The dietary intake of lactating Women in Vientiane Capital, Lao PDR

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ABSTRACT

Introduction: The period of mother's lactation is a relatively brief and very special time with her newborn baby as well as a good memory in a women's life. In the Lao PDR it has been observed from various nutritional surveys that the nutritional status of lactating mothers and infants is not satisfactory, due to practicing certain food restrictions.

Method: A **c**ross-sectional study was applied to 420 lactating mothers who attend the Child Well Clinics in three district hospitals of Vientiane Capital. The Stata Version 13 statistical package was used to generate descriptive and inferential statistics such as mean, median, standard deviation and standard errors. A univariate analysis was used to describe factors associated with food consumption patterns.

Results: The study found that 62.6% of family members made decisions about buying foods for family consumption. Family income and following the MCH guidebook are positively associated with the consumption of a variety of food groups (P-value 0.022).

Conclusion: Information on existing food consumption patterns, their associated socio-demographic and health service factors can be useful for public health efforts to improve lactating mothers' nutrition and diet. Intervention may be more effective if they are targeted in specific socio-demographic subgroups such as focusing on low-income mothers.

Keywords: Food consumption, food habit, food choice, lactating mothers.

Introduction

Good nutritional status for women is important for their strong health and working capacity, as well as for the health of their offspring. During pregnancy and lactation, women are more vulnerable to under nutrition than others at the reproductive age, due to their increased energy and nutrient requirements [1].

The period of lactation is a relatively brief and very special time in a woman's life with her newborn baby serving as a fond memory, a lactating mother will need to take extra care to assure that she produces and provides for her infant high-quality breast milk. Lactating mothers, who eat a nutritious diet, ensure good health which is essential for an optimal growth pattern for their babies. In the Lao PDR it has been observed from various nutritional surveys that the nutritional status of lactating mothers and infants is not satisfactory [2].

Many of the ethnic groups in Laos have cultural beliefs that influence the food consumption of women during pregnancy and after giving birth. Restricting food items during pregnancy and while breastfeeding can affect the health and nutrition of both the mother and her child, particularly as both are already nutritionally vulnerable [3]. In environments of food scarcity, this implies a trade-off among parental and child resources and the case of food, dietary inequalities to the scope to which children's dietary adequacies exceed those of their mothers and maternal-child dietary inequalities [4].

More evidence related to malnutrition in Laos shows it is often determined through anthropometric and clinical indicators such as wasting, stunting, underweight, anemia [3] and food restrictions [5]. A study in Vientiane Capital [5] reported that in contrast to a high antenatal care attendance (91%) and delivery under health professional supervision (72%), there was a high prevalence of traditional practices found after delivery with 93% of lactating women reported to be on a restricted diet or observing food taboos.

However, little is known about food consumption patterns and what factors are related to food consumption patterns among lactating women such as actual nutritional needs and multi-factorial aspects associated with food intake and food consumption patterns that were not clear.

Therefore, assessing the multiple factors that drive the lactating mothers to make decisions about choosing foods to consume might be the key to describe the food consumption patterns of lactating mothers. This assessment was also a key input in guiding program implementers on the

social and behavioral changes in communication for lactating women and for health staff engaged in antenatal care so as to provide the requisite and correct information.

Methodology

Research subject

Lactating mothers who had children aged 0-24 months who were attending the vaccination and outpatient units of health facilities were selected. They gave voluntary consent to participate in the study.

Inclusion criteria: Lactating mothers who were willing and gave consent to participate were recruited in this study. The study was conducted in three district hospitals aiming to access lactating mothers who brought their children aged less than two years to receive vaccinations. It was thought this was a convenient way to get a suitable sample size in the short period of time for data collection. Vientiane Capital was selected as the study site because the study by Barennes in 2009 showed that 90% of lactating mothers had restricted diets [5].

Exclusion criteria: Mothers who did not have milk because they were suffering chronic illnesses (anemia, thalassemia, hepatitis, tuberculosis) were excluded from this study. It was deemed they would have special dietary patterns.

