MINISTRY OF HEALTH

UNIVERSITY OF HEALTH SCIENCES, FACULTY OF PUBLIC HEALTH

and

MINISTRY OF EDUCATION AND TRAINING - MINISTRY OF HEALTH

HANOI UNIVERSITY OF PUBLIC HEALTH

Phonepaseuth SOUTHALACK

FOOD CONSUMPTION PATTERN AMONG LACTATING MOTHERS DURING 2019 IN VIENTIANE CAPITAL, LAO PDR

MASTER OF PUBLIC HEALTH

CODE: 8720701

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Assoc. Prof. Nguyen Thanh Ha **Dr. Sengchanh Kounnavong**

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Content

ABBREVIATIONS

ADD	Attention Deficit Disorder
DHA	Docosahexaenoic Acid
DNA	Deoxyribonucleic Acid
EFSAs	Emergency Food Security Assessments
FA	Fatty Acids
FAO	Food and Agricultural Organizational
FFQ	Food Frequency Questionnaire
IYCF	Infant and young child feeding
Lao PDR	the Lao People's Democratic Republic
MCH	Maternal and Child Health
MoHME	Ministry of Health and Medical Education
MOH	Ministry of Health
PHC	Primary Health Care
UNICEF	United Nations Children’s Education Fund
WFP	World Food Program
WHO	World Health Organization

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ABSTRACT

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

Objective: The study aimed to describe food consumption pattern and to determine its potential factors among lactating mothers during 2019 in Vientiane capital.

Method: Cross-sectional study was applied to 420 lactating mothers who attend the Child well clinics in three district hospitals of Vientiane capital. Data on food consumption pattern and potential factors included socio-demographic characteristics, individual, family factors of lactating mothers were collected using a structured questionnaire and analyzed by STATA software. Descriptive and inferential statistic was described.

Results: The study found that 62.6% of husband/family members made decision buying foods for family consumption. More than half of the participants claimed that they eat whenever they felt like, nearly half of respondents eat more than four food groups with variety of food in moderation whereas, almost all respondents eat fruits and vegetable daily and as well as meats. All women reported of following MCH guidebook and have positive perception of health care provider's education and counseling. 46.9% of respondents reported of eating more than four food groups. Family income and following MCH guidebook are positive associated with consumption of variety of food groups (P-value 0.022).

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

Introduction

Global and regional food consumption patterns and economic development are normally accompanied by improvement in the country's food supply, the graduate elimination of dietary deficiency, and improving the overall nutrition status of the country population (Vasileska & Rechkoska, 2012).

Good nutritional status of women is important for their good 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 reproductive age, due to increased energy and nutrient requirements (Desalegn, Lambert, Riedel, Negese, & Biesalski, 2018).

The period of lactation is a relatively brief and very special time in a women's life with her newborn baby as a good memory. A lactating mother will need to take some extra care to assure that she produces and provides to her infant high-quality breast milk. Lactating mothers, who eat a nutritious diet, ensure good health for they are essential for optimal growth pattern for their babies. In Lao PDR it is observed from various nutritional surveys that the nutritional status of lactating mothers and infants is not satisfactory (Banashree, 2015).

Many of the ethnic groups in Lao PDR, cultural beliefs influence consumption by 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. Infant and young child feeding (IYCF) practices refer to the age-appropriate practices of breast-feeding and introduction of complementary foods and are critical in the nutrition status of children. Together with maternal nutrition and health during pregnancy, these first 1000 days of the child's life, from inception to 23 months of age, are viewed as an important 'window of opportunity' to improve nutrition outcomes (MoH & UNICEF, 2012)

More evidence existed are related to malnutrition in Lao PDR is often determined through anthropometric and clinical indicators as, wasting, stunting, underweight and anemia (MoH & UNICEF, 2012) and food restrictions (Barennes et al., 2009). The study in Vientiane capital (Barennes et al., 2009) reported that contrasting with a high antenatal care attendance (91%) and delivery under health professional supervision (72%), a high prevalence of traditional practices was found after delivery 93% of lactating women reported a restricted diet or food taboos.

However, less is known about food consumption pattern and what factors are related to food consumption pattern among lactating women such as actual nutritional needs and multi factorial on food intake and food consumption pattern 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 enhance their nutritional status by improving intake of healthy and nutritious foods. This assessment was also be a key input in guiding program implementers on the social and behavioral change communication for lactating women and for health staff at antenatal care to provide right information.

Objective

- To describe food consumption pattern of the lactating mother in Vientiane capital during 2019.
- To determine the potential factors associated with food consumption pattern of lactating mothers in Vientiane capital during 2019.

Chapter 1

Literature Review

1.1. Definition of food, food consumption, food consumption pattern, and food restriction

Food: food is a substance (usually of animal or plant origin), consisting of nourishing and nutritive constituents such as carbohydrates, fats, proteins, essential mineral and vitamins, which (when ingested and conformed through digestion) sustains life, generates energy, and provides growth, endurance, and health of the body.

Food consumption: is a food consume by person the progress of the element according to the amount of use or eaten, the act of using, eating or drinking the condition in which information, food consumption for the process of grazing is a function of food demand and food density spring and the resource.

Food consumption patterns can be defined as the recognizable ways of eating foods rural dwellers tend to adhere to their old eating patterns rather than venturing to seek new and more proper eating habits. In order to maintain healthful diets, a variety and balance of foods from all food groups and moderate consumption of all food items is very important (Dhaliwal, 1980).

Food taboo/restriction: Food taboos refer to the restriction of specific foods as a result of social or religious customs during critical life stages like pregnancy (Zerfu, Umeta, & Baye, 2016). These include avoiding food that is too sour, too spicy or too bitter, as it is believe leading to stomach problems in the late stage of pregnancy or postpartum.

Effect of food taboo: A lack of adequate protein in the diet, further depleted by food prejudices that forbid eating what is available, can adversely affect the health status of a population, i.e., cause protein-calorie malnutrition in children, maternal depletion, premature aging, and general malnutrition in women.

The following session described the concepts of all 4 aspects: Food, food consumption, food consumption pattern, food restrictions and its effect to health, and potential related factors to food consumption pattern.

1.2. Food consumption

Food consumption refers to the amount of food available for human consumption as estimated by the FAO Food Balance Sheets. However the actual food consumption may be lower than the quantity shown as food availability depending 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 or given away. Healthy food for consumption including leafy green, allium, and cruciferous vegetables are key components of a healthy diet. A healthy diet is a diet that helps to maintain or improve overall health. A healthy diet provides the body with essential nutrition: fluid, macronutrients and adequate calories (Lean, 2015).

For people who are healthy, a healthy diet is not complicated and contains mostly fruits, vegetables, and whole grains, and includes little to no processed food and sweetened beverages. The requirements for a healthy diet can be met from a variety of plant-based and animal-based foods, although a non-animal source of vitamin B 12 is needed for those following vegan diets. Various nutrition guides are published by medical and governmental institutions to educate individuals on what they should be eating to be healthy including pregnant and lactating women. The Lao pink book for maternal and child health well child follow up is also include some nutrition guidance. Nutrition fact label are also mandatory in some countries to allow consumers to choose between foods based on the components relevant to health.

The World Health organization (WHO) makes the following 5 recommendations with respect to both populations and individuals (WHO, 2018)

1. Maintain a healthy weight by eating roughly the same number of calories that individual body is using.

2. Limit intake of fats. Not more than 30% of the total calories should come from fats. Prefer unsaturated fats to saturated fats. Avoid Tran's fats.
3. Eat at least 400 grams of fruits and vegetables per day (potatoes, sweet potatoes, cassava and other starchy roots do not count). A healthy diet also contains legumes (e.g. lentils, beans), whole grains and nuts.
4. Limit the intake of simple sugars to less than 10% of calorie (below 5% of calories or 25 grams may be even better) (WHO, 2018)
5. Limit salt/ sodium from all sources and ensure that salt is iodized. Less than 5 grams of salt per day can reduce the risk of cardiovascular diseases (WHO, unhealthy diet)

1.3 Recommended foods for lactating mothers consumption

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 consideration of energy and nutrient needs (Ongosi, 2010).

Breastfeeding provides vital nutrients and vitamins to newborn. However, many mothers are confused about what they should be eating in order to provide the safest, healthiest breast milk. A mother's diet can affect her breastfeeding newborn, making a healthy diet with adequate calories and plenty of fluids critically important for lactating mother. It was proposed that lactating mother should still have balanced diet with adding extra calorie needs, and drink more (Claussen, 1999).

Balanced Diet

In general, the ideal diet of a breastfeeding woman is not that different from a healthy diet at any stage of life. International bodies recommend a balanced diet that incorporates fresh vegetables and fruits, whole grains, protein foods and small quantities of fat. These foods should be as natural as possible-whole foods with few additives or contaminants. They stresses that the vast majority of lactating women do not follow a perfect diet at all times. Breastfeeding is still safe and healthy even when

the mother's diet is less than ideal (Claussen, 2018). The study in Vientiane capital in 2009 (Barrenes) found that during the first months, mothers did not eat popular Lao foods, such as raw or fermented vegetables, fruits, meat '*lap-mou*' (pork meat chopped with vegetable), '*sommou*' (fermented pork meat with vegetable) or '*pad-dek*' (fermented fish sauce), 'white' skinned mammals, liquid meals and sauces, sugar and spices. They also did assessment of the daily nutritional intakes of mothers that showed most of lactating women eat glutinous rice. Diet in the previous day consisted of rice associated with meat (85.3%), fish (60.0%) or both (47.6%), with fruits (50.3%) or vegetables (54.3%) or roots (22.2%) (Barennes et al., 2009).

Protein needs during pregnancy increase to about 60g/day over the entire nine month period. This is an increase of 10 to 15g/day over the needs of a non-pregnant woman. In lactation a further increase of 15-20g/day above pre-pregnancy requirements is needed since protein is responsible for various functions (Ongosi, 2010). Some of the protein in human milk is probably not nutritionally available to the infant; it serves immunological purposes instead. The high quality of protein in human milk and its precisely balanced quantity meet the energy needs of infants. The protein is composed of five major components: (1) alpha-lactalbumin, (2) serum albumin, (3) lactoferrin, (4) immunoglobulin, and (5) lysozyme (Henry-Unaeze, 2013)**.** While breast-feeding you should eat two to three servings of protein each day. A serving is equal to 3 to 4 ounces of meat, fish or poultry (Ongosi, 2010).

