

ORIGINAL ARTICLE

Factors that Influence Obesogenic Infant Feeding Practices: Findings from an Urban Community in Malaysia

Naleena Devi Muniandy^{1,2}, Dhiya Nurfatimah binti Ibrahim³

¹ Centre of Nutrition and Dietetics, Faculty of Health Sciences, University Teknologi MARA Selangor, Puncak Alam Campus, 42300 Puncak Alam Selangor, Malaysia

² Maternal, Infant and Young Child Nutrition (MiChild) Research Group, Universiti Teknologi MARA, Cawangan Selangor, 42300 Puncak Alam, Selangor, Malaysia

³ Happy Pharmacy Desa Setapak, 32, Jalan 1/27b, Desa Setapak, 53300 Kuala Lumpur, Wilayah Persekutuan Kuala Lumpur

ABSTRACT

Introduction: Feeding practices in the first year of life is crucial for an optimum physical and mental development of a child. Early feeding practices that include breastfeeding practices and complementary feeding practices mold a lifetime eating habit that is linked with future obesity. However, these feeding practices are influenced by many factors. This study explored the factors influencing obesogenic feeding practices during the first year of life. This study reports the qualitative findings from a larger study that was conducted in two health clinics in Selangor, Malaysia.

Methods: An in depth interview using a grounded theory approach was used to obtain findings that involved ten mothers. Interviews were coded and arranged in themes to generate a model that explains the factors that influence obesogenic feeding practices among the infants in the study population. **Results:** Practices linked to obesogenic feeding practices in the study participants were early termination of breastfeeding, early introduction to complementary food and introduction to sugar. Themes that emerged from this finding include, infants' influence such as: refusal to breastfeed, maternal influence such as ; perceived milk insufficiency, maternal knowledge and perception, religious practice and external influences such as: influence of family and friends and lack of family support. **Conclusion:** This study highlights the importance of inclusion of family members and public in intervention programs that target to promote healthy and appropriate infant feeding.

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Corresponding Author:

Naleena Devi Muniandy, PhD

Email: naleena@uitm.edu.my, drnaleena@gmail.com

Tel: +603-32584383

INTRODUCTION

Infant feeding practices are an important determinant of a child's physical growth and cognitive development. Infant feeding practices include breast feeding practices, formula feeding, and complementary feeding (1, 2). Feeding practices in this first year of life is crucial as studies suggest nutrition intake in infancy is associated with future obesity and non-communicable diseases (NCDs) (3-5).

The World Health Organization has recommended to initiate breastfeeding within one hour of birth, exclusive breastfeeding until six months and to introduce solid food gradually from six months while continuing breastfeeding until two years old (6). Unfortunately, a survey conducted in Low- and middle-income countries (LMIC) indicated only 47.5% of infants were exclusively

breastfed for the first six months while 15% were introduced to solids and semi-solid before 6 months (7). In Malaysia, exclusive breastfeeding for up to 6 months is set at 58% based on national Key Performance Index. However, only 47.1% was achieved based on the latest National Health Morbidity Survey in 2016 (8).

Feeding practices in infancy have been identified to contribute to childhood overweight and obesity (9, 10). These factors are referred to as the obesogenic feeding factors and includes introduction of solid foods before 4 months of age, early termination of breastfeeding, and introduction of sugar in the first year of life. Previous studies have stated that these types of feeding practices were associated with increased weight gain in infancy and early childhood (11, 12). Early cessation of breastfeeding leads to early introduction to formula milk and solids resulting in reduction in receiving natural protection of a child from obesity(11). Existing studies show that breastfeeding on demand and the probiotic from breastmilk is protective over future obesity (13). The literature suggests that the high protein content in formula milk and the high probability of overfeeding

using bottle feeds are risk factors for future obesity (9, 11). Early introduction to solids may result in early introduction to sucrose, salt and fats that have been reported to result in rapid weight gain subsequently contributing to excessive weight (14, 15).

Obesogenic feeding practices may be influenced by many ecological factors such as the infant him/herself, maternal factors and external influences that include the people and environment around the mother and the child (16, 17). Studies have shown that children from low socioeconomic status are at higher risk of obesity in early childhood (16). Existing literature also suggest that customs, beliefs, and sociodemographic may influence feeding practices (16, 17).

Malaysia has been classified as one of the most obese country in the Southeast Asia in which two out of three adults were overweight or obese. The prevalence of overweight had risen from 16.6% to 30.0% while obesity had increased from 4.5% to 17.7% in the last two decades (18, 19). A recent study reported that 13.8% of children were overweight while 20% were obese in the urban setting in Malaysia (20). A report by UNICEF indicated that certain urban areas in Malaysia had a higher proportion of malnourished children compared to the national average (21). The report emphasized that the environment had a major influence on the type of food consumed by a child.

Given the link on infant feeding practices with future obesity and the alarming rise in obesity in Malaysia, hence it is important to explore the factors that are associated with obesogenic feeding practices among infants especially in the urban setting in this country. Although there are many existing studies to report the nutrition status of the children in this country (19-21), however limited studies have explained the influence of all the socio demographic factors in the environment of a child that may influence their food intake. This interaction is best studied using a qualitative study. Thus, the aim of this study was to explore the factors that influence obesogenic feeding practices in infants in a selected urban population in Malaysia. The qualitative method was chosen to understand how feeding practices tend to promote obesity in the chosen population.