Study design

This was a cross-sectional study using a pre-testing data collection tool on food consumption patterns for lactating mothers who have children aged less than 24 months and who live in three district hospital feeder areas in Vientiane Capital.

Location and study duration

The study was conducted in three out of nine districts in Vientiane Capital, Lao PDR, representing an urban area (Sisattanak District Hospital), a peri-urban area (Hatxayfong District Hospital), and a rural area (Sangthong District Hospital). The duration of the study was one year from May 2018 to June 2019

Sample zise

The sample size of the study was 420 lactating mothers. Originally only 385 mothers consented, but this was 10% below the acceptable sample number needed. Hence extra mothers were approached and recruited for this study.

Data collection

This study was conducted in three districts hospital in Vientiane Capital, investigator has trained six volunteer who had complete medical degreed. The questionnaire had been test in Setthathilath Hospital in 30 lactating mothers investigator was adapt the question in Lao Language for understanding and meaningful for the answer. Team had divide into two people per district hospital. Data collections were using the questionnaire from by face to face interview and the interview period about 20 minute per participant in 63 questions about food consumption in Lactating women. During the interview, to obtain inform consent.

Tools

The independent variables included Individual factors, family factors, and health services factor, social environmental, and social cultural factors. The socio-demographic factors included age, Education of the lactating, Occupation, Ethnicity, Number of children/house member.

The information for mothers' factors concerned what kinds of food were useful in helping lactating women increase their breast milk and what food restrictions were applied to their diet. The questions provided a list of foods that were commonly believed to be helpful during feeding. For family factors participants were asked about barriers to food consumption according to their income or their socio-economic status. For health services the focus was on the nutrition education services for lactating women after delivering their babies. Sociocultural and environmental factors focused on food availability. The cultural factor plays a significant role in determining the level of difficulty for food taboos (food restrictions). The degree of difficulty for food taboos conditions the mother's diet as it dictates the types of self-restricted foods, and the foods believed by mothers to be helpful for breastfeeding.

The dependent variable for the questionnaire was the survey included items assessing food frequency on lactating mother was consume during breast feeding such as food regular consume per day, hot meal, get up at night to eat, the measure of food frequency also asked about w you have (breakfast, lunch, dinner). The food choice and eating habit selected from frequency asked the question of lactating mother have 9 categories such as energy, protein, dessert, oil and fat, calcium, Vitamin, iron, carbohydrate and zinc. The frequency assumes to descript food consumption.

Data Analysis

The Stata Version 13 statistical package was used to generate descriptive and inferential statistics such as mean, median, standard deviation and standard errors. A univariate analysis was used to describe factors associated with food consumption patterns. Meanwhile a p value of less than 0.05 and a 95% confidence interval were applied for statistical significance.

Ethical approval

For ethical considerations, research protocols and collection tools, these were submitted to the University of Health Sciences and the Hanoi University of Public Health. The ethical consideration was based on the concepts in the Belmont report such as respect to patients, respect to anonymity and privacy, beneficence and doing no harm. The participants were voluntary and could withdraw from the research at any time and the information acquired was kept confidential and was only used in the research work. This study interviewed lactating mothers by using a questionnaire only.

Results

Table 1 presents the individual characteristics of lactating women who were recruited for this study. Most had secondary and higher education (82.6%), more than half were employed (54.0%), one fourth were aged less than 24 years, and a clear majority earned less than 2 million kip per month. In the studied households, an average family size was just under five people with more than four fifths having less than two children and just under a quarter having families with more than five members.

