize, sorghum, taro, millet, and sorghum were more common in P. Cassava and wheat were not significantly different. The main relish were fish, pulses,

meat, and vegetables. Meat were more common in D, while others were not significantly different.

The frequency of intake of food groups is generally higher for fruits. Comparing the regions, fruits and pulses are more frequently consumed in D during both seasons. Comparing between seasons, pulses and fruits are more frequently taken in the dry season, while oil and milk are more frequently taken in the rainy season (Table 5).

Table 4. Main staple and side dishes eaten by students

Staple foods	Total		Dar es Salaam	Pwani	Regional difference
	No.	%	%	%	<i>P</i>
Rice	1,089	88.2%	92.0%	84.9%	0.000
Cassava	900	72.9%	72.2%	73.7%	0.222
Maize	896	72.6%	67.3%	77.7%	0.000
Cooking banana	871	70.6%	74.5%	67.0%	0.000
Potatoes	845	68.5%	72.0%	65.3%	0.000
Wheat	624	50.6%	49.9%	51.3%	0.542
Taro	554	44.9%	41.2%	48.4%	0.000
Millet	432	35.0%	31.7	38.2%	0.000
Sorghum	363	29.4%	24.0%	34.6%	0.000
Side dishes					
Fish	933	75.6%	75.5%	75.8%	0.843
Pulses	902	73.1%	74.0%	72.3%	0.176
Meat	883	71.6%	77.2%	66.4%	0.000
Vegetable	864	70.0	72.0%	68.2%	8.461
Milk	519	42.1%	42.4%	42.4%	0.694

Note: In bold are foods with statistically significant regional differences.

Table 5.1. Food Intake Frequency Scores for 12 Foods in the Dry Season

Food group	Total		Dar es Salaam		Pwani		Regional difference	Seasonal variation
	Mean value	Standard deviation	Mean value	Standard deviation	Mean value	Standard deviation	<i>P</i>	<i>P</i>
Staple food	2.54	1.209	2.65	1.187	2.43	1.219	0.198	0.106
Vegetable	2.55	1.129	2.64	1.127	2.46	1.124	0.537	0.474
Meat	2.00	1.022	2.05	1.001	1.94	1.039	0.318	0.049
Fish	2.16	1.076	2.08	1.077	2.24	1.070	0.140	0.113
Milk	1.91	1.396	1.98	1.398	1.85	1.393	0.165	0.001
Pulses	2.30	1.104	2.33	1.142	2.27	1.067	0.010	0.000
Nuts	1.71	1.219	1.64	1.202	1.77	1.232	0.482	0.582
Fruits	3.16	1.087	3.32	0.991	3.01	1.150	0.000	0.000
Wild food	1.71	1.284	1.51	1.294	1.90	1.246	0.085	0.224
Oil	2.62	1.175	2.73	1.150	2.51	1.189	0.167	0.000
Salt	2.84	1.092	2.87	1.073	2.81	1.110	0.175	0.104
Sugar	2.55	1.120	2.57	1.119	2.54	1.122	0.782	0.071

Table 5.2. Food Intake Frequency Scores for 12 Foods in the Rainy Season

Food group	Total		Dar es Salaam		Pwani		Regional difference	Seasonal variation
	Mean value	Standard deviation	Mean value	Standard deviation	Mean value	Standard deviation	<i>P</i>	<i>P</i>
Staple food	2.48	1.173	2.52	1.186	1.16	0.046	0.519	0.106
Vegetable	2.57	1.115	2.54	1.108	1.12	0.045	0.926	0.474
Meat	1.93	1.167	1.95	1.185	1.15	0.046	0.071	0.049
Fish	2.10	1.184	2.06	1.226	1.14	0.046	0.026	0.113
Milk	2.03	1.492	2.10	1.511	1.47	0.059	0.034	0.001
Pulses	2.09	1.203	2.14	1.234	1.17	0.047	0.040	0.000
Nuts	1.69	1.269	1.55	1.256	1.27	0.051	0.899	0.582
Fruits	3.05	1.167	3.20	1.115	1.20	0.049	0.000	0.000
Wild food	1.76	1.310	1.50	1.284	1.29	0.052	0.717	0.224
Oil	2.84	1.119	2.90	1.100	1.13	0.046	0.429	0.000
Salt	2.88	1.066	2.92	1.039	1.09	0.044	0.209	0.104
Sugar	2.62	1.128	2.60	1.174	1.08	0.044	0.018	0.071

Note: In bold are foods with statistically significant regional and seasonal differences.
The responses ranged from 0 to 4 in total and both regions, both seasons.

