INFANT FEEDING PRACTICES AND THEIR ASSOCIATION WITH PICKY EATING BEHAVIOUR AMONG TODDLERS ATTENDING MATERNAL AND CHILD HEALTH CLINICS IN KOTA BHARU KELANTAN

DR. SITI HAZAR SALAMON

DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE DEGREE OF MASTER IN MEDICINE (PAEDIATRICS)

UNIVERSITI SAINS MALAYSIA

2020

Infant feeding practices and their association withpicky eating behaviour among toddlers attending Maternal and Child Health clinics in Kota Bharu Kelantan

DR. SITI HAZAR SALAMON

Main supervisor:

1. **DrRowanibintiMohdRawi**

   Consultant Paediatric Geneticist

   Department of Paediatrics,School of Medical Sciences

   UniversitiSains Malaysia

Co-supervisors:

1. **Associate Professor DrNoorizanHjAbd Majid**

   Consultant Paediatric Gastroenterologist

   Department of Paediatrics, School of Medical Sciences

   UniversitiSains Malaysia

2. **Associate Professor DrAriffin bin Nasir**

   Consultant Paediatrician

   Department of Paediatrics, School of Medical Sciences

   UniversitiSains Malaysia

UNIVERSITI SAINS MALAYSIA

2020

ACKNOWLEDGEMENT

Thank youAllah SWT for guiding me and give me the wisdom and confident to complete this study.

I would like to take this opportunity to express my thanks and appreciation to my family, supervisors and colleague to make the research possible

- Greatest thanks to my husband and family for their encouragement, support, and patience during the completion of this study.
- Associate Professor DrSarwanybinti Mohamed, Head of Department and Lecturer in Paediatrics Department, School of Medical Sciences, UniversitiSains Malaysia for her approval and guidance in this study;
- My main supervisor DrRowanibtMohdRawi for her advice, guidance and support throughout this study;
- My co-supervisorsAssociateProfessor Dr. NoorizanbtAbdul Majid and Associate ProfessorDrAriffin bin Nasir, for the guidance in data interpretation and analysis.
- Special thanks to my research assistant, colleagues, nurses, and staffs at Maternal and Child Health Clinics in Kota Bharu,Medical Research Ethics Committee Ministry of Health Malaysia and Research Ethics Committee of UniversitiSains Malaysia.

TABLE OF CONTENTS

LIST OF TABLES AND FIGURE

LIST OF ABBREVIATION

Hospital USM	Hospital UniversitiSains Malaysia
MCH	Maternal and Child Health
NHMS	National Health Malaysia Survey
NPANM	National Plan of Action for Nutrition of Malaysia
MPFS-5	Fifth Malaysian Population and Family Survey
NPFDB	National Population and Family Development Board
WHO	World Health Organisation
UNICEF	United Nations International Children's Emergency Fund
BMI	Body Mass Index
SPSS	Statistical Package for the Social Science
SD	Standard deviation
IQR	Inter quartile range
CI	Confidence interval
ROC	Receiver operating characteristic
OR	Odd ratio
aOR	adjusted Odd ratio
MLR	Multiple Logistic Regression
BFHI	Baby-Friendly Hospital Initiative
MOH	Ministry of Health
TV	Television

ABSTRAK

AMALAN PEMAKANAN BAYI DAN TINGKAH LAKU PEMAKANAN YANG TIDAK NORMAL DI KALANGAN KANAK-KANAK DI KLINIK KESIHATAN IBU DAN ANAK DI KOTA BHARU KELANTAN

Objektif: Kami menjalankan kajian ini untuk melihat ciri-ciri amalan pemakanan bayi; dan prevalen tingkah laku pemakanan yang tidak normal serta faktor-faktor penyebabnya di kalangan kanak-kanak berumur 18 hingga 24 bulan yang hadir di Klinik Kesihatan ibu dan anak (MCH) di Kota Bharu, Timur Semenanjung Malaysia.

Kaedah:Ini adalah sebuah kajian rentasyang dijalankan dari Julai hingga September 2019. Data telah diambil melalui temuduga menggunakan borang soal selidik berstruktur yang mengandungi data demografi kanak-kanak dan penjaga, ciri amalan pemakanan bayi dan tingkah laku amalan pemakanan yang tidak normal.Data telah dianalisis menggunakan model regresi logistik dan keputusannyadiselaraskan dengan nisbah kemungkinan padaselang keyakinan95%.

Keputusan: Tiga ratus dua (302) kanak-kanak telah terlibat dalam kajian ini. Hasil kajian menunjukkan bahawa hanya 72% bayi telah diberi susu ibu dalam tempoh satu jam selepas dilahirkan. 65% telah diberikan susu ibu secara ekslusif sehingga umur 6 bulan; 63% sehingga satu tahun; dan 45% di antara 18 hingga 24 bulan. Majoriti (86.1%) kanak-kanak telah di berikan makanan pelengkapsemasa berumur 4 hingga 6 bulan.Dalam hal ini, sebanyak 79% kanak-kanak telah didapati mempunyai sekurang-kurangnya satu tingkah laku pemakanan yang tidak normal; neophobia terhadap makanan 19% (95% CI = 14.6%, 23.8%),