Table 1: General characteristic of study subject

Individual factors	**Number (%)**
Education level	
Primary school and lower	73(17.4%)
Secondary school and higher	347(82.6%)
Occupation	
No work/housewife	193 (46%)
Employee/business/farmer	227 (54%)
Age	
≤ 24 years old	107(25.5%)

>24 years old	313(74.5%)
Mean age (Min, Max -+SD)	28(17,45- +5.5)
Monthly family income	
≤2 million kips	245(58.5%)
>2 million kips	175(41.7%)
Mean monthly family income (Min, Max ±SD)	2.322.142 (1.000.000, 9.000.000 ± 1.338.095)
Individual factors	**Number (%)**
Number of children in the Household	
≤ 2 children	366 (87.1%)
> 2 children	54(12.9%)
Average number of children in the household (Min, Max ±SD)	1.68 (1, 4 ±0.70)
Number of family members	
≤ 5 members	321 (76.4%)
> 5 members	99 (23.6%)
Average number of family members in the household (Min, Max ±SD)	4.81 (3,9 ± 1.25)

Food frequency

Table 2 shows that almost all women reported eating 2-3 times per day for the following seven food groups, namely grains (97.8%), roots and tubers (88.1%), legumes and nuts (85.7%), dairy products (94.0%), meats (98.1%, Vitamin A rich foods (99.3%), and other fruits and vegetables (98.3%).

Table 2: The frequency of eating particular food items

Food item	Eating 2-3 times and more per day		Eating less than 2 times per day	
	Number	%	Number	%
Grains (1)	411	97.8	8	2.2
Roots and tubers (2)	370	88.1	50	11.9
Legumes and nuts (3)	360	85.7	60	14.3

Dairy products (4)	395	94.0	25	6.0
Flesh foods (meats/fish/poultry/eggs) (5)	412	98.1	8	1.9
Vitamin A-rich fruits and vegetables (6)	417	99.3	3	0.7
Other fruits and vegetables (7)	113	98.3	7	1.7

Food choices, food preferences and frequency of consumption

Table 3 shows the food choices of all lactating mothers. All mothers consumed grain products (energy)/Bread/Rice and protein sources (100%). In addition, every single one of them consumed vitamin rich fruits and vegetables. Almost all lactating mothers (98.6%) consumed dairy products (calcium source) and over half of all mothers (52.4%) consumed lipid rich food (deep fried foods) and we found that less than half of the respondents ate more than four food groups.

Table 3: Food choice grouped in 4 food groups

Food choices	**N (%)**
Grain products (energy)/ Bread/ Rice and protein sources	420 (100%)
Fruits and vegetables (Green leave vegetables Vitamin C rich vegetables and fruits/ Iron rich vegetables /Vitamin A rich vegetables/ Green beans (source of zinc)	420 (100%)
Daily product (Calcium source)	414(98.6%)
Fat food (deep fry foods)	220(52.4%)
Eat four food groups	
Eat less than four food groups	223 (53.1)
Eat more than four food groups	197 (46.9)

Eating habits

Table 4 shows that 82.6% of respondents consumed food frequently and most of the time they prepared new food for each meal (90.9%). A few of the respondents woke up at night to take food because they were hungry (6.9%) and more than two thirds (67.6%) liked to eat out some time.

Food restrictions

Shows that the overwhelming majority of lactating mothers (97.3%) preferred traditional family food consumption habits. One fourth of mothers (25.9%) reported difficulties encountered while following food restrictions during the lactation period. Nevertheless, a vast majority (97.3%) of

respondents stated that they practiced traditional family food consumption habits and nearly an equal amount of respondents (95.3%) believed in traditional family food consumption habits.

Food preference

We grouped foods into 14 items, and the results reported in Table 8 indicate that most of the lactating mothers consumed grain products (97.9%). Nearly all mothers (99.3%) consumed vitamin A rich vegetables and a slightly lower percentage (88.1%) consumed fatty foods. The lowest response was for root products consumed which totaled less than 10%. Almost all of the mothers consumed green leafy vegetables (98.3%), and vitamin A rich fruits (92.1%). The bulk of lactating mothers also liked to consume fruits not rich in vitamin A , meat and other animal byproducts , seafood's , nuts and beans , dairy products , and fruit and vegetable juices . However, the consumption of beverages was more moderate with less than two thirds of mothers drinking carbonated and alcoholic drinks.