The percentage daily energy that comes from **fat** does not change during pregnancy (Ongosi, 2010). However, diet does play a role in the amounts and types of lipids found in breast milk. They should not be totally avoided, since fat is essential for the new tissues and cells being formed and in addition for fetus fat stores during the third trimester (Ongosi, 2010).

Extra Calorie Needs

Women who are breastfeeding should increase their energy and nutrient intakes to levels above those of non-pregnant, non-lactating women. The requirements are

greater than during the pregnancy period, since breast milk has to supply an adequate amount of all the nutrients for an infant‘s needs for growth and development**.** The nutrition requirements for breast-feeding are similar to those for pregnancy, and women are recommended to continue eating similarly, to how they were eating during their pregnancy. However, a breast-feeding woman needs 200 more calories per day than she did during pregnancy, and it is important that the calories come from nutritious foods. Breast-feeding women usually lose 1 to 4 pounds per month without restricting their calorie intake (Center, 2002 - 2018).

While lactating, women do require more calories than they otherwise would. Though actual calorie requirements depend upon body fat percentages and activity levels, in general, breastfeeding mothers are recommended to increase consumption by approximately 500 calories daily. However, this does not give women the green light to eat fast food and ice cream, mothers should be mindful to incorporate these extra calories through nutrient-rich foods.

Nursing mothers need slightly more vitamin C than they did during pregnancy. If you are 18 years of age or younger, you should get 115 milligrams of vitamin C per day (Chen et al., 2012). During lactation 20mg/day vitamin C is secreted in milk. For an assumed absorption efficiency of 85%, the mother will need an extra 25mg (Ongosi, 2010).

Calcium is a significant component of breast milk. As in pregnancy, calcium absorption is enhanced during lactation and urinary loss is decreased. In addition, some calcium appears to come from demineralization of the mother‘s bones and increased dietary calcium does not prevent this (Ongosi, 2010). The suggested daily intake of calcium for breast-feeding mothers is 1,300 milligrams per day. Reading nutrition labels can help ensure that you are getting enough calcium. For example, one cup of milk or yogurt contains 300 milligrams of calcium (Center, 2002 - 2018).

Calcium and phosphorus supplements are sometimes given to breastfed infants with low birth weight who should be monitored for hyperkalemia (calcium > 11

mg/dl), babies absorb 67 percent of the calcium in human milk as compared to only 25 percent of that in cow's milk (Henry-Unaeze, 2013).

Iron is also important for breast-feeding mothers (Center, 2002 - 2018). Iron is needed for psychomotor development, maintenance of physical activity and resistance to infection. Its deficiency develops when the intake of bio-available iron does not meet requirements or when excessive physiological or pathological losses of iron occur. Prevalence of iron deficiency varies greatly according to age, gender and physiological, pathological and socio-economic conditions. The requirements decrease from 27mg/day to merely 9mg/day, compared to pre-pregnancy amounts of 18mg/day. This is because iron is not a significant component of breast milk and in addition, breast-feeding usually suppresses menstruation for a few months minimizing iron losses (Ongosi, 2010). For the first few months of life, healthy, full term infants draw on extensive iron reserves generally present at birth. Normally, an infant's hemoglobin level is high (16–22 mg/dl) at birth and decreases rapidly as physiological adjustment is made to extra uterine life (Henry-Unaeze, 2013).

Zinc is an essential trace element in human and animal nutrition, with protective properties against endogenous or exogenous aggression, necessitated by the hyper production of highly reactive oxygen derivatives, which are substances that promote biochemical reactions in the body (Ongosi, 2010). Zinc requirements are based on growth velocity; therefore, requirements are relatively high in the very young infant and decrease with increasing age of the infant. For fully breastfed infants, a combination of high absorption and efficient conservation of intestinal endogenous zinc retain enough zinc to meet the demands of infant growth in the face of modest intake (Henry-Unaeze, 2013). It is fundamental for growth, development, reproduction and immune response. Variations in plasma zinc concentration occasioned by disease, pregnancy, or stress and fluctuations in dietary intake are common. It is beneficial for growth, maintenance of the immune function which enhances prevention and recovery

from infectious diseases, maintains sense of taste and smell, and is needed for DNA synthesis (Ejezie & Nwagha, 2011).

Vitamin A is essential for vision acuity, maintaining mucosal surfaces of the respiratory, gastrointestinal, and genitourinary tracts and for differentiation of immune system cells; however excess preformed vitamin A exerts teratogenicity effects. The recommended dietary allowance in lactation is 850μg/day which gives a normal retinol concentration in breast milk of 485μg /liter (Ongosi, 2010). Human milk is a good source of vitamin A (200 IU/dl), which is present mainly as retinol (40–53 mg/dl). Required for vision and maintenance of epithelial structures, vitamin A is at highest levels in the first week after birth and then gradually declines (FAO, WHO, & UNU, 2001).

The three major types of dietary carbohydrate are starch, sugar and fiber. Many people regard starch and sugar as fattening and therefore to be avoided. Refined sugar is commonly blamed to cause Attention Deficit Disorder (ADD) and fiber is known as something to consume to avoid constipation. Intake of excess carbohydrate can cause weight gain, and only a small percentage of children with Attention Deficit Disorder (ADD) are actually sensitive to sugar. In lactation, carbohydrate intake is slightly increased by 80g/day from 130g/day recommended for pregnancy. Human milk has a very high lactose content (the principal carbohydrate in milk), about 7g/dl and provides about 40% of energy to the infant (Ongosi, 2010).

Impact on Baby

The nutrient intake of lactating women is one of most important determinants of woman's health, well-being and the ability for long-term successful breastfeeding. Human lactation is a natural process, which is well established to provide many health benefits for both mothers and their infants. The nutrient intake of lactating women affects the nutrient content of breast-milk and maternal health (Chen et al., 2012). Everything a breastfeeding mother eats is passed along to her child. Breast milk is consistent in terms of vital nutrients, but babies may react differently to various foods

the mother consumes. Dairy products and peanut butter may make some babies gassy; others may become fussy when their mother eats spicy foods.

Lactation is the most energy-demanding phase of human reproduction. The energy cost of milk production in the first six months of exclusive breastfeeding increases women‘s daily energy needs by 30% or 1260 kJ/day above the pregnancy energy requirement. An additional 500 kcal for the first six months, and 400 kcal during the next six months, are required for a lactating mother (Ongosi, 2010).

The energy cost of lactation is determined by the amount of milk that is produced and secreted, its energy content, and the efficiency with which dietary energy is converted to milk energy. the energy requirement of a lactating woman is defined as the level of energy intake from food that will balance the energy expenditure needed to maintain a body weight and body composition, a level of physical activity and breast milk production that are consistent with good health for the woman and her child, and that will allow economically necessary and socially desirable activities to be performed (FAO et al., 2001).

Drink Up

A breastfeeding mother should drink at least enough to quench her thirst, a minimum 13 cups per day. Water is the best choice for hydration, though milk and juice are also options. Because they could potentially affect the baby, it may be best to limit caffeinated drinks and alcoholic beverages while breastfeeding. Additionally, alcohol consumption may slow production of breast milk. It was reported (Barrennes, 2009) that 95% of studied women drank only traditional unsweetened herb tea in the first 15 days postpartum as herb tea was considered to be beneficial for lactation (70%), healing of tissue injuries caused by delivery (67%) and for prevention of cardiac failure (29%) (Claussen, 1999).

Summery the best diet

International bodies recommend a balanced diet that incorporates fresh vegetables and fruits, whole grains, protein foods and small quantities of fat. Protein in

lactation a further increase of 15-20g/day above pre-pregnancy requirements is needed since protein is responsible for various functions. Extra need calorie was a breast-feeding woman needs 200 more calories per day than she did during pregnancy, and it is important that the calories come from nutritious foods. The suggested daily intake of calcium for breast-feeding mothers is 1,300 milligrams per day. Human milk is a good source of vitamin A (200 IU/dl), which is present mainly as retinol (40–53 mg/dl). The energy cost of milk production in the first six months of exclusive breastfeeding increases women‘s daily energy needs by 30% or 1260 kJ/day above the pregnancy energy requirement.

1.4 Food consumption assessment

Food frequency questionnaire (FFQ) is an approach that asks respondents to report their usual frequency of consumption of each food from a list of foods for a specific period. Information is collected on frequency, but little detail is collected on other characteristics of the foods as eaten, such as the methods of cooking, or the combinations of foods in meals. Many FFQs also incorporate usual portion size questions or specify portion sizes as part of each question. Overall nutrient intake estimates are derived by summing, overall foods, and the products of the reported frequency of each food by the amount of nutrient in a specified (or assumed) serving of that food to produce an estimated daily intake of nutrients, dietary constituents, and food groups. In most cases, the purpose of an FFQ is to obtain a crude estimate of usual total daily intakes over a designated time period (F. E. Thompson & Subar, 2013). In this study, only frequencies of consumption of each food from a list of foods during lactation period were asked.

1.5 Food taboo/restriction and its effect to health

Food taboos refer to those foods that are strictly forbidden for health, cultural, and religious reasons. Other food taboos are related to cultural traditions and norms, and do not harm the health of mothers and babies. Among these taboos are avoiding

forms wildlife, such as monkeys, bats, cave animals, snakes and eggs (Silke STOEBER, 2013).

1.6 Potential related factors on food consumption pattern

Diets evolve over time, being influenced by many factors and complex interactions. Income, prices, individual preferences and beliefs, cultural traditions, as well as geographical, environmental, social and economic and access to food factors all interact in a complex manner to shape dietary consumption patterns.

1.6.1. Food consumption pattern

Variety in diet implies choosing a number of different foods within any food group, rather than eating the "same old thing" day after day. Food consumption patterns has been observed to be influenced by socio-economic factors including sex, income, occupation, type of house and source of cooking energy, food consumption patterns of the mother prior to conception during pregnancy and lactation affects the reproductive cycle and health of the newborn infant. A mother with poor food consumption patterns has the risk of delivering a baby that is physically and mentally handicapped. Wright and Sims (1987) assert that many complex interacting systems affect man's food consumption pattern and his consequent state of health. They further explained that natural environment (climate, topography soil conditions etc) determines what food can be produced. The man made environment (technological developments for processing, storing and distribution of food) affects what food will be made available for consumption (Dhaliwal, 1980).

Proper and adequate food consumption patterns is the instrument for achieving other rural developmental goals, most especially those connected to reduction in child mortality and improvements in maternal health. Primary educational enrolment and achievement, gender equity and the capacity of resist disease, in order to be healthy and active women need to have food in adequate quantity, quality and variety in order to meet energy and nutrient (Dhaliwal, 1980).