IV Analysis

1. Food intake patterns

Principal component analysis and factor analysis on the frequency of food group intake during the dry and rainy seasons revealed food habit patterns that could be explained by factor analysis (Table 6). In the dry season, four patterns with the following characteristics were found: 1. higher frequency of milk intake; 2. higher frequency of salt, oil, and sugar intake; 3. higher frequency of protein intake; and 4. lower frequency of staple food and vegetable intake.

In the rainy season, there were patterns of:

1. higher frequency of milk intake; 2. higher frequency of intake of diverse food groups; and 3. higher frequency of protein intake. Comparing the means of the factor analysis scores, pattern 1 was more common in D during the dry season and pattern 4 intake was more common in P.

Factor analysis showed that in D, during the dry season, there were five patterns with emphasis on: 1. sugar; 2. low intake in general; 3. salt and oil; 4. low intake of milk, meat, wild food, nuts, and fruits; 5. fruits, vegetables, and staple foods (Table 7.1, Kaiser-Meyer-Oikin frequency of sample validity 0.664, $p < 0.000$, cumulative contribution 36.3%). During the rainy season D showed 3 patterns of food intake habits characterized by: 1. milk; 2. salt, oil, sugar, fruits, staples and vegetables; 3. fish, pulses, meat, nuts and wild foods (Table 7.2, 0.727, $p < 0.000$, 56.9%).

In P during the dry season two patterns with emphasis on: 1. meat, milk, nuts, fish, pulses, and fruits; 2. salt, sugar, staples, vegetables, and oil (Table 8.1, 0.778, $p < 0.000$, 23.5%), and in the rainy season, three patterns characterized by: 1. salt, oil, sugar, vegetables, staple foods, fruits; 2. milk, nuts, wild foods, meat; 3. fish and pulses were seen (Table 8.2, 0.770, $p < 0.000$, 56.9%).

Table 6.1. Food intake patterns from factor analysis (factor matrix) on frequency of food group intake during dry season

Dry season	Factor (food patterns)			
	1	2	3	4
Food group	Milk	Salt & Oil	Pulses, Fish	Staple Foods & Vegetables
Milk	1.016	-0.047	-0.020	0.019
Salt	-0.009	0.730	-0.071	-0.022
Oil	-0.035	0.466	0.092	-0.024
Sugar	0.070	0.297	0.024	-0.175
Pulses	-0.107	-0.076	0.464	-0.107
Fish	0.002	0.072	0.420	0.108
Meat	0.140	-0.088	0.353	-0.137
Nuts	0.091	0.050	0.340	0.033
Wild food	0.051	0.140	0.234	-0.014
Staple food	-0.005	-0.004	-0.009	-0.633
Vegetable	-0.011	0.152	-0.005	-0.315
Fruits	0.156	0.094	0.200	-0.270

Table 6.2. Food intake patterns from factor analysis (factor matrix) on frequency of food group intake during rainy season

Rainy season	Factor (food patterns)		
	1	2	3
Food groups	Milk	Salt & oil	Protein
Milk	0.982	0.092	0.013
Salt	-0.016	0.747	-0.111
Oil	-0.030	0.711	-0.138
Sugar	0.008	0.446	0.079
Vegetable	0.059	0.348	0.079
Staple food	-0.012	0.309	0.184
Fruits	0.106	0.294	0.173
Fish	-0.045	0.009	0.524
Meat	0.160	-0.072	0.442
Nuts	0.152	0.025	0.427
Pulses	-0.151	0.068	0.411
Wild food	0.043	0.017	0.327

Note: Factor extraction method: generalized least squares.

Rotation method: Oblimin method with Kaiser's normalization; rotation converged after 8 iterations.