Table 4: Eating habit among Lactating women

Food consumption habit	**N (%)**
Frequency of food consumption	374 (82.6%)
Frequency of preparing new food for consumption	382 (90.9%)
Wake up at night for food	25 (6.9%)
Frequency of Eating out	284 (67.6%)
Food restrictions	
Preference of traditional family food consumption habit	409 (97.3%)
Level of difficulty following food restriction during lactation period	109 (25.9%)
Practice of traditional family food consumption habit	409 (97.3%)
Belief on traditional family food consumption habit	400 (95.3%)
Food Preference	
1 Grain products	411 (97.9%)
2 Vitamin A rich vegetables	417 (99.3%)
3 Fat food (deep fry foods)	370 (88.1%)
4 Root products	31 (7.3%)
5 Green leave vegetables	413 (98.3%)
6 Vitamin A rich fruits	387 (92.1%)

7 Other fruits	413 (98.3%)
8 Animal products including offal	338 (80.5%)
9 Other animal products	412 (98.1%)
10 Sea foods	383 (91.2%)
11 Nuts and Beans	360 (85.7%)
12 Dairy products	395 (94.1%)
13 Beverage	255 (60.7)
14 Fruit and vegetables juice	407 (96.9)

Factor affecting food consumption pattern

Table 5 shows factors including socio-demographic, individual, family, and environmental factors related to eating more or less varieties of food. It was found that women who had a family income of more than 2 million kip and who followed the MCH guide book consumed a greater variety of foods with a p value of 0.001 and 0.022 respectively**.**

Table 5: Univariate analysis of potential factors to food consumption pattern

Potential factors	Food pattern		OR (CI 95%)	P-Value
	Eat less than 4 food groups N (%)	Eat more than 4 food groups N (%)		
Education level				
Primary school and lower	42 (57.5%)	31 (42.5%)	1.220(0.691-	0,440
Secondary school and higher	151 (52.2%)	166 (57.8%)	2.153)	
Occupation				
No work/housewife	101 (52.3%)	92 (47.7%)	0.735(0.473-	0.884
Government employee/business person/farmer	122 (53.7%)	105 (46.3%)	1.144)	
Age				
< 24 years old	53 (49.5%)	54 (50.5%)	0.668(0.412-	0.433
>24 years old	170(54.3%)	143 (45.7%)	1.084)	
Monthly family income				
<2 million kip	147 (60%)	98 (40%)	2.268(1.452-	0.001*

>2 million kip	76 (43.4%)	99 (56.6%)	3.544)	
Number of children in the household				
< 2 children	199 (54.4%)	167 (45.6%)	1.579(0.850-	0.16
> 2 children	24 (44.4%)	30 (55.6%)	2.933)	
Number of family members				
<5 members	178 (55.5%)	143 (44.5%)	1.181(0.729-	0.085
>5 members	95 (45.5%)	54 (54.5%)	1.913)	
Decision making to buy foods				
Family member	89 (56.7%)	68 (43.3%)	1.471(0.959-	0.268
Women	134 (51%)	129 (49%)	2.256)	
Practice based on the hospital guide book during lactation (Pink MCH guide book)				
Yes	101 (52.7%)	62 (41.3%)	2.258 (1.566-	0.022*
No	223 (53.7%)	192 (46.3%)	3.549)	
Good perception of health care provider's health education and counseling				
Yes	24 (33.3%)	27 (66.7%)	0.625 (0.451-	0.602
No	198 (53.2%)	171 (46.8%)	1.124)	