penolakan makanan 36% (95% CI = 30.7%, 41.8%), kecenderungan untuk kaedah penyediaan makanan tertentu 52% (95% CI = 46.5%, 58.1%) dan variasi makanan yang terhad 48% (95% CI = 42.3%, 53.8%). Faktor yang didapati berkait rapatsecara signifikan dengan tingkah laku pemakanan yang tidak normal termasuklah (1) penangguhan pemberian susu ibu dalam tempoh satu jam selepas kelahiranberkait rapat denganpenolakan makanan (p=0.007) (2) bapa yang berpendapatan rendah dengan sifat memilih makanan yang spesifik (p=0.015) (3) bapa yang mempunyai anak lebih lima orang dengan variasi makanan yang terhad (p=0.007) (4) jenis makanan pelengkap yang digunakan sama ada berbentuk separa pejal vs makanan kisardengan penolakan makanan (p=0.006) (5) pemberian pencuci mulut dan manisan dengan kecenderungan memilih makanan spesifik (p< 0.001).

Kesimpulan: Prevalenterhadap tingkah laku pemakanan yang tidak normal adalah tinggi iaitu sebanyak 79%. Faktor yang mempengaruhi termasuklahpenangguhan pemberian susuibu dalam tempoh satu jam selepas kelahiran, bapa yang pendapatan yang rendah dan mempunyai anak lebih dari lima orang,pemberian makanan separa pejal semasa penceraian susu dan pemberian pencuci mulut dan manisan sebagai sebahagian daripada penceraian susu.

Kata kunci: amalan pemakanan bayi, penyusuan eksklusif, makanan pelengkap, tingkah laku pemakanan yang tidak normal

ABSTRACT

INFANT FEEDING PRACTICES AND THEIR ASSOCIATION WITH PICKY EATING BEHAVIOR AMONG TODDLERS ATTENDING MATERNAL AND CHILD HEALTH CLINICS IN KOTA BHARU KELANTAN

Objectives: We undertake a research to look at the characteristics of infant feeding practices; prevalence of picky eating behaviour and their associated factors among children aged 18 to 24 months attending the maternal and child health (MCH) clinics in Kota Bharu, a city in northeast Peninsular Malaysia.

Methods: This was a cross-sectional study conducted from July to September 2019. Data was collected via interview using structured questionnaire contained demographic data of toddlers and caretakers, characteristic of infant feeding practices and picky eating behaviour. Logistic regressions were used for data analysis and the results were presented by adjusting odds ratios with 95% confidence intervals.

Results: Three hundred and two (302) toddlers were involved in this study. Breastfeeding was initiated within the first hour of birth for the majority of infants (72%), 65% continued the exclusive breastfeeding for six months; 63% up till one year old and 45% by 18 to 24 months old. The majority (86.1%) were weaned at 4 to 6 months old. In this sense, 79% was found to have at least one picky eating behaviour; food neophobia 19%, food rejection 36%, tendency for preferring specific food preparation method 52% and limited variety of food 48%. Factors found to be independently associated with picky eating behavior include (1)

delayed initiation of breastfeeding after delivery with food rejection (p=0.007) (2) father's low income with preference for specific food (p=0.015) (3) father's children more than five with eating limited variety of food (p=0.007) (4) types of weaning foods; semisolid food vs blended food with food rejection (p=0.006) (5) serving of dessert and candies with preference for specific food (p<0.001).

Conclusions: The prevalence of picky eating behaviour is high at 79%. The associated factors include delayed breastfeeding initiation after birth, low parental income and parents with children more than five, the use of semisolid for weaning, and serving sweet foods such as candies as part of the weaning diets.

Keywords: infant feeding practice, exclusive breast feeding, complementary feeding, picky eating behavior

(No of Words: 317 words)

CHAPTER I: INTRODUCTION

There is various definition of picky eating. In general, the term is used to identify individuals who have powerful food preferences; a limited food intake; a restricted consumption of vegetables; and who are averse to try new foods.[1]Other more specific description include food refusal; eating a limited variety of food; an unwillingness to try new food (food neophobia);[2]low enjoyment of food, slowness in eating and higher satiety responsiveness:[3]having strong opinions on foods preferences;choosy on how the food is prepared or the choice of food groups. The most common behaviours occuring 'all the time' were eating slowly or holding food in the mouth; refusing food, particularly fruit and vegetables; eating sweets and fatty foods instead of healthy foods; food neophobia, eating snacks instead of meals and accepting only a few type of foods.[4]Food neophobia was defined as an unwillingness to try new foods, with a prevalence between 40% and 60%.[5] However, the terminology is only appropriate for children above one year old as younger children is too young to experience neophobia, hence any parental concept of picky eating in this age group is unlikely to be true reflection of picky eaters.[6]

Feeding in early life is likely to affect feeding behaviour in later childhood. The first few years of life are recognized as a critical period for the development of food acceptence pattern.Eating behaviours evolve during the first years of life; children learn what, when, and how much to eat through direct experinces with food and by observing the eating behaviours of others.[7]The development of picky eating may be affected by factors such as pressure to eat, personality factors, and parental practices/ feeding styles, including parental control and social influences,[8]as well as specifics factors, such as the

absence of exclusive breastfeeding, the introduction of complementary foods before 6 months[9]and the late introduction of chewy foods.[10]

