



Trends and consequences of consumption of food and non-food items (pica) by pregnant women in Western Kenya

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ABSTRACT

Pregnancy is a memorable experience for every woman and it comes with many changes which include cravings for food and non-food items. The aim of this study was to explore the change in diet in terms of pica, food craving and aversions which occur during pregnancy. Two hundred and two pregnant women were interviewed. Food craving was reported by 73.8% of the study participants and nearly half (48.7%) had food aversions. Foods craved most were maize meal (12.5%), mangoes (9.5%), ripe banana (8.3%), beef (7.6%) and fish (5.7%). Foods avoided most were small fish (omona) (15.2%), beef (12.6%), kale (11.9%) and fish in general (10.6%). Eggs, tea and milk were also avoided. Reasons given for avoiding certain foods were: to prevent nausea (45.8%), vomiting (21.9%) and heartburn (10.4%). Other reasons given were unpleasant smell/taste and stomach ache. Pica prevalence was at 27.4%, with consumption of soil and soft stones being frequently reported. There was a highly significant association between level of education ($p = 0.02$) and history of child death/still birth ($p = 0.01$) with pica. Food cravings, aversions and pica practices should be assessed in antenatal care of pregnant women. Attention should be paid to pregnant women who have had a history of child death and women with low education level. © 2016 Published by Elsevier GmbH on behalf of Society of Nutrition and Food Science e.V. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

1. Introduction

Pregnancy is an important stage which can influence the wellbeing of future generations. In this period there is a change in maternal nutrition which contributes to the general health of the mother and child [1–3]. Pregnancy sometimes comes with the desire to consume non-food items commonly referred to as ‘pica’ [4]. Pica has puzzled researchers for a long time. It cuts across different cultures and religion. There are different forms of pica. The materials consumed also vary widely, from intake of clay or dirt (geophagia), ice or freezer frost (pagophagia), stones (lithophagia), ashes, charcoal, soap, pieces of papers, paint chips, chalk and many other non food materials [5–8]. Pica may sometimes be found in relation to micronutrient deficiency [6] but whether it is a cause or a result of the deficiency is not well understood. Other proposed causes of pica are gastrointestinal difficulties, reaction to stress, hunger and cultural belief [9]. On micronutrient deficiency, some studies have reported associated of pica with increased anemia, low plasma zinc level, low hematocrit (Hct) and low haemoglobin (Hb). This cannot completely explain whether or not pica is related to micronutrient deficiencies, but it does imply that pica is a risk for these deficiencies, all of which affect the health and wellbeing of an individual [6,8,10]. Food

craving, a strong desire for a specific food, is common, especially in pregnant women. Food craving may be related to change in hormonal levels, as a response to elevated nutritional needs, cultural factors and the presence of a specific desired ingredient in the craved food. Food aversion which is also common could be a protective function for the mother and fetus from food toxins [11]. Food aversions can be made consciously or unconsciously. It is considered a physiological mechanism where one learns to distinguish safe and toxic foods. During pregnancy, the human perceptual systems become more sensitive and certain food, smells and tastes are avoided. This frequently triggers pregnancy sickness like nausea and vomiting [12].

Food is supposed to provide nutrients for growth and general wellbeing of the mother and child therefore, understanding pica, food cravings and aversions during pregnancy is important [4]. The aim of the study was to estimate the prevalence and risk factors of pica and to assess the foods that are craved and avoided during pregnancy. This would help when formulating nutritional advice for pregnant women on better food choices.

2. Materials and methods

2.1. Study design

A cross-sectional survey was carried out in a rural–urban population in Kakamega district Hospital from November 2014 to January 2015.

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Two hundred and two pregnant women were randomly selected from the health care center as they came for the antenatal visit.

Sample size was determined from a rule of thumb where ≥ 200 subjects are considered a fair representation in a study [13–15].

A face to face interview was conducted with a detailed questionnaire on dietary habits, demographic and socio-economic characteristics including maternal age, marital status, education level and occupational status. Obstetric information including pregnancy stage, the history of stillbirths, Hb level and intake of iron and folic acid supplements (IFAS). Research permission was obtained from the National Council of Science and Technology, Nairobi, Kenya and ethically approval by Kakamega District Hospital.

2.2. Statistics

Statistical analyses were performed using SPSS version 23.0 (IBM, New York, USA). Normality of continuous variables was checked by Kolmogorov–Smirnov test. The not-normally distributed continuous variables were analyzed using Mann–Whitney test, while categorical variables were tested by Chi-square or Fisher exact test. Odds ratios for the predictors of pica were determined by binary logistic regressions. Statistical significance was set at $p \leq 0.05$.