Table 7.1. Factor analysis by season to understand food group combinations (Dar es Salaam)

Dry season	Factor (food pattern)				
	1	2	3	4	5
Food groups	Sugar	Pulses	Salt, oil, fruit	Milk	Wild food
Sugar	1.000	0.000	0.000	0.000	0.000
Pulses	0.031	0.998	0.000	0.000	0.000
Salt	0.232	0.001	0.562	-0.346	-0.021
Oil	0.223	-0.045	0.445	-0.258	0.038
Fruits	0.172	0.109	0.443	0.354	-0.107
Nuts	0.106	0.120	0.296	0.146	0.097
Milk	0.158	-0.053	0.233	0.320	0.176
Meat	0.074	0.103	0.204	0.233	0.164
Vegetable	0.023	-0.035	0.321	0.077	-0.328
Wild food	0.022	0.020	0.292	0.037	0.308
Fish	0.153	0.155	0.084	0.003	0.260
Staple food	0.178	0.088	0.192	0.208	-0.219

Table 7.2. Factor analysis by season to understand food group combinations (Dar es Salaam)

Rainy season	Factor (food pattern)		
	1	2	3
Food groups	Milk	Salt & oil	Animal Products
Milk	1.016	0.023	-0.072
Salt	-0.057	0.877	-0.132
Oil	-0.038	0.679	-0.114
Sugar	0.027	0.408	0.084
Fruits	0.151	0.259	0.195
Vegetable	0.099	0.256	0.110
Staple food	0.013	0.228	0.184
Fish	-0.013	0.048	0.503
Pulses	-0.165	0.062	0.483
Nuts	0.175	0.107	0.348
Meat	0.161	-0.026	0.346
Wild food	0.020	-0.061	0.280

Table 8.1. Factor analysis by season to understand food group combinations in the dry season (Pwani)

Dry season	Factor (food pattern)	
	1	2
Food groups	Animal Products	Salt & Sugar
Meat	0.614	-0.057
Milk	0.603	-0.059
Nuts	0.407	-0.045
Fish	0.360	0.041
Fruits	0.357	0.247
Pulses	0.353	0.110
Salt	-0.144	0.665
Sugar	0.002	0.472
Staple food	0.068	0.458
Oil	0.032	0.432
Vegetable	0.031	0.419
Wild food	0.233	0.245

Table 8.2 Factor analysis by season to understand food group combinations in the rainy season (Pwani)

Rainy season	Factor (food pattern)		
	1	2	3
Food groups	Salt & oil	Animal Products	Fish
Salt	0.708	0.022	-0.130
Oil	0.672	-0.066	-0.033
Sugar	0.481	0.074	0.035
Vegetable	0.393	-0.002	0.146
Staple food	0.358	0.047	0.215
Fruits	0.253	0.124	0.192
Milk	0.008	0.709	-0.135
Nuts	-0.020	0.504	0.102
Meat	-0.129	0.468	0.262
Wild food	0.139	0.438	-0.019
Fish	-0.023	0.084	0.536
pulses	0.088	-0.025	0.371

2. Utilization of wild food

primary school children.

2.1 Examples of wild food

Table 9 indicates the common wild food mentioned to be eaten in the dry and rainy season. It indicates that a variety of wild animals are eaten both in Dar es Salaam and the Pwani. Most commonly mentioned wild animal was gazelle in the dry season in Dar es Salaam, and fish and rabbit in Pwani for both seasons. Mabungo fruit was most commonly mentioned in Dar es Salaam during the dry season.

2.2 Wild food intake frequency and food group intake

Correlation analysis (Spearman) in both seasons (Table 10) indicated that the frequency of wild food intake was correlated to the frequency of intake of nuts, meat, and fish in D. In P, wild food intake frequency was correlated to all the food groups intake. The relationship was strongest with fruits, pulses, and staple food in the dry season, and milk, nuts, and meat in the rainy season.

V. Conclusions and Future Issues

The situation of health, food intake, and food pattern was clearly different between the schools in D and the P. This is likely to be due to the socio-economic and environmental differences between the regions.

The research findings indicated that even in the urban and semi-urban areas of D and P, many children were utilizing wild food. From the examples provided, it indicated evidence that a substantive amount of protein is obtained from wild animals. Correlation between wild food intakes and other food especially nuts, meat, and fish were visible in both regions, and with other food groups in P.