Infant feeding practices comprises breast feeding and complementary feeding have major roles in determining the nutritional status of the child. WHO has defined the following indicators for the study of feeding practices of infants and young children: early initiation of breast feeding (proportion of children born in the past 24 months who were put to the breast within an hour of birth); exclusive breastfeeding under 6 months (proportion of infants aged 0-5 months who are fed exclusively with breast milk, continued breastfeeding at 1 year (proportion of children aged 12-15 months who are fed breastmilk); and continued breastfeeding at 2 years (proportion of children aged 20-23 months who are fed breastmilk).[11]Breastfeeding increases a chance to learn flavors in all foods consumed by mothers and likely provides a protective effect against the development of picky eating in infancy and picky eating estimates were higher when foods introduced before 4 months than before 6 months of age.[9]

CHAPTER 2: STUDY PROTOCOL

Literature review

There is various definition of picky eating. In general, the term is used to identify individuals who have powerful food preferences; a limited food intake; a restricted consumption of vegetables; and who are averse to try new foods.[1]Other more specific descriptioninclude food refusal; eating a limited variety of food; an unwillingness to try new food (food neophobia);[2]low enjoyment of food, slowness in eating and higher satiety responsiveness:[3]having strong opinions on foods preferences;choosy on how the food is prepared or the choice of food groups. The most common behaviours occuring 'all the time' were eating slowly or holding food in the mouth; refusing food, particularly fruit and vegetables; eating sweets and fatty foods instead of healthy foods; food neophobia, eating snacks instead of meals and accepting only a few type of foods.[4]Food neophobia was defined as an unwillingness to try new foods, with a prevalence between 40% and 60%.[5]However, the terminology is only appropriate for children above one year old as younger children is too young to experience neophobia, hence any parental concept of picky eating in this age group is unlikely to be true reflection of picky eaters.[6]

Picky eating behaviour is a common problem in children worldwide. In a study of 3022 American infant and toddler, Carruth reported 50% of 24 month old toddler are picky eaters.[12] In a later study of American children 43.2% of children between 12 to 24 months are shown to have picky eating behaviour.[13] In a population cohort study involving 4018 Netherland children age 1 to 6 years old, picky eating was 26.5%, 27.6% and 13.2% at 1.5, 3 and 6 years old respectively.[3] Incidence of abnormal eating behaviour is also high in various asian countries, Vietnam, 33.6% of children 12 to 40

month old;[14] Singapore, 25.1% of children age 1 to 10 years old;[4]Indonesia, 52.4% of children age 36 to 60 month old;[15] and China, 54% of pre-schooler children;[16]The true prevalence of abnormal eating behaviour in Malaysia is not known. A study looking at parental perception of picky eating in three urban hospitals in Malaysia and Singapore indicates 68% of the parents felt that their child has one type of abnormal feeding behaviour.[17] Nevertheless, picky eaters is frequently encountered in day to day paediatric practices, particularly among children with poor growth.

In one study, the prevalence of picky eating increases from 19% to 50% as a child grew older from infancy to 24 months old.[12]However, the prevalence has been shown to decline after the age of three years, 27.6% at 3 years old, 13.2% at 6 years.[3]In later childhood, the prevalence is higher (14–50%) among preschoolercompared to later childhood.[2,12,18]A significant number of preschool children with persisting picky eating behaviour continue to have the problems until later age.[3] Factors that has been associated with persistent picky eating are male sex, lower birth weight, non western maternal ethnicity, and low parental income.[3] Non western maternal ethnicity, and low parental income are also associated with late onset picky eating behaviour.[3]

In some studies, it is shown not to affect growth.[15] However, in a systematic review of researches for all children less than 18 years old, picky eating is shown to affect the body weight and height.[19]Children described as picky eaters or having an eating problem gain less weight during the first 2 years of life, with 11.1% of these children failing to thrive.[9] Other researches which has shown positive correlationship includes Kwon et.al[20], Yong Xue et.al[16], Antoniou et.al.[21] Of those with eating problems, 42% parent described their child as definitely picky, 39% maybe and 30% definitely poor eater.[22]

Picky eating behaviour leads to psychological and mental stress to the caregivers and results in family discord.[16,19,20] It is also shown to be associated with childhood depression at later age.[23]

Feeding in early life is likely to affect feeding behaviour in later childhood. The first few years of life are recognized as a critical period for the development of food acceptence pattern.Eating behaviours evolve during the first years of life; children learn what, when, and how much to eat through direct experinces with food and by observing the eating behaviours of others.[7]The development of picky eating may be affected by factors such as pressure to eat, personality factors, and parental practices/ feeding styles, including parental control and social influences[8], as well as specifics factors, such as the absence of exclusive breastfeeding, the introduction of complementary foods before 6 months[9]and the late introduction of chewy foods.[10]

Based on well-established evidences, the World Health Organisation and UNICEF recommended exclusive breastfeeding in the first six months and complementary feeding from 6 – 24 months. Exclusive breastfeeding important because breastmilk completely satisfies an infant's nutritional and water needs for the first six months.[24]From the age of about six months onward, infants should continue to receive breastmilk and in addition, should be fed safe and adequate amounts of local foods frequently throughout the day.[25]