Fasting diet plan is another food consumption pattern that can help individual loss their weight by fasting (Fitness, 2013). Ramadan fasting was affected nutritional status, dietary nutrient intake, birth outcome, breast milk composition, and health status of women in reproductive age. The main difference between religious fasting and the ordinary type of food taboo is its momentary nature, in which abstention from eating animal source foods and/or from eating certain foods is done for fixed periods of time (Desalegn et al., 2018)

1.6.2 Factors associated with food consumption pattern

1.6.2.1 Income

Income is considered to be one of the most important factors in determining food consumption patterns. The high-income was the consumption of meat, milk, eggs and cereals. The low-income levels, the cheap foods such as meats, bread, sugar and rice are the main source of energy. The some people as the incomes rise, people have to more expensive foods such as meat, poultry, fruits and luxury foods. The household income increased the availability of meat, fish, milk, eggs, fruits and vegetables increased. There are diversification occurs in the quantity and quality of food consumed (Musaiger, 1993).

In the Lao People's Democratic Republic (PDR), a lower–middle income country in South East Asia with high maternal and child mortality, the Ministry of Health has promoted BF since the mid-nineties (Lee, Durham, Booth, & Sychareun, 2013).

1.6.2.2 Education

Education is the practice of equipping and empowering family members to develop knowledge and skills that enhance well-being and strengthen interpersonal relationships through an educational, preventive, and strengths-based approach (Relations, 2019). Illiteracy and ignorance of sound was eating habits food consumption, especially among the women, who was mainly responsible for food preparation and infant feeding. For the studies have been carries out on the effect of

education on the dietary habits of the family in this region. However, education is not always connected with good food habits (Musaiger, 1993).

1.6.2.3 Occupation

There are some occupations which are more or less closely connected with dietetics. Workers in lead, plumbers, painters, polishers, pottery glaziers, et al, should be taught to be very careful to cleanse the clothing, hands, and especially their finger nails, before eating and should never be permitted to bring their food into the workrooms (W. G. Thompson, 2018).

1.6.2.4 Ethnicity

An ‘ethnic group’ has been defined as a group that regards itself or is regarded by others as a distinct community by virtue of certain characteristics that will help to distinguish the group from the surrounding community. Ethnicity is considered to be shared characteristics such as culture, language, religion, and traditions, which contribute to a person or group’s identity (Ireland, 2019).

1.6.3 Family factors.

Social support from husbands, mothers, sisters, healthcare providers, communities, employers and policy makers is also critical to breastfeeding success (Ongosi, 2010).

1.6.3.1 Role of husband in food consumption decision

Husband is an individual who has an important role as a determinant of behavior of lactating mother. Adoption of this conceptualization holds the potential for more comprehensive descriptions of husband and wife role structure at both the macro-analytic and the micro-analytic level, suppose, for example, that husbands and wives responded to the categories to describe the role structure of various purchase decisions. The husbands' and wives' matched responses for a given decision at a particular stage in the decision-making process. Husband and wife- dominant and joint decisions (Burns, 1977).

1.6.3.2 Family members in food consumption

A family member was eating habits of affected by individual factors and the family food environment (Hebestreit et al., 2017). When the family members received their paychecks, a greater quantity and variety of food was available on the tables, in the pantries and cupboards (Chuproski, Tsupa, Fujimori, Ribeiro, & Mello, 2012).

The main source of nutrition information among lactating women is the Maternal and Child health (MCH) clinics. Other sources include the antenatal clinics during pregnancy, school curriculum depending on their education levels, radio, television, friends and relatives.

1.6.4. Cultural and religious diets

Many cultures hold some food preferences and some food taboos. Dietary choices can also define cultures and play a role in religion. For example, only kosher foods are permitted by Judaism, halal foods by Islam, and in Hinduism beef is restricted (Luca Bossi, 2014). In addition, the dietary choices of different countries or regions have different characteristics. This is highly related to a culture's cuisine.

In Asia, postpartum maternal food restrictions (food avoidances) are common practices, especially in Lao PDR with multi-ethnic groups, regions and traditional cultures also affects the lactation behavior. There are differences taboo (restricts) food during breast-feeding, mother in lactation period always concern about the quality of breast feeding and volume of milk. Breast milk is important as it is a main and first nutrition for new born. High prevalence of traditional practices was found, 97% of woman who deliver baby had exposure hot beds, and 95% use traditional herb tea as the only beverage and 90% of mothers has restricted diets. Twenty-five of mothers were underweight because of insufficient intake of calories, lipids, iron, vitamins A, C, thiamin and calcium (Barennes et al., 2009).

1.6.5. Access to food

1.6.5.1. Home garden

Home gardens are found in both rural and urban areas where the family growing the animal and vegetable in the small-scale to serve the daily food for the family

member and selling if it's enough. These gardens have persistently endured the test of time and continue to play an important role in providing food and income for the family (Galhena, Freed, & Maredia, 2013).

These gardens have an established tradition and offer great potential for improving household food security and alleviating micronutrient deficiencies. Gardening can enhance food security in several ways, most importantly through: 1) direct access to a diversity of nutritionally-rich foods, 2) increased purchasing power from savings on food bills and income from sales of garden products, and 3) fall-back food provision during seasonal lean periods (FAO, 2010).

1.6.5.2. Animal husbandry

Livestock contribute one-third of the protein that people consume: poor people depend on animal-source food (especially dairy products) to ensure that their diets deliver the nutrients necessary for cognitive and physical development. The rearing of livestock plays an important role in enabling smallholders to have resilient livelihoods and to avoid both food insecurity and poverty; people depend on livestock for their livelihoods (Nabarro & Wannous, 2014).

1.6.5.3. Wild foods collection

In both agricultural and hunter gatherer systems, there are no easy distinctions between 'wild' and 'cultivated' foods. While food research and policy tend to consider these separately, the differences are rarely mirrored by local communities. Plant foods can thus be envisioned as 'existing along a continuum ranging from the entirely wild to the semi-domesticated, wild foods have long provided farmers a 'hidden harvest', as they have used co-evolved species and other wild biodiversity in and around their farms to supplement their foods and earnings (Bharucha & Pretty, 2010).

1.6.6 Health service factors

Healthcare service factors are the service in the health facility that provided to the patients in the communities including treatment and health promotion as well as the

health education for mother and child during ANC and post-partum. These factors may impact to the food consumption pattern of the lactating mother.

1.6.7 Health education

Health education is any combination of learning experiences designed to help individuals and communities improve their health, by increasing their knowledge or influencing their attitudes (WHO, 2019). Health education provides the knowledge on health promotion and prevention which routinely provided through the media (TV, Radio, newspaper, poster and village speaker) and through the health practitioner provides directly to the mothers. The accessibility to the health education is a key for the community to understand the health issues, therefore some area where the ethnic people are populated, the ethnic languages are needed to be translated for health education.

1.6.8 Social environment factors

1.6.8.1 Food available

Food availability data measure the use of basic commodities, such as wheat, beef, and shell eggs for food products at the farm level or an early stage of processing. Ingredients of highly processed foods, however, are included as components of less processed foods, such as sugar, flour, fresh vegetables, and fresh meat (Organization, 2008).

1.6.8.2 Food adverting

Food advertising comprises the actions used in communicating a food product's features and benefits in attempt to persuade the consumer to purchase the product. This can be done in-store, out-of-store, or even on the packaging itself (Fuller). WHO has issued the exclusive breast feeding policy (WHO), the advertisement may interfere the implementation of this policy such as the formula milk is a main issue that induces the mother’s decision to use formula milk instead of breast milk.

1.6.8.3 Market

A market is a place where two parties can gather to facilitate the exchange of goods and services. Where there is no direct physical contact between buyers and sellers. Alternatively, the term may also be used to describe a collection of people who wish to buy a specific product or service (Kenton, Jun 1, 2019).

1.6.9 Social cultural factors

Individual practices differ according to the culture in which one is brought up. For example, a paper on women‘s health in the Arab world argued for viewing women‘s health using a holistic concept of health and wellbeing. Data on cultural influences are lacking in this community and it was important to explore the cultural practices that affect the mothers ‘feeding habits in order to obtain valuable insight useful for practical policy implementation (Ongosi, 2010).