3. Results

Two hundred and two pregnant women participated in the study. They lived in households which were mostly headed by male (80%). The mean age of the participants was 25.7 ± 5.1 (15–44) years. Most of the respondents were married (87%) and 11% single. The education level of 32% of the pregnant women was primary school, 34% went to secondary school and 34% at college/post secondary training. The main source of livelihood was employment (37%), small business (26%) casual labour (18%) and farming (4%).

Food craving was reported by 73.8% of the participants. Out of these, 27.9% craved one food while 72% craved more than one food. Food cravings were reported to be highest (48.9%) in the second trimester than in the third trimester (27.6%) and first trimesters (23.4%). Nearly half of the respondents (48.7%) had aversion to one (19.3%) or more foods (29.4%) in the pregnancy.

Most of the foods craved for were starch 'maize', followed by animal protein (beef, fish, eggs, milk) and fruits (mangoes, bananas) and others as shown in Table 1. The most common foods avoided were small fish (omena), beef, kale, fish, tea and rice (Table 2). Cravings were common during the first (30.6%) and second trimester (41.8%).

Table 1

Types of food craved for by the pregnant women at that particular time and frequency of response (N = 143).

Specific food	Count	Percent (%)
Maize meal (ugali)	33	12.5
Mangoes	25	9.5
Mixture of maize and beans (kienyeji/githeri)	25	9.5
Banana	22	8.3
Rice	21	8.0
Beef	20	7.6
Fish	15	5.7
Tea	13	4.9
Fried Irish potatoes (chips)	12	4.5
Chicken	10	3.8
Milk	10	3.8
Beans	9	3.4
Sweet potato	9	3.4
Flat bread (chapatti)	9	3.4
Soft drink (soda)	8	3.0
Kale (sukuma wiki)	8	3.0
Bread	8	3.0
African nightshade (managu)	7	2.7

Table 2

A list of the food which were commonly avoided by the pregnant women either one or combination of many foods at a time and the total percentage. (N = 98).

Specific foods	Count	Percent (%)
Small fish (sardine/omena)	23	15.2
Beef	19	12.6
Kale (sukuma wiki)	18	11.9
Fish	16	10.6
Tea	9	6.0
Rice	8	5.3
Maize meal (ugali)	8	5.3
Milk	7	4.6
Mandazi-wheat flour product, deep fried	7	4.6
Eggs	6	4.0
Flat bread (chapatti)	5	3.3
Green gram (ndengu)	5	3.3
Bread	5	3.3
Mixture of maize and beans (githeri)	5	3.3
Cabbage	5	3.3
Cowpea (kunde)	5	3.3

Most of the women who had food aversion claimed it gave them nausea (45.8%), caused them to vomit (21.9%), gave them heartburns (10.4%), had no appetite for that food (5.2%), general dislike (4.1%), dislike of smell (3.1%) or caused stomach ache (3.1%), only 2.0% had no reason for aversion.

Pica prevalence among the pregnant women was at 27.4%. Nearly half of the participants reported the use of soft stones for their pica practice, followed by house construction soil (33.9%) and termite soil (11.3%) as shown in Table 3.

There was no significant association between pica practice with women dietary diversity (WDDs), food cravings, food aversions, gender of the household head, marital status of the respondent and others as shown in Table 4. Pica practices were shown to be more prevalent among women with lower education level (below and equal to primary school) than that of higher education level ($p = 0.013$). Pica practice was also high in women with a history of child death/still birth and the association was significant ($p = 0.001$). Although there was no association between iron supplementation and pica, most of the pregnant women reported taking iron supplementation (89.8%).

Logistic regression analysis with forward selection was performed to investigate predictors of pica practices. The variables included in the analysis were gender of the household head, food craved, food aversion, child death, IFAS and Education level. The model was significant at $p \leq 0.05$. History of child death/still birth ($p = 0.00$) and college/post secondary education level ($p = 0.03$) were significant as shown in Table 5. Women with recorded child death had 4.9 times higher risk of practicing pica and college/post secondary education level had a 3.2 protective effect against pica practices.

The mean Hb level of the study population was 11.13 ± 1.58 g/dl. Hb levels in different pregnancy stages with and without pica are shown in Table 6. Only in the third trimester were Hb levels significantly lower in the pica group than the non pica group. Although the mean Hb level in the second trimester was 0.88 g/dl lower in the pica group, the difference was not statistically significant.

Table 3

Non food items mentioned by the interviewed pregnant women, which were used for pica practice (N = 53).

Non-food item (N)	%
Market stones-soft stones	43.4
House construction soil	33.9
Termite soil	11.3
Stones and soils	5.6
Charcoal	3.7
Ash	1.8

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