The NHMS 2006 showed that 14.5% children were breastfed exclusively for 6 month, however based on clinic data this rate had increased from 14.4% in 2009 to 49.4% in 2015.[26] The Malaysian Population and Family Survey also reported 98.2% of childs less than 24 months were breastfed, with 56.4% having been breastfed within one hour of birth. In the case of infant that below 6 mnths, 43.8% are exclusively breastfed

and 33.8% are predominantly breastfed.[27] Whilst, prevalence of ever breastfed among children age less than 12 month was 94.7%, exclusive breastfeeding below 6 months 14.5%, breastfeeding rate at 4 months was only 32%, timely initiation was 63.7% and continued of breastfeeding up to 2 years was 37.4%.[28]

Infant feeding practices comprises breast feeding and complementary feeding have major roles in determining the nutritional status of the child. WHO has defined the following indicators for the study of feeding practices of infants and young children: early initiation of breast feeding (proportion of children born in the past 24 months who were put to the breast within an hour of birth); exclusive breastfeeding under 6 months (proportion of infants aged 0-5 months who are fed exclusively with breast milk, continued breastfeeding at 1 year (proportion of children aged 12-15 months who are fed breastmilk); and continued breastfeeding at 2 years (proportion of children aged 20-23 months who are fed breastmilk).[11]Breastfeeding increases a chance to learn flavors in all foods consumed by mothers and likely provides a protective effect against the development of picky eating in infancy and picky eating estimates were higher when foods introduced before 4 months than before 6 months of age.[9]

Complementaryfeeding is a transition from exclusive breastfeeding to family foods typically covers the period from 6 - 24 months of age, even though breastfeeding may continue to two years of age and beyond. This is a critical period of growth during which nutrient deficiencies and illnesses contribute globally to higher rates of undernutrition among children under five years of age.[11]Fourty one percent infants received timely complementary feeding and 55.9% children aged 9 – 23 months received at least 3 meals a day.[29] Data from clinics showed that timely introduction of complementary feeding was improved from 64.6% in 2009 to 92.2% in 2015.[30] Dietary

intake by infants begins with a liquid diet, a transition to complementary foods occurs in the latter six months and, by 24 months, most children are consuming adult foods.[12]Any foods or nutritive liquids, besides breast milk, that are given to young children during this period are defined as complementary foods. Complementary foods may be prepared specifically for children or may consist of family foods served to another household members which are modified to make them more easily consumed by infants and young children and provide sufficient amounts of nutrition.[31]Optimal infant and young child feeding practice is crucial for nutritional status, growth, development, health and ultimately the survival of the infant and young children.[32]The early feeding environment is critical for establishing eating habits that may influence weight, development and healthy growth in the long term.[33]

According to an estimate, 19.4% of children less than 5 years of age in developing countries were underweight and about 29.9% were stunted in the year 2011.[34]It is well recognised that the period of 6-24 months of age is one of the most critical time for the growth of the infant.[35]

Theoretically, abnormal eating behavior is a likely cause of poor growth in children due to reduced nutritional intake. Picky eating is likely to contribute to malnutrition in a child, particularly in the low to moderate income population where the purchasing power is limited. Picky eating could be one of the factor contributing to the high prevalence of poor growth of Malaysian children under five as reported by the latest NHMS 2015, 12.4% were underweight, 7.5% stunted and 8% wasted, in contrast to 7.6% obesity.[30]The triple burden of malnutrition is driven by the poor quality of children's diets: 2 in 3 children are not fed the minimum recommended diverse diet for healthy growth and development.[36]

Unfortunately, only few researches had been undertaken in Malaysia to understand the prevalence of picky eating, early childhood feeding practices and factors contributing to picky eating behaviour. This study is undertaken to fill up the gap. We explore the prevalence of eating behaviour and its associated presdisposing factors, as well as to understand infant and toddler feeding practices in this population. We hypothesis that early infant feeding practice do influence the eating behaviour of a child by the aged of 18 to 24 months.

Problem statement

Picky eating is a worldwide problem among normal children.[1] In one study of those with eating problems, 42% parent described their child as definitely picky, 39% maybe and 30% definitely poor eater.[22] Yong Xue[16] reported 50% incidence of picky eating behavior among preschoolers age 3 to 7 years old. The negative impact of picky eating behavior to growth of children has been shown by various studies.[16,20]

Studies related to infant feeding practice and associated factors related to abnormal eating behaviour have been limited in Malaysia generally. This study explores regarding associated factors towards abnormal eating behaviour among toddlers. The hypothesis for this analysis is that early infant feeding practice does has effect on eating behaviour at 18 to 24 months old children.

Research Gap

Despite the commonly encounters difficult eating behaviour among young children, no study has been undertaken in Malaysia to evaluate the problem objectively. There is also lack of understanding whether feeding practices during infancy will subsequently affect feeding behaviour.

Research Questions

1. What is the prevalence of pickyeating behaviour among 18 to 24 months old toddler attending maternal and child health clinics in Kota Bharu Kelantan?
2. What are the characteristics of infant feeding practices(birth to current) among the 18 to 24 months old toddlersattending maternal child health clinics in Kota Bharu Kelantan?
3. What factorsare associated withpicky eating behaviour among the 18 to 24 monthstoddlers attending maternal and child health clinics in Kota Bharu?

Research statement

From this study, we will be able to report the incidence of picky eating behaviour among 18 to 24 months-old children and determine whether the picky eating behaviour result from specific feeding practices during infancy.