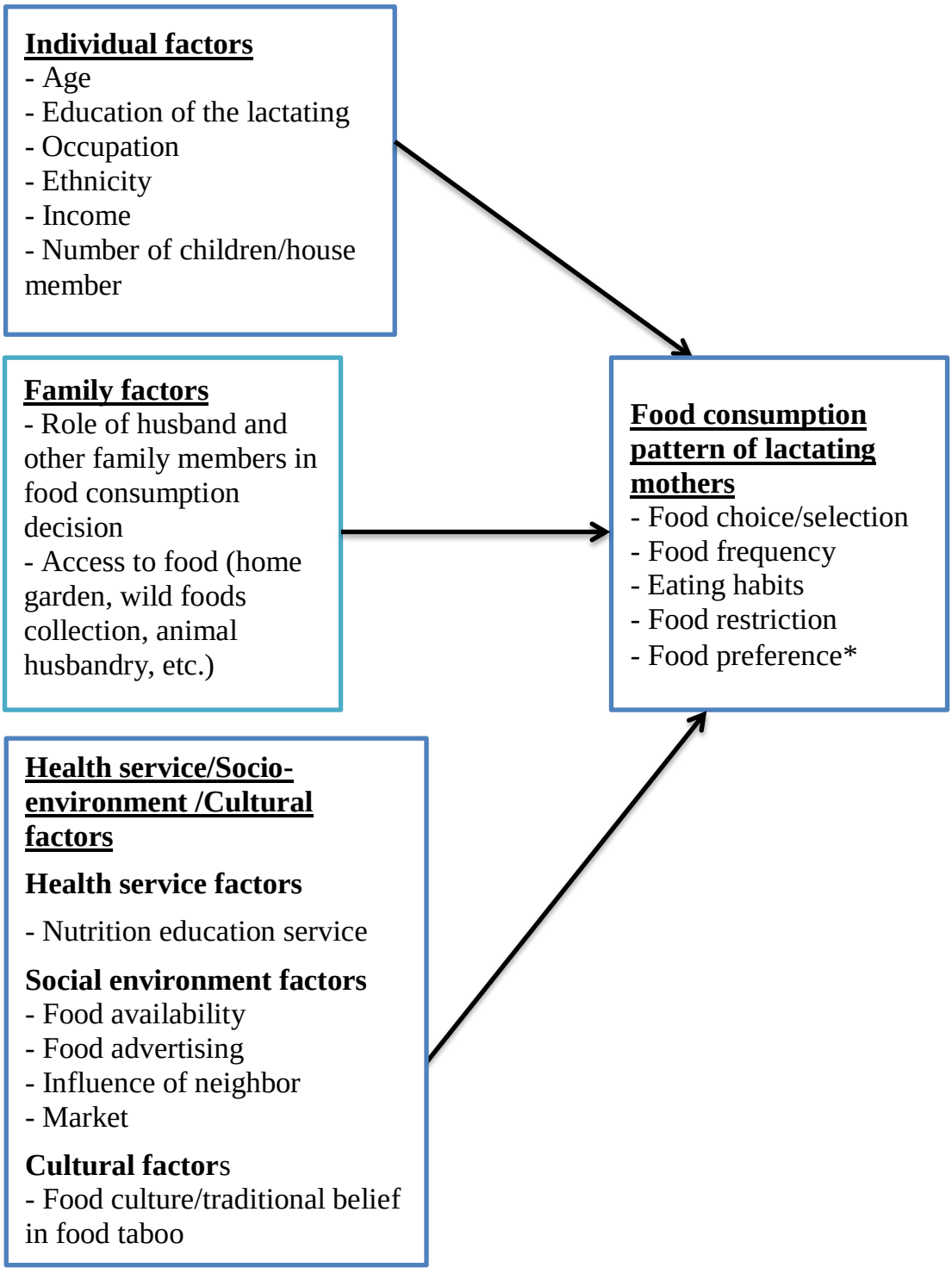
1.6.10. Food culture

Culture is proposed having three dimensions; 1) knowledge; shared ideologies, beliefs, values, norms and meanings of individuals, 2) practice; group of individuals sharing and deploying cultural knowledge and change; 3) constantly evolving culture through dynamic relationship between cultural knowledge and practice.

One cultural feature which possibly influences infant and young child feeding practices is perception of motherhood. In many studies conducted in Western countries the breastfeeding decision and practices have largely been comprised by mothers of breastfeeding being natural part of motherhood. Picturing breastfeeding as natural part of motherhood and best for the baby throws aside real experiences of breastfeeding and different challenges that the mothers may face (Ukegbu, 2014)**.**

The traditional nutritional habits are embedded in wider postpartum practices, such as the ‘hot bed’, in which mothers lie on a bed with hot charcoal laid beneath for 3–4 weeks after delivery. Traditional practices may have important health implications for both mother and infant. Early complementary food may reduce or terminate their breast-milk intake (Barennes et al., 2009)**.**

Conceptual framework



* Only food preference was used as dependent variable and utilized in the univariate analysis.

Chapter 2

Methodology

2. Materials and Methods

2.1 Study subject:

Lactating mother who have children 0-24 months of age attending the vaccination and outpatient were selected in health facilities and voluntary consent to participate in the study.

- Inclusion criteria

Lactating mother who was willing and consent to participate were recruited in this study. The study conducted in three district hospitals aiming to access lactating mother who brought their children under two years old to vaccination. It was thought this convenience way to get enough sample size awarding to short period of time for data collection.

Vientiane Capital was selected as study site because the study by Barennes in 2009 showed that 90% of lactating mothers had restricted diet (Barennes et al., 2009).

- Exclusion criteria: Mother who did not have milk with chronic illnesses (Anemia, thalassemia, hepatitis, Tuberculosis) was excluded from this study. In assumption they might have their special dietary pattern.

2.2. Time and setting for study

Setting:

The study was conducted in 3 out of 9 districts in Vientiane Capital, Laos PDR, representing urban area (Sisattanack district hospital), peri-urban (Hard Xaiy Fong district hospital), and suburb area (Santhong district hospital).

Vientiane Capital has 9 districts with population 196,731 people. It divides in 3 zones: 4 districts belong to urban zone, 2 districts belong to semi urban and 3 districts belong to rural zone. We selected represent district from 3 zones.

Study duration: The study was conducted from August, 2018 to March 31, 2019

2.3 Research design

This is a cross sectional study using pre-testing data collection tool on food consumption pattern with the lactating mothers who have children less than 24 months and lives in three districts hospital catchment areas at Vientiane capital, Lao PDR.

2.4 Sampling

$$\frac{Z^2_{(1-\alpha/2)}\, p(1-p)}{d^2}$$

n: the desired sample size

Z: the standard normal deviation set at 1.96

p: the proportion of lactating mothers who having good in food choice, but there is no similar study in Laos PDR so choose p = 0.5

d: the degree of accuracy desired, set at 5 % i.e. 0.05

Sample size of study was 385 lactating mother plus 10% of mothers who declined for participation. A total sample size of 420 lactating mothers was recruited for this study.

2.4.1 Sampling selection method

The sample was taking daily when the mothers visited target health facilities. Convenience sampling was used as sampling technique. We recruited lactating women who take their children to get the service at OPD ward in three target hospitals using convenience sampling method to select 10 mothers daily from each district hospital with a total of 14 working days to be able to get enough sample size of 420 lactating women.

Name of district hospital	Number of subjects
Hatxaiyfong district hospital	140
Sisattanak district hospital	140
Xangthong district hospital	140
Total	420

2.5. Data collection method:

This study was conducted in three districts hospital in Vientiane Capital, the 2 trained data collectors were selected for each hospital using Face to face interview.

Prior to administration of questionnaire, the research assistants were trained on the appropriate skills needed for interviewing respondents. During the interview, to obtain inform consent, objectives of the study were explained to the respondents before the interview commenced.

2.5.1 Tools

A structured questionnaire was administered to the mothers (see Appendix 1). It was used to collect information from each mother on food consumption pattern of lactating mother at three district hospitals, Vientiane Capital, Lao PDR. The questionnaire contained the following sections maternal socio-demographic, family factors, and health services factor, social environmental, and social cultural factors.

2.5.2 Measurement of Dependent variables

2.5.2.1 Food frequency

The survey included items assessing food frequency on lactating women was consume during breast feeding such as: how many meals did you regular consume per day? , answer was (1) 1-2 time per day, (2) 3-4 time per day, (3) 5-6 times a day, (4) more than 6 meals per day. How often did they have hot meals? (1) Once a day, (2) twice a day, (3) more than 3 time a day, (4) Never. Did you get up at nights to eat? (1) Yes, (2) No. the measure of food frequency also asked about where you have (breakfast, lunch, dinner). Describe the lactating woman as how often did you cook in a week? The answer was (1) never, (2) Less than once a week, (3) 1-3 times per week, (4) times a week, (5) daily

2.5.2.2 Food choice

Food types are selected from frequently asked questions of breastfeeding mother and previous study, 9 categories such as: rice and flour foods (energy) such as; sticky rice, rice, Lao noodle; meat, fish, pork chicken, eggs, bamboo, bean, nuts (protein);

banana fly and coconut (desert); dry skin pork (oil and fat); milk, soy milk, yogurt (Calcium); orange, mango, papaya, water melon, banana (Vit C); gory morning, broccoli, cabbage, salad, vegetables (Iron); pumpkin, carrot (Vit A); bread (carbohydrate); eggs, green bean (zinc); the frequency assume to descript food consumption per day, per week and per month.

2.5.2.3. Eating habit

Food habit consist within 15 questions such as: How often did you eat rice, noodle (energy)?, How often did you eat pumpkin, carrot, orange (vit C), How often did you eat coconut, dry pork skin (oil)?, How often did you eat white potatoes, white yam, cassava?, How often did you eat vegetable, cabbages, gory morning (vit A)?, How often did you eat mango, fruit?, How often did you eat liver, chicken, lamp, organ?, How often did you eat fish, meet (protein)?, How often did you eat nuts, green bean?, How often did you drink beverage such coca cola, beer, tea, wine, spy so on, all this question asked for how many that the lactation woman consume per day, each question include the name local and traditional food (specific). All questions were having the same answer list such: (0) mean never, (1) once per day, (2) 2-3 times per day, (3) 4-5 times per day, (4) 6-7 times per day.

2.5.2.4 Food restriction

Food restriction consists within 4 questions such as: how did you feel your cultural habit food and traditional? The answers were (1) feel bad, (2) feel best, (3) feel better. The degree of difficulty related self-food restriction? Answers were (1) very difficult, (2) difficulty, (3) easy. Did you consume food follow your tradition? The answers were (1) yes, all of it, (2) yes, some time, (3) Have your beliefs of eating food? The answers were (1) very trust, (2) trust, (3) no trust.

2.5.2.5 Food preference

The food preference like the same the food choice was selected from frequently asked questions of breastfeeding mother and previous study.

2.5.3 Measurement of Independent variables.

2.5.3.1 Individual factors

The information for mother's factors was the concern what kind of food was helpful the lactating women gain the breastfeeding and the restrict food that they concern to not consume the question was a list of food that they believe that it was helpful during feeding such as: drink a lot of hot food, banana flower soup, Lao Larp (raw beef), milk products and so on

2.5.3.2 Family factors

Family factor were ask for the barriers of food consumption according to their income or social economic status the question were consist of 4 domains such as: did your household inadequate money to buy food? Did you ever rely on a limited number of foods? Did you ever have experience that you want to have food but you couldn't reach it because of your family condition?

2.5.3.3 Health service

Health service health was focus on the nutrition education service for lactation woman after delivered baby consist with 4 domains such as: have your doctor provide education and counseling about food consumption during lactation?, Have you ever heard about micronutrient supplement?, Did you follow hospital guide book about nutrient food during breast feeding?, Did you think that health education is approaches infant about mother and child feeding? All items were being answer as: (0) never/no, (1) yes, sometime, (2) yes, every time.

2.5.3.4 Social environment

Socio culture and environment factors were focus on food available the question ask for the available food in local such as; Where did you buy food?, what the reason that you decide to buy food?, Did you trust that the food was safe and have quality for you and baby?, food adverting, influence of neighbor and market. The sources of information like what type of advertisement are most influential for you to buy?