However, the research has been based on questionnaire answers by students, and may be important to verify by other methods including observations and identifications of wild food to conclude. For example, we may need to confirm if children actually eat gazelle in Dar es Salaam as they claim or as mentioned. Also of interest is that students mentioned many cultivated crops and livestock as wild food in spite of the fact that our definition of wild food has been explained prior to the questionnaire. Further analysis is necessary to understand the contribution of wild food intake on the health and the diet of the

Table 9. Common wild food mentioned to be eaten in the dry and rainy seasons

Food groups	Swahili	English	Family name	Scientific name	Dry season			Rainy season		
					Dar es Salaam	Pwani	Total	Dar es Salaam	Pwani	Total
Staple	Mzizi	Root		Unidentified	7	25	32			
	Mibao, Mabao		Dioscoreaceae	<i>Dioscorea hirtiflora</i>	0	22	22			
	Ming'oko				3	3	6			
Wild animals	Swala (pori), Swara	Gazelle			122	34	156	56	32	88
	Samaki	Fish			47	68	115	53	63	116
	Sungura, Sungula	Rabbit			24	67	91	41	58	99
	Nyati	Buffalo			38	6	44	43	8	51
	Ndezi (pori)	Cane rat			2	48	50	1	42	43
	Kanga (wa pori(ni))	Guinea fowl			6	14	20	18	21	39
	Dagaa	Small fish			8	10	18	6	16	22
	Digidigi, Ngonde	Dicdic			5	9	14	14	7	21
	Ndege	Bird			2	7	9	3	16	19
	Mbala, Mbara, Mbawala	Bushback			1	1	2	1	11	12
Wild vegetables	Chunga, Msunga, Sunga, Mchungu		Asterceae	<i>Launaea cornuta</i>	33	16	49	28	22	50
	Mchicha bwasi, Mbwasi, Bwasi, Buasi		Amaranthaceae	<i>Amaranthus sp.</i>	20	33	53	9	22	31
	Mnavu, Mnavu		Solanaceae	<i>Solanum nigrum</i>	19	10	29	38	14	52
	Uyoga	Mushrooms		Unidentified	4	12	16	24	10	34
	Mrenda, Mlenda (pori)		Pedaliaceae	<i>Sesamum augustifolium</i> , <i>Ceratheca sesamoides</i>	25	5	30	10	6	16
	Delega, derega	Indina spinach	Bassellaceae	<i>Basela alba</i>				10	0	10
	Mabungo, Bungo, Kibungo, Vibungo		Apocynaceae	<i>Saba comorensis</i> , <i>Landolphia sp.</i>	144	77	221	34	39	73
	Mabuyu, Ubuyu, Buyu, Mibuyu	Baobab	Malaceae	<i>Adansonia digitata</i>	33	0	33	7	2	9
	Mbwiku, Mabwiku, Bwiku			Unidentified	0	25	25	0	17	17
	Matunda damu			Unidentified	12	3	15	26	1	27
Wild fruits	Ukwaju, Kaju (Tamarind)		Fabaceae	<i>Tamarindus indica</i>	34	0	34	2	0	2
	Kitoi, Vitoi, Vitowi, Futoi, Nitoi			Unidentified	0	19	19	0	12	12
	Matopetope, Topetope		Annonaceae	<i>Annona sp.</i>	6	1	7	12	3	15
	Maanga, Mahanga, (Maha, Mahange, Mahango)			Unidentified	0	14	14	1	5	6
	Vinoe			Unidentified	0	12	12	0	4	4

Table 10.1 Correlations (Spearman) between wild food intake frequency and food group intake in the dry season

	Staple	Vegetables	Meat	Fish	Milk	Pulses	Nuts	Fruits	Oil	Salt	Sugar
Correlation Coefficient	0.026	-0.001	.154**	.137**	.112**	0.020	.168**	0.046	.095*	.131**	0.001
Sig. (2-tailed)	0.533	0.981	0.000	0.001	0.008	0.628	0.000	0.271	0.024	0.002	0.980
N	572	571	568	567	567	570	568	572	570	575	572
Correlation Coefficient	.207**	.186**	.155**	.134**	.192**	.213**	.129**	.218**	.146**	.162**	.117**
Sig. (2-tailed)	0.000	0.000	0.000	0.001	0.000	0.000	0.001	0.000	0.000	0.000	0.004
N	617	609	612	610	612	613	610	617	614	618	618

Table 10.2 Correlations (Spearman) between wild food intake frequency and food group intake in the rainy season

	Staple	Vegetable	Meat	Fish	Milk	Pulses	Nuts	Fruits	Oil	Salt	Sugar
Correlation Coefficient	0.008	.125**	.148**	.156**	.093*	0.049	.231**	-0.008	0.011	0.009	0.072
Sig. (2-tailed)	0.847	0.003	0.000	0.000	0.027	0.245	0.000	0.851	0.802	0.821	0.087
N	561	563	565	565	566	567	565	570	568	569	567
Correlation Coefficient	.133**	.096*	.263**	.145**	.288**	.143**	.282**	.090*	.100*	.201**	.162**
Sig. (2-tailed)	0.001	0.018	0.000	0.000	0.000	0.000	0.000	0.027	0.014	0.000	0.000
N	602	601	599	597	596	605	600	601	603	605	606

** . Correlation is significant at the 0.01 level (2-tailed). * . Correlation is significant at the 0.05 level (2-tailed).