The findings from this study may give better understanding and insight into ways to prevent development of picky eating behaviour of young children.

Research hypothesis

Early infant feeding practice does has an effect on picky eating behaviour at 18 to 24 months old children.

General objective

To evaluate the prevalence, associated factors for infant feeding practices and picky eating behaviour among toddlers attending Maternal and Child Health clinics in Kota Bharu.

Specific objective

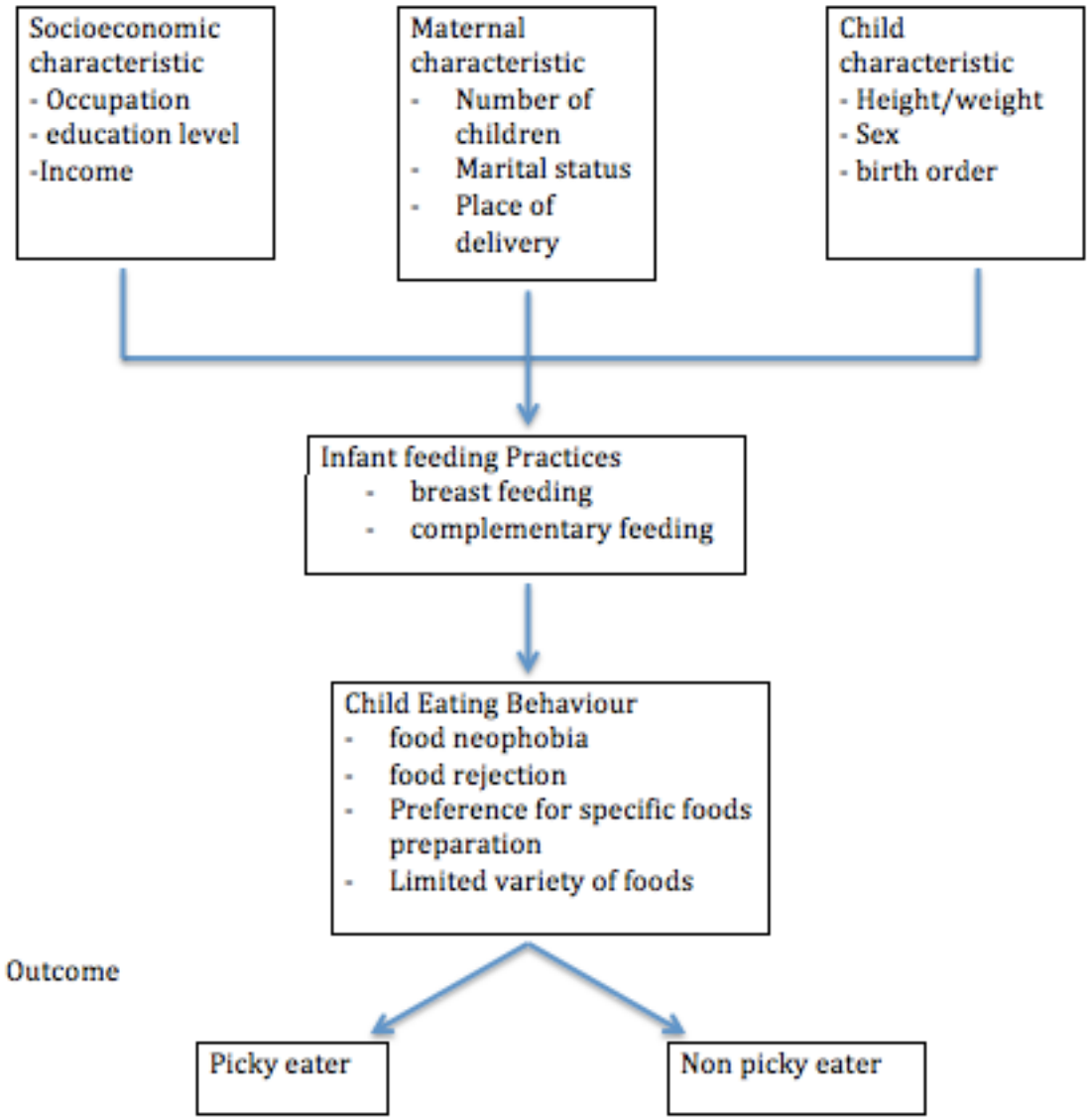
1. Toestimate the prevalence of picky eating behavior of children age 18 to 24 months old attending the Maternal and Child Health clinics (MCH) in Kota Bharu Kelantan.
2. Todescribe the characteristics of infant feeding practices among 18 – 24 months old children attending MCH clinics in Kota Bharu Kelantan.
3. To identify the associated factors for picky eating behaviour of children18 to 24 months attending MCH clinics in Kota Bharu Kelantan.

Methodology

Research design

This was a cross-sectional study conducted in selected Maternal and Child Health clinics in Kota Bharu from July 2019 until September 2019.

Conceptual framework



Study area

Study was conducted in selected Maternal and Child Health clinics in Kota Bharu from July 2019 until September 2019.

Study population

Referrence population: Children age group between 18 to 24 months old.

Source population: Children aged 18 to 24 month who attending selected Maternal and Child Health clinics in Kota Bharu for vaccination.