2.5.3.5 Social cultural factors

Culture factor degree of difficulty with the taboo condition (food restrict) the degree of difficulty with the taboo condition (restricted) diet, types of self-restricted foods, food believed by mothers to be helpful for breast feeding. 1 the degree of difficulty related self-food restricts was categorized as four levels according by ease of maintenance: (1) very difficult, (2) difficult, (3) bearable, (4) easy. And also ask for how do they feel about culture habit food and tradition? (1) Feel bad, (2) Feel best, (3) feel better

2.6 Data analysis method

Stata version 13 Statistical package was used to generate descriptive and inferential statistics such as mean, median, standard deviation and standard errors. Univariate analysis was used to describe factors associate with food consumption pattern and p value less than 0.05 and 95% Confidence Interval for statistical significance.

2.7 Ethic consideration

For the ethical considerations, research protocol and collection tools, was submitted to the University of Health Sciences Ethics Committee for Health Research, Ministry of Health Lao PDR **Approval number: No 112/19, Vientiane, 16/01/2019**, and HUPH ethical committee Hanoi, December 26, 2018. **Approval number: 477/2018/YTCC-HD3**

The ethical consideration was based on the concept of Belmont report such as Respect to patients, Respect to anonymity and privacy, beneficence and do not harm. Participants are voluntary and can withdraw from research at any time and the information acquired is kept confidential and is only used in the research work. This study interviewed lactating mothers using a questionnaire only.

Chapter 3

Results

This chapter presents the results of the study. It focuses on the presentation, interpretation and analysis of the responses of lactating woman sampled for the study from three districts hospital (Sisattanak, Sangthong, and Hard Xaiy Fong) catchment areas. The results are presented in sections which correspond with the study's objectives.

3.1. General characteristic of lactating women

A total of 420 lactating mothers with aged 17-45 years were interviewed in 3 districts hospital, with a response rate of 100%. The study participants included 140 lactating mothers from each district hospital.

Table 1 presented individual characteristic of lactating women recruited for this study. Mostly have secondary and higher education (82.6%), more than half are employed (54.0%), one fourth had age less than 24 years old, and more than half earned less than 2 million kips. In the studied households, an average family size was 4.81 with 87.1% having children less than 2 persons and 23.6% had family members more than 5 people.

Table 1: General characteristic of lactating women

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)

Table 1: General characteristic of lactating women (cont')

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)

3.2. Potential factors of food consumption of lactating women

3.2.1 Family factors

Table 2: Potential factors of food consumption among lactating women

Family factors	Number (%)
Decision making to buy food	
Husband/family member	281 (62.6%)
Women	157 (37.4%)
Most preferable meal in the family	
All meals	349 (83.1%)
Only Breakfast and Lunch	17 (4.0%)

Only lunch and dinner	54 (12.9%)
Consumption of collected vegetables from somewhere else	407 (96.9%)
Consumption of own raised animal	418 (99.5%)
Consumption of vegetables from own garden	419 (99.7%)
Place to buy mostly food for household consumption	
Garden (home and Community market)	388 (92.4%)
Frequency of food purchase for household consumption	
Less than three time	123 (29.3%)
More than three time	297 (70.8)
Reason to purchase food in the above mentioned place	
Close home	315 (75.0%)

Table 2 showed that only one third of women (37.4%) made decision to buy food with 83.12% of family members preferred to have all meals. The consumption of collected vegetables from somewhere else is (96.9%), consumption of own raised animal (99.5%), and consumption of vegetables from own garden (99.7%). Majority of the family has bought food from market nearby was (70.8%), half of them reported that they were bought food everyday (75%)**.**

3.3 Health service/Socio- environment

3.3.1 Health service factor

Table 3: Health service factor

Health service factors	
Receiving health education or counseling from health care providers	415 (98.8%)

Ever heard about micronutrient supplementation	412 (98.7%)
Practice based on the hospital guide book during lactation (Pink MCH guide book)	415 (98.7%)
Good Perception on health care provider health education and counseling	418 (99.2%)

Table 3 presented health service factors contributing to food consumption pattern among lactating women. Most of lactating mother has been educated for the food consumption from the medical staffs in hospital. It was shown that 98.8% of them have receiving health education or counseling from health care providers, And mostly there has heard about micronutrient in sometime they visited doctor 344 (98.7%). Nearly all of lactating mother (98.7%) had followed the hospital's guide book during lactation (Pink MCH guide book), and (99.2%) of lactating mother had good perception on health care provider health education and counseling.

3.3.2 Environmental factors

Table 4: Environmental factors of food consumption among lactating women

Environmental factors	**Number (%)**
Place for vegetables purchase	
Community market	374 (89.1%)
Reason of purchasing on this place	
Fresh	166 (39.5%)
Having various of products	197 (46.9%)
Perception on safety of food purchase	394 (93.8%)
Perception on food advertisement	401 (95.5%)

Perception of positive impact of reviewing food advertisement	400 (95.2%)
Information on advertisement	380 (90.5%)
Brand and product information	227 (54.0%)
Sources of information of advertisement	
Importing product purchase	285 (67.9%)
Sources of importing products	195 (46.4%)
Reason why purchasing those importing product	
Good quality	70 (16.7%)
Various products	100 (23.8%)

Table 4 showed that a majority of lactating mothers (89/1%) buy food at community market. The main is reason to buy food from this place, because there had various products (46.9%), safety (93.8%), and fresh (39.5%). When asking about perception on advertisement, respondents mostly had good perception (95.5%) and reviewed information in particular on brand and product (90.5%). More than half of respondents (67.9%) like to purchase imported products as they believed the imported product have good quality (16.7%) and variety of products (23.8%).

3.4 Food consumption of lactating mothers

3.4.1 Food frequency

Table 5: 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

Table 5 showed that almost all women reported of eating 2-3 times per day for the following 7 food groups such as grain (97.8%), roots and tubers (88.1%), legumes and nuts (85.7%), dairy products (94.0%), flesh food (98.1%, Vitamin A rich food (99.3% and other fruits and vegetables (98.3%).

3.4.2 Food choice, food preference and frequency of consumption

Table 6: 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%)

The table 6 showed the food choices of all lactating mother consumed, all of mothers consumed Grain products (energy)/ Bread/ Rice and protein sources (100%) and 100% of them consumed type of fruit and vegetable. The almost of all lactating

mother (98.6%) has consumed daily product (calcium source) and half of all (52.4%) consumed type of fat food (deep fry foods).

3.4.3 Eating habit

Table 7: 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%)

The table 7 shown that 82.6% of respondents consume food more frequent and most of the time they prepare new food for each consumption (90.9%). Few of them wake up at night for taking food because of they were hungry (6.9%) and more than half (67.6%) like to eat out some time.

3.4.4. Food restriction

Table 8: Food restriction among lactating women

Food restrictions	N (%)
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%)

The table 8 showed that majority of lactating mothers (97.3%) preferred traditional family food consumption habit. Despite difficulty following food restriction

during lactation period with one fourth of mothers (25.9%) reported, however, 97.3% of respondents reported they practice of traditional family food consumption habit and 95.3% of respondent's belief on traditional family food consumption habit

3.4.5 Food preference

Table 9: Food preference among Lactating women

Food Preference	N (%)
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)

We grouped foods in 14 items, the results reported in table 8 indicate that almost of all lactating mother consumed grain products (97.9%), 99.3% of them consumed

vitamin A rich vegetables and high percentage (88.1%) of them consumed fat food (deep fry foods) with only few people consumed root products (7.3%). Almost all of them consumed green leave vegetables (98.3%), and Vitamin A rich fruits (92.1%). The lactating mother preferred to consume other fruit (98.3%), animal products including offal (80.5%) and other animal products (98.1%), sea foods (91.2%), nuts and beans (85.7%), dairy products (94.1%), beverage (60.7) and Fruit and vegetables juice (96.9%).

Based on the recommendation of WHO for lactating women to consume diversity of food, then food list obtained from FFQ were groups in 7 groups as Grains (1), roots and tubers (2); Legumes and nuts (3); Dairy products (4); Flesh foods (meats/fish/poultry/eggs) (5); Vitamin A-rich fruits and vegetables (6); and Other fruits and vegetables.

Table 10: Eating four food groups of lactating mother

Eat four food groups	Number	%
Eat less than four food groups	223	53.1
Eat more than four food groups	197	46.9

As recommendation, we grouped foods in 7 food groups such as Grains (1), Roots and tubers (2); Legumes and nuts (3); Dairy products (4); Flesh foods (meats/fish/poultry/eggs) (5); Vitamin A-rich fruits and vegetables (6); other fruits and vegetables (7), we found that less than half of respondents (46.9%) reported of eating more than four food groups (Table 7).

3.5. Factor affecting food consumption pattern

There are three variables under food consumption pattern (food preference, food habits, and food choice), as food preference and frequently food eaten asked the same group of foods, it was decided to group it into one new variable eating more or less than 4 food groups. This could be referring to lactating women having habit to eat more or less variety of food consumption.

Table 11: Univariate analysis of potential factors to food consumption pattern

Potential factors	Food pattern		OR (CI 95%)	P-Value
	Eat less than 4 groups N (%)	Eat more than 4 food groups N (%)		
Education level				
Primary school and lower	42 (57.5%)	31 (42.5%)	1.220(0.691-2.153)	0,440
Secondary school and higher	151 (52.2%)	166 (57.8%)		
Occupation	101 (52.3%)	92 (47.7%)	0.735(0.473-1.144)	0.884
No work/housewife	122 (53.7%)	105 (46.3%)		
Employee/business/farmer				
Age				
< 24 years old	53 (49.5%)	54 (50.5%)	0.668(0.412-1.084)	0.433
>24 years old	170(54.3%)	143 (45.7%)		
Monthly family income				
<2 million kips	147 (60%)	98 (40%)	2.268(1.452-3.544)	0.001*
>2 million kips	76 (43.4%)	99 (56.6%)		

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 food				
Husband/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 on health care provider 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)	

Table 11 shown factors included socio-demographic, individual, family, and environmental factors related to eating more or less variety of food consumed. It was found that women who have family income more than 2 million kips and women who follow the MCH guide book consumed more variety of foods with p value 0.001 and 0.022 respectively**.**

Chapter 4

Discussion

This study assessed the food consumption pattern among lactating mothers during 2019 in three district hospitals (Sisattanak, Sangthong, and Had Xay Fong) in Vientiane Capital, Lao PDR.

1. Food consumption pattern

Food consumption refers to the amount of food available for human consumption as estimated by the FAO Food Balance Sheets. However the actual food consumption may be lower than the quantity shown as food availability depending 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 or given away. Healthy food for consumption including leafy green, allium, and cruciferous vegetables are key components of a healthy diet. A healthy diet is a diet that helps to maintain or improve overall health. A healthy diet provides the body with essential nutrition: fluid, macronutrients, micronutrients, and adequate calories (Lean, 2015). 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 consideration of energy and nutrient needs (Ongosi, 2010).