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Among the authors, Sakamoto is responsible for the initial draft and finalization of the article, overall inception and first draft of the questionnaire, data analysis, and supervision of the data insert. Kafanabo has modified the questionnaire, coordinated field work, and contributed to the manuscript. Kabelege was responsible for the actual field work (questionnaire explanation and collection in each of the schools), contributed in the manuscript on information of Dar es Salaam, Pwani, and the schools, and supplementing definition provided to students on the wild food. Ohmori has contributed in the research conceptualization and questionnaire contents especially related to the nutrition and health methodology. Kikuchi played a major role in data insert and its coordination. Tsuda contributed to the identification and interpretation and translation of the compiled results. All the authors have gone through the article and confirmed the final draft.

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Is Wild Food Utilized by Primary School Children in Urban and Semi-urban Areas of Tanzania? In Relation to Their Diet and Health from a Survey in Dar es Salaam and Pwani Regions

SAKAMOTO Kumiko, Eugenia KAFANABO, Eliud KABELEGE, OHMORI Reiko,
KIKUCHI Yukiko and TSUDA Katsunori

Abstract

Wild food utilization was confirmed in urban and semi-urban areas of Tanzania in East Africa. Questionnaires to 1,223 children in 16 primary schools in a urban city Dar es Salaam (D) and neighboring Pwani (P) regions were administered and analyzed. Children in D generally had higher food group intake frequency, most significant in fruits intake. Rice and meat were most mentioned in D, and maize and fish was most mentioned in P. Most common health problems were headaches, stomachaches, no appetite, and diarrhea, more frequent in P. Variety of wild food especially wild animals, fruits, and vegetables were mentioned. Frequency of wild food intake had correlation with food groups (all in P; and meat, fish, and nuts in D for both season), indicating that wild food constitutes part of the food group and/or that they are eaten in combination with other food groups. Factor analysis also confirmed that consumption of animal products was combined with intake of wild food in most cases, except in the dry season of D with more varied patterns.

Matumizi ya Chakula cha Porini kwa Watoto wa Shule za Msingi wa Maeneo ya Mjini katika Mikoa ya Dar es Salaam na Pwani Nchini Tanzania Yanavyohusiana na Hali Yao ya Lishe na Afya Ikisiri

Matumizi ya chakula vya porini yalithibitishwa kuwepo katika maeneo ya mijini nchini Tanzania iliyopo Afrika Mashariki. Wanafunzi wapatao 1,223 wa shule 16 za msingi za mkoa wa Dar es Salaam (D) na mkoa jirani wa Pwani (P) waligawiwa hojaji, walizijaza na takwimu zote zilichakatwa kwa usahihi. Kwa jumla, wanafunzi wa eneo D walikuwa na mdafoa wa juu wa ulaji wa chakula, hususani ulaji wa matunda. Wali na nyama vilitajwa zaidi katika eneo D, na mahindi na samaki vilitajwa zaidi katika eneo P. Matatizo ya kawaida ya afya yalikuwa kuumwa kichwa, kuumwa tumbo, kukosa hamu ya kula, na kuhara, nayo yalijitokeza zaidi katika eneo P. Aina kuu za vyakula vya porini vilivyotajwa vilikuwa ni nyama pori, matunda, na mbogamboga. Mdafoa wa ulaji wa chakula cha porini uliwiana na makundi ya vyakula (makundi yote katika eneo P; ya nyama, samaki, na mbegu katika eneo D kwa misimu yote miwili), hali inayoonyesha kuwa chakula cha porini ni sehemu ya kundi la vyakula na/au kwamba huliwa pamoja na vyakula vya makundi mengine. Uchanganuzi mtiririko pia ulithibitisha kuwa matumizi ya bidhaa zinazotokana na wanyama yalijumuishwa na ulaji wa chakula cha porini kwa nyakati nyingi, isipokuwa wakati wa kiangazi katika eneo D kwa namna tofauti tofauti.

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