Sampling method

Samples are captured by convenient sampling in each clinic involved. Twelve Maternal and Child Health clinics in Kota Bharu Kelantan were involved in this study. All children and their mothers/caretakers were selected based on inclusion and exclusion criteria and consented to participate in the study. The research instrument used to collect the data is interview structured questionnaire with a list caretaker and child characteristics about infant feeding practices and abnormal eating behavior. Trained research assistant was placed at the selected clinic during the study period. Interview session was conducted in a special area/room while waiting for their turns in clinic.

Involve clinics	Cencus January – March 2019	Numberof Sample included N: 302 (July -September 2019)
1) KK Bandar Kota Bharu	206	58
2) KK Badang	44	12
3) KK Cabang 3 Perol	40	11
4) KK Kota Jembal	79	22
5) KK Kubang Kerian	214	60

6) KK Ketereh	67	19
7) KK Lundang Paku	20	6
8) KK Penambang	16	5
9) KK Pengkalan Chepa	149	42
10) KK Peringat	90	25
11) KK wakaf Che Yeh	83	24
12) KK Kok Lanas	63	18
Total	1071	302

Eligibility criteria

Inclusion criteria

1. Children aged 18 to 24 months.
2. Parents/caretakers above 18 years and consented for the study.

Exclusion criteria

1. Child known to have chronic medical/surgical disorders that is suspected to affect growth and nutrition–i.e congenital heart disease, chronic kidney disease/renal failure, dysmorphism/syndromic, GIT disorders, inborn errors of metabolism, endocrine disorders such as diabetes/hypothyroidism/dwarfism, malignancy, chronic hematological disease/gastro-oesophageal reflux disease, food allergies/lactose intolerance written in the home based card.
2. Congenital anomalies/neurological problem that impair feeding and eating.
3. Children with serious illnesses at the time of examination such as severe infection i.e dengue, tuberculosis.
4. Ex-prematurity i.e born less than 38 weeks gestational age.

Sample size calculation

1. The necessary sample size to examine the prevalence of picky eater in children aged 18 to 24 months old was estimated. Assuming 27.6% of picky eater, and a desired precision of ±5%, the sample size calculated (n=302) used simple formula (Daniel, 1999); based on the study by Cardona Cano et.al 2015.

$$\mathbf{n = \frac{Z^2 P(1 - P)}{d^2}}$$

$$\mathbf{n = 1536 \times 0.27(0.73)}$$

$$\mathbf{n = 302}$$

Z: value of standard normal distribution (1.96^2)

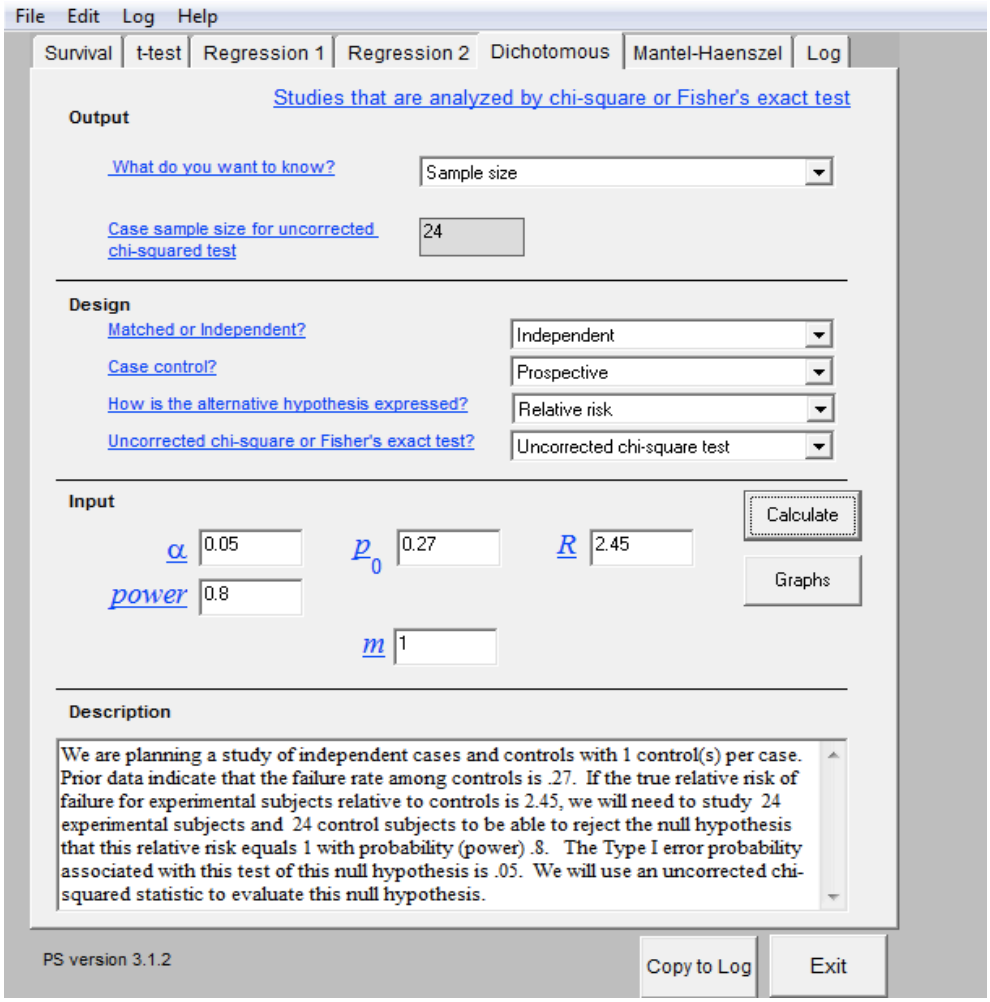
P: prevalence of picky eater

d^2: precision 5% (margin of error)