In Asia, postpartum maternal food restrictions (food avoidances) are common practices, especially in Lao PDR with multi-ethnic groups, regions and traditional cultures also affects the lactation behavior. There are differences taboo (restricts) food during breast-feeding, mother in lactation period always concern about the quality of breast feeding and volume of milk. Breast milk is important as it is a main and first nutrition for new born. High prevalence of traditional practices was found, 97% of

woman who deliver baby had exposure hot beds, and 95% use traditional herb tea as the only beverage and 90% of mothers has restricted diets. Twenty-five of mothers were underweight because of insufficient intake of calories, lipids, iron, vitamins A, C, thiamin and calcium (Barennes et al., 2009). This study showed that majority of lactating mothers (97.3%) preferred traditional family food consumption habit. Despite difficulty following food restriction during lactation period with one fourth of mothers (25.9%) reported, however, 97.3% of respondents reported they practice of traditional family food consumption habit and 95.3% of respondent's belief on traditional family food consumption habit.

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

2. Potential factors associated with food consumption pattern

In general, the study included one fourth of young pregnant women less than 24 years old, with large age range between younger and older age 17-45 years (mean age 28 years old). If compare to the studied from Nigeria (Ijarotimi, 2010), and Vietnam (Nguyen et al., 2018) the range age group was 25-35 years. Unlike other studies, this study included more women with higher education than primary education. In Bangladesh (IMERA, 2016) study mothers education of lactating mothers who had failed to complete primary school education or had no formal education were about 80%. We observed that only one fourth of families have more than two children and more than five members in the households.

More than half of the participants claimed that they eat whenever they felt like, nearly half of respondents eat more than four food groups with variety of food in moderation whereas, almost all respondents eat fruits and vegetable daily and as well as meats. Intake of moderate amount of food in various varieties including fruits and vegetables ensures healthy weight gain for both mother and child and also reduces the

risk of constipation and heartburn (WHO, 2001). Almost all respondents confirmed that they forbid the intake of certain food items during pregnancy due to belief on traditional family food consumption habit and almost all respondents practice of traditional family food consumption habit. The key factors which contribute to respondent's good nutritional practice of receiving health education or counseling from health care providers. Other factors include good socio-economic status, literacy and husband support. Husband support during pregnancy fosters a sense of shared responsibility and could in turn affect related health habits observed in pregnancy including nutritional habits (Sokoya, Farotimi, & Ojewole, 2014).

To get a healthy diet we need to eat many different types of food each day including fruit and vegetables, grains, roots, beans, nuts and animal products and other. It is not healthy to eat the same food with the same components every day. Consumption 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 showed that lactating mother consumed variety of food from sticky rice (staple food in Laos), most of subject eat more on carbohydrate and more on vegetable, and protein, if compare to Ethiopia country almost all lactating mothers consumed cereal based foods (Haileslassie, Mulugeta, & Girma, 2013).

Mothers consumed more than four food groups is higher than the finding in the study from Vietnam, Bangladesh and Ethiopia (Weldehaweria et al., 2016).

The study did not have clear information about food restriction or food taboos and what kind of food restriction or food taboos that mother practice because questions were asked about their perception related to tradition food habits and how difficult to follow that practice. It was found that only one third of women reported for difficulty follow traditional food habit. In other studies they focus on food taboos and mostly food taboos were associated with living more than 10 years in the local areas (Santos-Torres & Vásquez-Garibay, 2003).

Family factor is important and influence to access to food, the study reported that only one third of mother could decide to buy food for household consumption as other family members also have more decision making to buy food. The food access was depend on location and convenient status belong to income and family role this is similar findings from other developing countries among lactating mother (Alam, van Raaij, Hautvast, Yunus, & Fuchs, 2003),(Ogechi, 2014).

Food advertises also be a one dominion important for lactation women to consume, Lao PDR, Vietnam and Thailand are in close proximately and have similar cultures and language. A 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 product. The relationship between media content and health behavior is well established (Foss & Southwell, 2006).

This study found almost all lactating women received health education and counseling from health care providers. Having MCH guidebook for each woman is positive effect (p 0.002) as in the MCH guidebook particular information on nutrition food during breastfeeding. This is indicated very important effect on nutritional status of lactating women and on properly food consumption during lactation.

In order to improve the education of lactating mothers, there is a need to promote counseling skill of health care providers on how to advise mothers the way to consume foods. Most of mothers in Laos has reported that they had education and know 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(Lee et al., 2013).

The study could not find any relation between mother's level of education and current occupation to the proper food consume during breastfeeding as well as religion or belief.

The lactating mothers, who follow the hospital guidebook, could practice food consumption with more variety of food groups than the women who did not follow the

hospital guide book. It is positive effect of the MCH guidebook to the food consumption of women. A majority of mothers in our study were repeatedly exposed to advertisements while watching television broadcasts from Thailand. Almost half of these mothers expressed interest in buying product. The relationship between media content and health behavior is well established (Foss & Southwell, 2006).

Even though, this study include the population in various areas such as urban, semi-rural and rural area in Vientiane capital the examination of various factors that have not been explored in the past. However, this was a cross-sectional study with very short time observation, and the present study investigated the primary information about food consumption pattern of the lactating mother in Vientiane capital and the study did not look at this location factor. A study in Korea since 1990 already 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 will grow if production growth rates are not reduced. Second, the relatively high own-price elasticity for meats-particularly beef and pork (Ingco, 1990). In 2011, another study also investigated the food consumption pattern of households by classifying consumer types using cluster analysis and multinomial legit model. As a result of classification analysis, it was found 6 types of food consumption patterns. Further, a multinomial legit approach is used to identify factors affecting these consumption patterns. Important factors influencing food consumption patterns are found to be household income, household type, the age of head of household, car ownership and so on (Kim, Kim, & An, 2011).

Limitations and bias

There was a limitation of geographic area, mother who took child to hospital for vaccination had difficulty to answer the questionnaire because of they had to hold baby or feeding during their respond and sometime the examiner had confused between grandmother, cousin and mother of child. Lactating women not had difficulty to answer the questionnaire base on their education and the level of wellbeing. Moreover, the lactating mother in community might not be recruited into this study.

It is a first study in Laos to seek information on food consumption pattern as in the previous study only related to food taboos and food restrictions or food habits. The method to recruit lactating mothers using convenience method might not get subject to represent lactating women as a whole; there is no standard questionnaire tool and the questionnaire used for data collection is still limited in their content and design.

Some bias might occur, as the tool is not completed to collect the pattern of food consumption and questions did not specified lactating period so studied subjects might think about overall consumption. The food consumption pattern questionnaire was not standardized nationally and it could not be represented for nationwide.

The recall bias might be occurred because the age of children was older than 12 months. The non-probability convenient sampling was used in this study which was not suitable because the cases in the community will not have the chance to be recruited.

The multivariate analysis should be further done in the next research study.

Conclusion

The aim of this study was to obtain data on food consumption pattern and the factor affecting of food consumption pattern among lactating mothers in three district hospitals, Vientiane Capital, Lao PDR

1. Food consumption pattern of lactating women

The food choices in some main items were not quite adequate including majority of score less than 50%. For the food frequency of mothers was quite acceptable due to almost scores of result was high more than 50%, however, some items was less than 50%. In addition food habit showed that the lactating mothers quite low because they did not follow good consumption of mother.

In the assessment of nutritional status of lactating mother were considered to be weak. The food consumption was considered below recommended. The consumption of proteins, lipids and carbohydrates was inadequate according to the recommendations of the World Health Organization.

2. Factor affecting to Food consumption pattern

The majority of the lactating mother has been educated for the food consumption from the staff, doctor in hospital. Health education or counseling from health care providers related to micronutrient and lactating mothers had good perception on health care provider health education and counseling. This study indicated that almost of all lactating women were categorized in the highest dietary diversity.

Factors included socio-demographic, individual, family, and environmental factors related to eating more or less variety of food consumed. It was found that women who had family income more than 2 million kips and women who follow the MCH guide book consumed more variety of foods with p value 0.001 and 0.022 respectively**.** Due to the cross sectional nature of the study, it is suggested that

longitudinal assessment be carried out in the study area in order to ascertain nutritional status of lactating women over a longer period of time.

Recommendation

The following issues are recommended:

1) To local health staff: Continuing to strengthen Primary Health Care services to deliver integrated nutrition and health interventions for women of reproductive age, pregnant women, and lactating mothers. It is important that health staff able to provide clearly message on nutrition knowledge to all mothers visiting three district hospitals, to enhance infant and maternal health. The advocacy policies must be strongly advocated to promote healthy nutrition among lactating women.

2) To Lactating mother: The health education about nutrition during pregnancy , childbirth and lactating period must be implemented nationwide that emphasizing the important nutrients in milk products , good quality, healthy, and indispensable, such as calcium, iron, vitamins that can be found at local foods, such as rice, meats, milk fruit, vegetable and other to have each vitamin.