Discussions

Food consumption pattern

Food consumption refers to the amount of food available for human intake as estimated by the FAO Food Balance Sheets. However, actual food consumption may be lower than the quantity shown as food availability depends on the magnitude of wastage and losses of food in the household e.g. during storage, in preparation and cooking as plate-waste or quantities fed to domestic animals and pets, thrown out or given away. Healthy food for consumption includes leafy greens, alliums, and cruciferous vegetables which are key components of a well-balanced diet. A healthy diet is one that helps to maintain or improve overall health. It provides the body with essential nutrition: fluids, macronutrients, micronutrients, and adequate calories [6]. Taking

at least two additional meals per day during lactation is recommended for all lactating women. Good nutritional intake supports the stamina, patience and self-confidence that nursing an infant demands. Helping women achieve appropriate nutritional status to optimize breastfeeding is important and requires a more pro-active consideration of energy and nutrient needs[7].

In Asia, postpartum maternal food restrictions (food avoidances) are common practices, especially in Laos with its multi-ethnic population, varied regions and diverse traditional cultures which affect lactation behaviors. There are different food taboos (restrictions) during breastfeeding, as mothers in lactation period are always concerned about the quality of breast milk and the volume of milk. Breast milk is important as it is the main and first form of nutrition for new born. A high prevalence of traditional practices was found, with 97% of women who delivered babies having exposure to hot beds, 95% used traditional herbal teas as the only beverage they consumed and 90% of mothers had restricted solid diets. Twenty-five percent of mothers were underweight because of an insufficient intake of calories, lipids, iron, vitamins A and C, thiamin, and calcium [5]. This study showed that the vast majority of lactating mothers (97.3%) preferred traditional family food consumption habits because they were an accepted cultural obligation and had functioned adequately for previous generations. One quarter of mothers (25.9%) reported difficulty when following food restrictions during the lactation period. However, the overwhelming majority (97.3%) of respondents stated they practiced traditional family food consumption habits and similar portion (95.3%) expressed a firm held belief in traditional family food consumption habits.

Dietary diversity, also known as dietary variety, is globally recognized as a key component of a wholesome diet. Diversity in dietary choices provided the foods are considered healthful, increases the potential for the provision of different nutrients and phytochemicals required for optimal health.

Potential factors associated with food consumption pattern

One quarter of the pregnant women in the study were aged less than 24 years, with the overall age range being 17-45 years (mean age 28 years old). comparative studies from Nigeria [8], and Vietnam [9] had age ranges for their groups of only 25-35 years. Unlike other studies, this study included more women with education levels above primary schooling. In Bangladesh [10] a study of lactating mothers' education found that about 80% had failed to complete primary schooling or had no formal education at all. We also observed that only one fourth of families had more than two children and five or more household members.

More than half of the participants claimed that they ate whenever they felt like it, and nearly half of the respondents ate more than four food groups in moderation. Most of the respondents ate fruits and vegetables daily as well as meats. The intake of moderate amounts of various foods ensures healthy weight gains for both the mother and child, and also reduces the risk of constipation and heartburn [11]. Almost all of the respondents confirmed that they forbid the intake of certain food items during pregnancy due to traditional family beliefs regarding food consumption habits and the bulk of respondents willingly applied these practices. The key factors which contributed to the respondents' good nutritional practice were receipt of health education or counseling from health care providers. Other factors contributing factors included a good socio-economic status, literacy and the support of their spouses. A husband's support during pregnancy fosters a sense of shared responsibility and can in turn affect health related habits observed in pregnancy such as nutritional habits [12].

To get a healthy diet we need to eat many different types of food each day including fruits and vegetables, grains, roots, beans, nuts and animal products. It is not healthy to eat the same food with the same components every day. Consuming a wide variety of foods is likely to increase nutrient adequacy. Good nutrition is the key to good mental and physical health. Data on food consumption has shown that lactating mothers consumed a variety of foods but the most prominent was sticky rice, a staple food in Laos. Most of the subjects ate more carbohydrates, vegetables and protein compared to Ethiopia where the majority of lactating mothers consumed cereal based foods[13].

Lao mothers consumed more than four food groups which was higher than the findings from studies in Vietnam, Bangladesh and Ethiopia [14].