2. Objective number 2.

Factors	Po	P_1	M	n	Literature review
Age food introduction <6 month	0.39	0.6	1	176	Shim et.al 2011
Exclusive breast feeding < 6 month	0.36	0.63	1	106	Shim et.al 2011
Exclusive breast feeding >6 month	0.39	0.6	1	176	Shim et.al 2011

3. Objective number 3.



From the formulation of sample size above, sample size for prevalence is the highest compared to others n= 302.

Data collection method

1. Information will be collected via interview use structured proforma questionnaire.

2. All the data collected from the study was obtained through face-to-face interviews with the children's parents/caregivers.
3. All participants were interviewed to gather socio-demographic data, as well as weight and height for age.
4. Data will be keyed into SPSS version 24

Operational definition

Infant feeding practices

Infant feeding practices include core indicators of infant and young child feeding which are;

1. Early initiation of breastfeeding: early initiation of breastfeeding within one hour of birth
2. exclusive breastfeeding: Exclusive breastfeeding under 6 months
3. Continued breast feeding: continued breastfeeding at 1 year
4. Complementary foods:
    - Introduction
        - timing
        - type
        - quantity
    - Process
        - Time to transition to solid and textured foods (solid, semi-solid, soft and pureed foods),
        - Variation of foods
        - Quantity,
        - Frequency

5. The feeding practices refer to

- Types of early feeding (bottle, exclusive breast feeding, mixed)
- Time of initiation of breast feeding
- Duration of exclusive breast feeding
- Duration of breast feeding
- Age of introduction of complementary food
- Type of food during weaning
- Junk food in the diet

Picky eating

Picky eating (also known as fussy, faddy or choosy eating) is usually classified as part of a spectrum of feeding difficulties. It is characterised by an unwillingness to eat familiar foods or to try new foods as well as strong food preference.[6] Definition of picky eating were more likely to be neophobia, texture resistent, and to eat only favorite foods,[13]unwilling to try new foods and consuming a limited type and amount of food.[37,38] Picky eating behaviour was considered to be complex term that reflexs several different dimensions. It is characterized by two attributes: consuming small amounts of food and having a limited variety, which was assessed using both direct and indirect variables. The indirect variables include unwillingness to try new food (food neophobia), rejection of specific food groups, such as fruits, vegetables, meats, and fish (food rejection), and preference for specific food preparation methods. Survey questions were inspired from the Oregon Research Institute Child Eating Behaviour Inventory, which is an item pool addressing child eating behaviour, to measure the four picky eating variables[9]. Picky eating behaviour will be determine from “no” to item in the

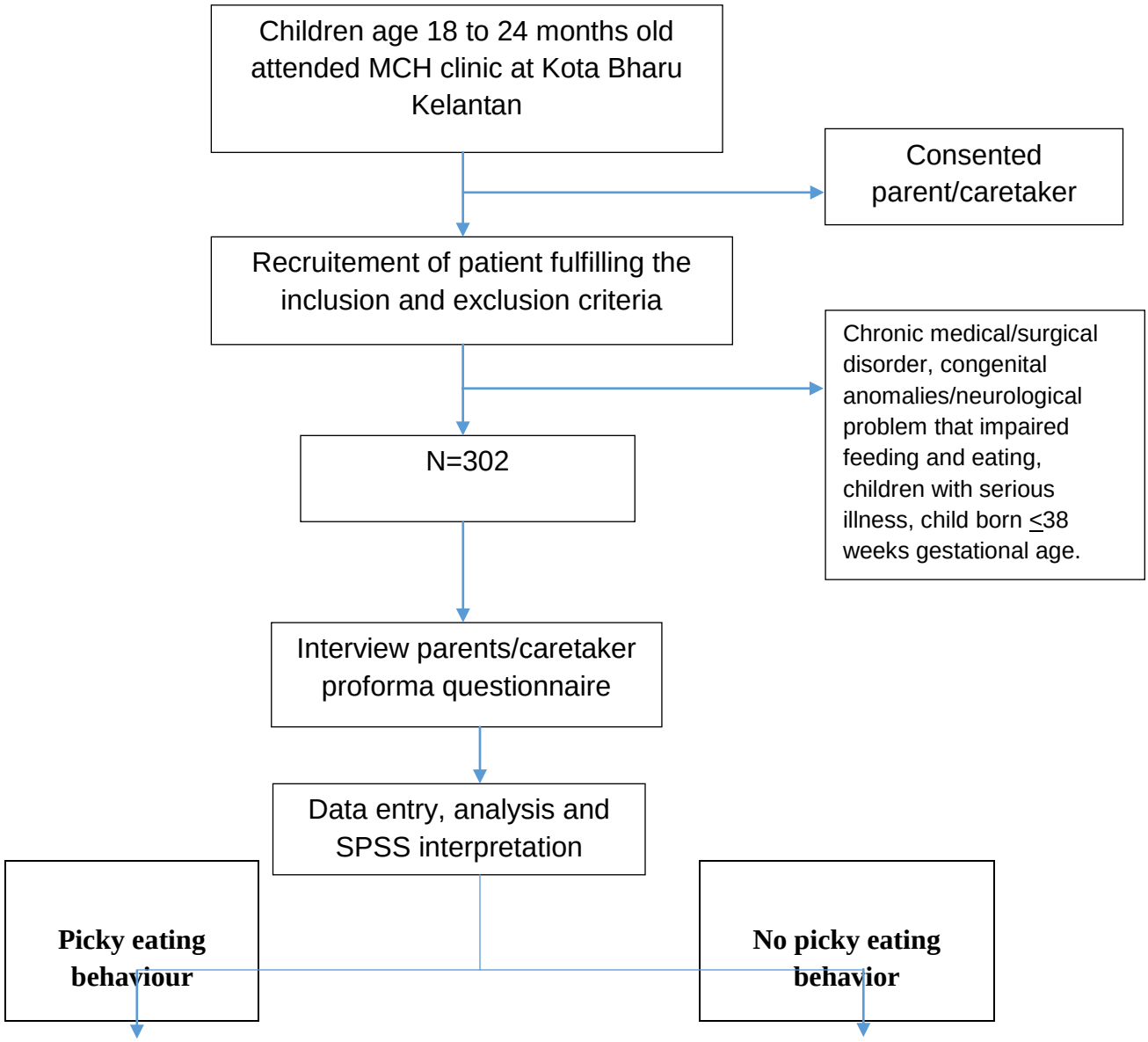
question (food neophobia) and “yes” to any items in the questions (food rejection, preference for specific preparation method and direct measurement of limited variety). There were no scoring system will be involve in these study. We will analyse for each dimensions of picky eater by multiple logistic regression to look for the association of infant feeding practices.