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ANNEXS

Annex 1: English version questionnaire

Food consumption pattern among lactating mothers at Vientiane Capital, Lao PDR

ID __ __ __ __ __ __ __ __

Date of interview _____/_____/_____

Target group: Lactating mother who has child < 2 years old

Area: ☐ 001 Sisattanak District Hospital

☐ 002 Hadsayfong District Hospital

☐ 003 Sangthong District Hospital

	Questionnaire Items	Variable	Remark
I	**General information about mother**		
G1	How old are you?	……year	
G2	What is your education level that you had completed?	☐ 0= Non attended school ☐ 1= Primary school ☐ 2= Secondary school ☐ 3= High school ☐ 4= College ☐ 5= University	[ ]
G3	What is your current occupation?	☐ 0= unemployed ☐ 1= Government officer ☐ 2= Farmer ☐ 3= Private Business ☐ 4= Housewife	[ ]
G4	What is your religion?	☐ 1= Buddhist ☐ 2= Christianity	[ ]

		☐ 3= Islam ☐ 4 = Others, specify.....	
G5	What is your monthly family income?	……...……kip	[ ]
G6	How many children do you have in your family?	……..……Children	[ ]
G7	How many people do you have in your family?	…… People	[ ]
II	**Family factor**		
A	**Role of husband and other family members in food consumption decision**		
R1	Who in your family decide to buy food every day	☐ 1= You ☐ 2= Your husband ☐ 3= Family member	[ ]
R2	What is the most preferable meal you have?	☐ 1= All meals (Breakfast, Lunch and Dinner) ☐ 2= Breakfast, Lunch ☐ 3= Lunch, Dinner	[ ]
B	**Access to food of lactating mother with children < 2**		
F1	Do you ever consume wild food such as bamboo shoot, mushroom, and other	☐ 0= Never ☐ 1= Yes Sometime ☐ 2= Yes Every time	[ ]
F2	Do you ever consume animal husbandry such as chicken, duck, pork, beef, and other?	☐ 0= Never ☐ 1= Yes Sometime ☐ 2= Yes Every time	[ ]
F3	Do you ever consume vegetable from home garden or from farming?	☐ 0= Never ☐ 1= Yes Sometime ☐ 2= Yes Every time	[ ]

F4	Where do you buy the majority of the food you make at home?	☐ 1= Supermarket / Grocery Store ☐ 2= Market in the other province ☐ 3= Garden (Home or Community)	[ ]
F5	How often do you buy your food at the location indicated above?	☐ 1= 1 Time per Week ☐ 2= 2 Times per Week ☐ 3= 3 Times per Week ☐ 4= Every day	[ ]
F6	Why do you buy most of your food there?	☐ 1= Close to Home ☐ 2= Near Public transportation ☐ 3= Appropriate of place	[ ]
III	**Health service/socio/cultural factors**		
A	**Nutrition education service**		
N1	Have your doctor provide education and counseling about food consumption during lactation during your visit for child vaccination?	☐ 0= No ☐ 1= Yes Sometime ☐ 2= Yes Every time	[ ]
N2	Have you ever heard about Micronutrient supplementation?	☐ 0= No ☐ 1= Yes Sometime ☐ 2= Yes Every time	[ ]
N3	Did you follow hospital guide book about nutrition food during lactation?	☐ 0= No ☐ 1= Yes Sometime ☐ 2= Yes Every time	[ ]
N4	Do you think it is good for you when health care providers (doctor or nurse) provide you health education for mother	☐ 0= No ☐ 1= Yes Sometime ☐ 2= Yes Every time	[ ]

	nutrition during lactation?		
B	**Social environment factor**		
	Food available and food in the market		
M1	Did you buy food, fruit and vegetable from the following places?	☐ 1= Supermarket such as Home Fresh mark ☐ 2= Food store ☐ 3= Roadside Food ☐ 4= Community market	[ ]
M2	What the reason that you buy from this places?	☐ 1= Fresh ☐ 2= Have price tags ☐ 3= Clean place ☐ 4= Variety of products choices	[ ]
M3	Do you trust the safety and cleanliness of food at the mentioned aboved locations?	☐ 0= Not trust ☐ 1= Trust	[ ]
Food adverting			
A1	Advertising is beneficial to consumers because it provides important information about goods and services. To what extent do you agree with this statement?	☐ 0= I disagree ☐ 1= I agree	[ ]
A2	The more times an advertisement is viewed by a consumer, the more likely the consumer is to go and buy the product. (To what extent do	☐ 0= I disagree ☐ 1= I agree	[ ]

	you agree with this statement?		
A3	What do you look out for in an advertisement?	❒ 1= A brand that I am familiar with and trust ❒ 2= Product information ❒ 3= Price information ❒ 4= Celebrities and famous people ❒ 5= Quality of food	[ ]
A4	What types of advertisements are most influential over your buying behavior?	❒ 1= Radio adverts ❒ 2= TV adverts ❒ 3= Newspaper and magazine adverts ❒ 4= Brochures and poster adverts ❒ 5= Staff the doctor	[ ]
A5	Which methods of online advertising are most influential on your buying behavior?	❒ 1= Google advertising methods ❒ 2= Facebook adverts ❒ 3= Wi-Fi adverts ❒ 4= You tube adverts ❒ 5= Mobile and smartphone adverts	[ ]
-	**Influence neighbor**		
I1	Did you buy any product that you need from other country? **- if yes, next to I2** **- if no, next to C1**	❒ 0= No ❒ 1= Yes	[ ]
I2	If yes. Which country that you buy?	❒ 1= Thailand ❒ 2= Vietnam ❒ 3= China	[ ]
I3	What is the reason that you buy	❒ 1= Cheaper than in local	[ ]

	from those country?	☐ 2= Good quality ☐ 3= Variety product choices	
C	**Culture factor**		
C1	How do you feel your cultural habits food and traditions?	☐ 1= Feel bad ☐ 2= Feel best ☐ 3= Feel better	[ ]
C2	The degree of difficulty related self-food restriction	☐ 1= Very difficult ☐ 2= Difficult ☐ 3= Easy	[ ]
C3	Do you consume food follow your family tradition?	☐ 1=Yes, all of it ☐ 2=Yes, some time ☐ 3=No, never	[ ]
C4	Have your beliefs of eating food?	☐ 1=Very trust ☐ 2=Trust ☐ 3=No trust	[ ]
IV. Food frequency			
H1	How many meals do you regular consume per day?	☐ 0 = less than 2 time per day ☐ 1= 2 Time per day ☐ 2= 3-4 Times per day ☐ 3= More than >5 Times per day	[ ]
H2	How often do they have hot meals?	☐ 0= Never ☐ 1= 1 time per day ☐ 2= 2-3 time per day ☐ 3= More than 3 times a day	[ ]
H3	Do you get up at nights to eat?	☐ 1= No ☐ 2= Yes	[ ]
H4	How often do you cooked in a	☐ 0= Never	[ ]

	week?	☐ 1= 1 time per day ☐ 2= 2-3 time per day ☐ 3= More than 3 times a day	
H5	How frequent do you (breakfast, lunch, diner) outside the house?	☐ 0= Never ☐ 1= Once a day ☐ 2= Twice a day ☐ 3= More than 3 times a day	[ ]
V. Food habit			
B1	How often do you eat bread, rice, noodles, porridge, or other foods made from grains per week?	☐ 0= Never ☐ 1= 2-3 Time per week ☐ 2= 4-5 Times per week ☐ 3= More than >6 Times per week	[ ]
B2	How often do you eat pumpkin, carrots, squash, or sweet potatoes that are yellow or orange inside per week?	☐ 0= Never ☐ 1= 2-3 Time per week ☐ 2= 4-5 Times per week ☐ 3= More than >6 Times per week	[ ]
B3	How often do you eat banana fly and coconut desert, dry skin pork made from contain oil and fat per week?	☐ 0= Never ☐ 1= 2-3 Time per week ☐ 2= 4-5 Times per week ☐ 3= More than >6 Times per week	[ ]
B4	How often do you eat white potatoes, white yams, cassava, or any other foods made from roots per week?	☐ 0= Never ☐ 1= 2-3 Time per week ☐ 2= 4-5 Times per week ☐ 3= More than >6 Times per week	[ ]
B5	How often do you eat any dark green, leafy vegetables, such as Spinach, Morning Glory, Salad	☐ 0= Never ☐ 1= 2-3 Time per week ☐ 2= 4-5 Times per week	[ ]

	Green, and Green Leaf Lettuce per week?	☐ 3= More than >6 Times per week	
B6	How often do you eat ripe mangoes or ripe papayas or carrots or sweet potatoes (locally available vitamin A-rich fruits) per week?	☐ 0= Never ☐ 1= 2-3 Time per week ☐ 2= 4-5 Times per week ☐ 3= More than >6 Times per week	[ ]
B7	How often do you eat any other fruits or vegetables, such as watermelon, banana, Pineapple, Mango, Orange and other fruit (most commonly eaten fruits) per week?	☐ 0= Never ☐ 1= 2-3 Time per week ☐ 2= 4-5 Times per week ☐ 3= More than >6 Times per week	[ ]
B8	How often do you eat liver, kidney, heart or other organ meats per week?	☐ 0= Never ☐ 1= 2-3 Time per week ☐ 2= 4-5 Times per week ☐ 3= More than >6 Times per week	[ ]
B9	How often do you eat any other meat, such as beef, pork, lamb, goat, chicken, duck or sausages made from these meats per week? (OTHER MEATS)	☐ 0= Never ☐ 1= 2-3 Time per week ☐ 2= 4-5 Times per week ☐ 3= More than >6 Times per week	[ ]
B10	How often do you eat fish or shellfish, either fresh or dried per week?	☐ 0= Never ☐ 1= 2-3 Time per week ☐ 2= 4-5 Times per week ☐ 3= More than >6 Times per week	[ ]
B11	How often do you eat beans,	☐ 0= Never	[ ]

	peas, lentils or nuts, including any foods made from these per week? FOODS MADE FROM BEANS, PEAS, NUTS,	☐ 1= 2-3 Time per week ☐ 2= 4-5 Times per week ☐ 3= More than >6 Times per week	
B12	How often do you drink milk product per week?	☐ 0= Never ☐ 1= 2-3 Time per week ☐ 2= 4-5 Times per week ☐ 3= More than >6 Times per week	[ ]
B13	How often do you drink beer, spy, wine and other made from alcohol per week	☐ 0= Never ☐ 1= 2-3 Time per week ☐ 2= 4-5 Times per week ☐ 3= More than >6 Times per week	[ ]
B14	How often do you drink tea, soda (pepsi, coke) and other?	☐ 0= Never ☐ 1= 2-3 Time per week ☐ 2= 4-5 Times per week ☐ 3= More than >6 Times per week	[ ]
B15	How often do you drink orange juice, coconut juice and other made from fruit and vegetable?	☐ 0= Never ☐ 1= 2-3 Time per week ☐ 2= 4-5 Times per week ☐ 3= More than >6 Times per week	[ ]
VI. Food choices			
K1	Rice and flours food (energy)	☐ 0= No ☐ 1= Yes ☐ 2= Don't know	[ ]
K2	Sticky rice, rice, Lao noodle, meat, fish, pork, chicken, eggs, bamboo (fiber), bean,	☐ 0= No ☐ 1= Yes ☐ 2= Don't know	[ ]

	nut (protein)		
K3	Dry skin pork, coconut dessert (oil and fat)	☐ 0= No ☐ 1= Yes ☐ 2= Don't know	[ ]
K4	Milk, soy milk, yogurt (calcium)	☐ 0= No ☐ 1= Yes ☐ 2= Don't know	[ ]
K5	Orange, watermelon, papaya, banana (Vit c)	☐ 0= No ☐ 1= Yes	[ ]
K6	Gory morning, broccoli, cabbage, salad, vegetable (Iron)	☐ 0= No ☐ 1= Yes ☐ 2= Don't know	[ ]
K7	Pumpkin, carrot (Vit A)	☐ 0= No ☐ 1= Yes ☐ 2= Don't know	[ ]
K8	Bread (Carbohydrate)	☐ 0= No ☐ 1= Yes ☐ 2= Don't know	[ ]
K9	Green bean (zinc)	☐ 0= No ☐ 1= Yes ☐ 2= Don't know	[ ]

Annex 2: Information sheet and consent form (English version)

Who have signed here below agree to participate in this research project

Title: Food consumption pattern among lactating mother in Vientiane Capital, Lao PDR

Name: Mr. Phonepaseuth Southalack

The results of this study are useful to me as a guide to the planning and coordination of the implementation in the future.