The study did not have clear information about food restrictions or food taboos, and what kinds of food restrictions that mothers practiced because questions were asked about their perceptions related to traditional food habits and how difficult it was to follow these practices. It was found that only one third of women reported any difficulty following traditional food habits. In other studies they focused on food taboos and these were mostly associated with living for more than 10 years in the same local area [15].

Family factors are important and influence mothers' access to food. The study reported that only one third of mothers could decide independently what foods to buy for household consumption as other family members generally took part in the decision making for food purchases. This is because of the Lao cultural practice of sharing dishes in a meal, whereas many Western cultures

focus on the meal of the individual. Food access in this study was dependent on location and convenience status which consisted of income and family roles. The findings gained were similar to those from other developing countries among lactating mothers [16],[17].

Food advertising is another key determiner for lactating women especially consumers in Laos, Vietnam and Thailand who are in close proximity and have similar cultures and language. The majority of mothers in our study were recurrently exposed to advertisements while watching television broadcasts from Thailand. Almost half of these mothers expressed interest in buying Thai products. The relationship between media content and health behavior is well established[18].

This study found that almost all lactating women received health education and counseling from health care providers. Having the MCH guidebook for each woman has a positive effect (p 0.002) as it contains particular information on nutritious food during breastfeeding. From our findings this indicated a very important and positive effect on the nutritional status of lactating women and on proper food consumption during lactation.

In order to improve the education of lactating mothers, there has been a need to promote the counseling skills of health care providers on how to advise mothers in better ways to consume foods. Most of the mothers in Laos reported that they had received education and knew well about food consumption during breastfeeding. Numerous food guides for lactating women have been developed by various state and national agencies concerned with maternal nutrition [19].

The study could not find any relationship between the mother's level of education and current occupation to the proper food consumed during breastfeeding. Nor did it establish a connection with regard to religion or other cultural beliefs. The lactating mothers who followed the hospital guidebook could practice food consumption with more varieties of food groups than the women who did not. Hence the MCH guidebook had a positive effect on the food consumption of women.

Even though this study included populations from various areas namely urban, semi-rural and rural areas in Vientiane Capital the examination of various factors had not been explored in the past. This was a cross-sectional study with very short time for observation. The present study investigated the primary information for food consumption patterns of lactating mothers in Vientiane Capital and did not examine location as a key factor. A 1990 study in Korea observed that urbanization and income growth explain the increasing consumption of beef, pork, chicken, and wheat flour, and the proportionate decline in the consumption of rice, barley and fish.

Continuing urbanization and income growth should simply reinforce these trends. The same phenomenon is occurring in other rapidly growing Asian countries with similar dietary profiles. The implications for estimating demand are important. First, there is a declining trend in the income elasticity of rice, which became negative in the 1980s. So, rice surpluses are anticipated provided that production growth rates are not reduced by unforeseen problems. Second, there is a relatively high own-price elasticity for meats, particularly beef and pork [20]. In 2011, another study investigated the food consumption patterns of households by classifying consumer types using cluster analysis and a multinomial legit model. As a result of classification analysis, it found six types of food consumption patterns. Furthermore, the multinomial legit approach helped to identify the factors affecting these consumption patterns. The important factors influencing food consumption patterns were household income, household type, the age of the head of household and car ownership [21].

Conclusions

The majority of the lactating mothers had been educated about food consumption by medical staff, including hospital doctors. Health education or counseling from health care providers which related to micronutrients gave lactating mothers a good perception about the benefits gained from new practices. This study showed that most of the lactating women were categorized as belonging to the highest dietary diversity group.

The assessment of the nutritional status of lactating mothers deemed them to be weak. This was because the food consumption was considered below levels recommended by health authorities. The consumption of proteins, lipids and carbohydrates was inadequate according to the recommendations of the WHO.

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Availability of data materials

This dataset analyzed during the current study is not publicly available due to the privacy policy imposed by the UHS, but may be available from the corresponding author on reasonable request.

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