1. Food neophobia, with the reverse-described question of “does your child accept new foods readily?
2. Foods rejection, with the question of “does your child refuse fruit/vegetables/meats/fish?”.
3. Preference for specific food preparation methods, with the question of “will he/she eat favorite foods only if they are prepared in a specific way?”
4. For the direct measurement of limited variety of foods through the question of “does your child eat a limited variety of food”?

Research tool

1. Proforma containing questionnaire on
    a. demographic data
    b. infant feeding practices
    c. picky eatingbehaviour
2. Anthropometric measurement
3. IBM SPSS Statistics 24 software

Figure 1: Study flowchart



Statistical analysis

The baseline characteristics of the study were described in table form. Categorical data were reported as frequencies, continuous data are shown as the mean ± SD. The data analyses were conducted using the Statistical Package for the Social Science (SPSS) version 24 (SPSS, Inc, Chicago, IL). Descriptive statistics were examined for all variables under study to estimate the prevalence of picky eating behavior and to describe the characteristics of infant feeding practices.The simple and multiple logistic regression were used to determine the associated factors of picky eating behavior. A P-value < 0.05 was considered statistically significant.

Result

Dummy table

Table 1: Socio-demographic, caretaker and child characteristics of respondents

Variables	N (%)
Caretaker's characteristics	
Age	
Race or ethnicity	
Malay	
Chinese	
Indian	
Others	
Marital status	
Married	
-widowed/divorced	
Unmarried	
Education level	
None	
Primary	
Secondary	
Graduate	
Post-graduate	
PhD	
Occupation	
Government	
Private	
Self employed	
Monthly household income	
child's characteristic	
Sex	
Male	
Female	
Weight	
Length	
Ethnicity	
Malay	
Chinese	
Indian	
Others	
Place of delivery	
Number of siblings	
Birth Order	
Ever breastfed	
Living with extended family	

Infant feeding practices
Early initiation of breastfeeding
Within 1 hour of birth
After 1 hour of birth
Exclusive breast feeding
Introduction of complementary foods

Eating Behaviour
Does your child accept new foods readily? (food neophobia).
Does your child refuse vegetables /fruits/meats/fish? (food rejection)
Will he/she eat favorite foods only if they are prepared in a specific way? (preference for specific food preparation methods)
Does your child eat a limited variety of foods? (limited variety)

Table 2: Participant's Toddler Picky Eating Behaviour (n = 302)

Variable	n	prevalence, %	(95% CI)
Overall Abnormal Eating Behaviour[a]			
Do your child accept new food readily (food neophobia)			
Does your child refuse vegetables/fruits/meats/fish? (food rejection)			
Will he/she eat favourite food only if they are prepared in a specific way (preference for specific food preparation methods)			
Does your child eat a limited variety of foods? (limited variety of food)			

[a] At least one abnormal eating behaviour, which either unable to accept new food readily, refuse vegetables, fruits, meats or fish, will eat favourite food only if they are prepared in a specific way or eat limited variety of foods.

Table 3. Associated factors for Picky eating behavior

Variables	Simple Logistic Regression			Multiple Logistic Regression		
	Crude OR (95%CI)	*Crude* β	P value	Adj. OR (95%CI)	*Adj* β	P value
Sex						
Male						
Female						
Weight						
Length						
Ethnicity						
-Malay						
Chinese						
Indian						
Others						
Number of siblings						
Birth order						
Living with extended family						