I willingly agree to participate in this project and consent the researcher to response to the questionnaire until the interview finish. You are an important person in answering these questions, which will take about 25-30 minutes.

I have the right not to answer any questions and can withdraw from my education at any time, at any rate; all the answers are kept confidential and will not be passed to the recipient. All answers will be used in the study.

If I am not treated as indicated in the information sheet, I can report to the National Ethic Committee for Health Research, Office address at Samsenthai Road, Ban Kaognot, Sisattanack district Vientiane Capital, Lao PDR.

Tel: +856 21 214012, 250670, Fax: +856 21 214012

If there are concerns, I can ask:

Mr. Phonepaseuth Southalack, Tel: 020 77811966, the Public Health Researcher of University of Public Health

Do you agree to participate in this study?

☐ Agree ☐ Disagree

Signature of participant **Signature of the interviewer**

Annex 3: Form of participant information sheet

Title: Food consumption pattern among lactating mother in Vientiane Capital, Lao PDR

Name: Mr Phonepaseuth Southalack

Telephone: 020 77811966;
030 5345802

E-mail: phonepaseuth8993@yahoo.com

You are being invited to take part in a research project. Before you decide to participate it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and do not hesitate to ask if anything is unclear or if you would like more information.

1. Introduction

The lactation period is a major source of concern in developing countries because of its positive impact on the health and nutrition of infants. Lactating women from developing countries are considered nutritionally vulnerable groups because this period places a high nutritional demand on the mother. Inadequate maternal diet during this period will lead to poor secretion of nutrients in breast milk and this can have long term impact on the child's health.

Assessing the multiple factors that drive the lactating mothers to make decisions about choosing foods to consume might be the key to enhance their nutritional status by improving intake of healthy and nutritious foods. This assessment will also be a key input in guiding program implementers on the social and behavioural change communication for lactating women and for health staff at antenatal care to provide right information.

2. Objective

- To describe food consumption pattern of the lactating mother (food habits, food choice, food frequency)

- To determine the factors (1. mother's factors, 2. family's factors including husband participation 3. health service, 4. cultural factors) associated with food consumption of lactating mothers.

3. Methodology

3.1 Target of study

Lactating mother who have children 0-24 months of age attending the vaccination and outpatient of the selected health facilities and voluntary consent to participate in the study.

- Selection criteria: Lactating mother who are willing and consent to participate in this study.

- Exclude criteria: Mother who not breast feeding, have deformities of the body, mothers with chronic illnesses will be excluded from this study.

3.2 Sample collection

The research assistants will interview the lactating mother using the questionnaires form; responses obtain will be recorded accordingly which the sampling collection will take in 3 districts hospital selected.

4. The danger or risk may occur to the study participants.

You will not have a mental, psychological, social, or economic risk or belief, but you may need to spend about 15-20 minutes answering the questionnaire.

5. The benefits may be included in this study.

This study will provide a better understanding of the nutritional needs of maternal nutrition for breastfeeding, which will be useful to health care: useful information on nutrition and better nutrition.

6. The confidentiality of the participants

Your information will be closed, the researcher will search for information, and record all the data obtained by yourself with the help of experts to avoid the secrecy of the participants.

7. The process of providing information to participants

Research activities which involving you volunteer to participate in this research project will be as following:

- You will be explained about the risk and inconvenience that may be occurred during the research.
- You will be informed about the benefits you may receive form the research.
- You will have the opportunity to ask about the research and its related processes.
- You can withdraw from the research in any time without any impact.
- If you voluntarily agree to be a respondent, the researcher would like you sign a written informed consent form.
- Then the researcher will ask you with a set of questionnaires, you have right in deciding to participate in the research without enforcing and cheating

Annex 4: Budget, equipment and tools for the research

No.	Particulars/Description	Price/Cost norm per unit	# Units	Unit	# Units	Unit	Total	Notes
I	**Training data collection team**						**1,010,000**	
1	Lunch	50,000	6	person	1	day	300,000	
2	Coffee break	20,000	6	person	1	day	120,000	
3	Supervisor training	40,000	6	hour	1	time	240,000	
4	Equipment for training (books, pens, pencils, yellow envelope)	350,000	1	site	1	time	350,000	
II	**Pretest questionnaire form**						**360,000**	
5	Lunch	50,000	6	person	1	day	300,000	
6	Phone card for fuel facilitator	20,000	3	person	1	day	60,000	
III	**Data collection in Xangthong, sisattanak and hadxayfong district**						**7,464,000**	
7	Lunch	50,000	6	person	14	site	4,200,000	
8	Phone card for fiel facilitator	20,000	3	person	1	time	60,000	
9	Copy fee (questionnaire form)	100	12	page	420	site	504,000	
10	Supply course (Book+Pen)	5,000	420	set	1	time	2,100,000	
11	Fuel	10,000	60	litre	6	Km/litre	600,000	
V	**Proposal printing**						**50,000**	
12	Ethical fee	50,000	1	research	1	time	50,000	
VI	**Editing**						**10,560,000**	
	Editing thesis	10,560,000	1	book	1	time	10,560,000	
	Total Cost (kip)						**19,444,000**	
	Total Cost (EUR) rate = 9722 kip/EU					9722	**2,000**	

Annex 5: Research plan

No	Total time available		13 months (until 15 Aug 2019)
	Description	Time period	Detail timeline
1	Prepare thesis topic	4 weeks	16 July 2018 – 14 Aug 2018
2	Thesis topic supervision	2 days	15-16 Aug 2018
3	Prepare Proposal	6 weeks	17 Aug 2018 – 04 Oct 2018
4	Thesis proposal defense	2 days	19-20 Oct 2018
5	Revise and summit final proposal	10 days	21 Oct 2018 – 22 Nov 2018
6	Data collection	6 weeks	1-30 Jan 2018
7	Data analysis	4 weeks	03 Feb 2018 – 10 April 2019
8	Defense thesis	4 days	17-19 June 2019
9	Writing manuscript	3 weeks	1-20 July 2019
10	Revise thesis		
11	Submit final thesis	2 weeks	1-15 Aug 2019
12	Submit manuscript		

Annex 6: Certificate of approval

MINISTRY OF HEALTH
HANOI UNIVERSITY OF PUBLIC HEALTH

No.:477/2018/YTCC-HD3
Subject: Ethical Approval

SOCIALIST REPUBLIC OF VIETNAM
Independence – Freedom - Happiness

Hanoi, December 26th , 2018

DECISION
On Ethical approval for research involving human subject participation

THE CHAIR OF THE ETHICAL REVIEW BOARD FOR BIOMEDICAL RESEARCH
HANOI UNIVERSITY OF PUBLIC HEALTH

- Based on decision No. 651/QD-ĐHYTCC by the Dean of Hanoi School of Public Health on the Issuing Regulation of the Institutional Ethical Review Board of Hanoi School of Public Health; 26 June 2015;
- Based on Decision No. 560/QĐ-ĐHYTCC by the Dean of Hanoi School of Public Health on Establishment of The Institutional Ethical Review Board of Hanoi School of Public Health; 16 May 2016;
- Based on the minutes of meeting to review ethics application No. **018-477/DD-YTCC** dated December 26th, 2018,

DECIDED:

Article 1. Grant ethical approval for study:
- Study Title**: Food consumption pattern among lactating mother in Vientiane Capital, Lao PDR**
- Principal Investigator**: Phonepaseuth Southalack,** Hanoi University of Public Health
- Supervisors: Prof Nguyen Thanh Ha – Hanoi University of Public Health
  Dr.Sengchanh KOUNNAVONG
- Project time: from 10/2018 to 05/2019
- Data collection time: from 01/2019 to 02/2019
- Review type: Expedited review

Article 2. This decision is effective from **26/12/2018** to **31/05/2019**

Article 3. Principal Investigator has to send progress report once each year and a final report upon the study completion to the Institutional Ethical Review Board of Hanoi University of Public Health (IRB of HUPH).

Article 4. Principle Investigator should notify (IRB of HUPH) immediately of any adverse effects arising from this study (e.g. unexpected adverse outcomes, unexpected community/subject risk factors or complaints, etc.). Active research projects are subject to random inspect by the IRB of HUPH.

CHAIR OF HUPH IRB
(Signature and full name)

Ha Van Nhu

SECRETARY
(Signature and full name)

Nguyen Thi Minh Thanh

Lao's People Democratic Republic
Peace Independence Democracy Unity Prosperity
****

Ministry of Health
University of Health Sciences
Ethic Committee

No: 1 1 2 /19

Tel: 021 245820

Vientiane, Date

Ethical Clearance

- According to the Ethic Committee's declaration of the University of Health Sciences Number: 3809/UHS.15, dated 1 Sep, 2015.
- According to the letter of request for Ethical Clearance of Mr Phonepaseuth SOUTHALACK, Master of Public Health, Faculty of Public Health, University of Health Sciences. for research entitled: « **Food consumption pattern among lactating mothers in Vientiane Capital, LAO PDR** »

The Ethic Committee of the University of Health Sciences approved the research proposal of this study before it is initiated. This study is committed in compliance with local requirements, to confirm that it is without the physical and psychological harm of the participants as well as the ethical issues for health research. However, we believed that this study/project will contribute to a great importance of health promotion; it will also be a direct and indirect participants' beneficial and to be a crucial database in the further research of the University of Health Sciences and Health sectors in the country.

Hence, the Ethic Committee of the University of Health Sciences sincerely agreed to approve in term of ethical clearance for this study/project.

V-President of the
University of Health Sciences

Assoc. Prof. Dr. Mayfong Mayxay

for President of the
Ethical research committee

Dr. Bansa OUPATHANA

Annex 7: BIOGRAPHY

Name: Mr.Phonepaseuth SOUTHALACK

Date of birth: November 12th 1989

Work experience: Hardxayfong District Hospital Office

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