MATERIALS AND METHODS

Study Design and Location

The data from this study was obtained from a larger study that was conducted in 2019. The initial project collected quantitative and qualitative data on infant feeding practices and growth in selected health clinics in Klang Valley. This study discussed the findings from the qualitative data that was obtained.

Data was obtained from two health clinics: Puncak Alam and Meru which were located in Klang Valley, Selangor.

Out of 150 mother infant pairs that were involved in the main, ten mother infant pairs were enrolled in the qualitative part. These two health clinics were chosen based on the availability of Malay, Chinese and Indian participants in this setting.

Ethical approval in the original study was obtained from the National Medical Research Register (NMRR), reference no: KKM/NIHSEC/PIT-811

Data Collection

Ten out of 150 mothers were enrolled in the qualitative part of the study. Participants were recruited based on a grounded theory approach (22). In which information or interviews with a respondent will determine the recruitment of the next respondent in order to be able to answer the research objectives. In depth interviews were conducted using a semi structured interview guide. The questions in the interview guide were originally informed by the literature.

The semi structured interview guide included questions on: a) Duration of breastfeeding and factors that are associated with continuation or termination of breastfeeding practices; b) Age of introduction to solids, type of food introduced and factors that are associated with the introduction of the solid food; c) Knowledge on infants feeding practices; d) influence on decision of feeding practices; e) Support received regarding infant feeding practices along with the extra questions that emerged during interviews.

The interviews were conducted by the principal investigator or the co- investigator whom were both females. The duration of the interviews were between 30 minutes to an hour. Interviews were conducted in either English or Bahasa Melayu and were recorded. The audio files were later transcribed to English. Participants were recruited until data saturation was reached.

Participants

All the ten participants included in this study were mothers of infants aged six to twelve months old. The inclusion criteria were infants with a birth weight of 2,500 g to 4,000 g, infants born from singleton pregnancy and infants born full term (within 37 to 42 gestation weeks). Participants were excluded if they were diagnosed with any congenital or medical problem.

Participants were given pseudonyms according to their residency (U for urban areas), ethnicity (M for Malay, I for Indian) and followed by hierarchy of first time of contact (one for first participant interviewed, two for second, and etc).

Data Analysis

Audio files were transcribed verbatim to English. Transcripts that were not clear were checked back within audio files. Coding was done manually and

independently by the co-investigator and principal investigator. Later, both investigators arranged the codes according to the themes guided by the thematic analysis method (23).

RESULTS

Participants characteristics are presented in Table I. Meanwhile, Table II describes the three major themes that emerge from the data analysis: infants, maternal and external influences.

Table I: Sociodemographic characteristic of participants

Variables	Frequency (n)
Age (years)	
< 35 years old	8
≥ 35 years old	2
Race	
Malay	7
Non-Malay	3
No of children	
≤3	7
≥4	3
Educational level	
Primary	1
Secondary	7
Tertiary	2
Household income	
< RM3000	3
≥ RM3000	7
Working	
Yes	6
No	4
Infants Gender	
Male	6
Female	4
Birth order	
First	3
Second and above	7
Currently breastfeeding after 6 months	
Yes	6
No	4

*RM-Ringgit Malaysia

Participants characteristics

A total of 10 participants were involved in this study in which the majority of the mothers were within the age of 18-34 years old (n=8) while only two of the participants were more than 35 years old. Most of the mothers were Malay (n=7) while the rest were non-Malay (n=3). Most Mothers had less than 3 children (n=7) and most of them had obtained a secondary level education (n=7).

Table II: Themes and Subthemes of Factors that Influence Infant Feeding Practices in the Study Population

Themes	Subthemes
Infants	Refusal to accept breastmilk
Maternal	Knowledge Perception Perceived breastmilk insufficiency Employment Religious Practice
External	Lack of support during breastfeeding Influence from family and friend

The average household income was RM3000, and the majority of the mothers were working (n=6) during the data collection. Most of the infants were males (n=6) in which only three of them were first born. Only four of the infants continued receiving breast milk after six months.

Factors influencing obesogenic infant feeding practices Thematic analysis was used to generate codes and relevant themes from the interviews.

Infant Factors

Refusal to accept breastmilk

Infants' refusal to consume breastmilk led to an early termination of breastfeeding in a few participants. Early termination of breastfeeding has been identified as a factor that is associated with future obesity. Interview with one of the participants, revealed that the infant refused to consume expressed breastmilk which resulted in her to stop offering breastmilk and introduce formula milk.

"I stopped breastfeeding him at 7 months, because he refused to drink expressed breast milk (EBM) through bottle"- [UM3].

Another participant expressed disappointment of her child that refused to be breastfed although she was confident she was able to breastfeed.

"My breastmilk is enough, but she refuses to direct feed"- [UI3]

Maternal Factors

Knowledge

Maternal knowledge on infant feeding affected their feeding practices. However, having the right knowledge will lead to correct practices. Findings from this study suggest that, Mothers prefer to seek information from the internet and many online platforms as it is the fastest way to obtain information.

One of the participants, narrated that she introduced solids to her infant at 7 months by giving her fruits

puree and added cereals in her formula milk via bottle feed. The participant had followed a suggestion from a website:

"I introduced fruit/vege puree first based on my own reading and because of the texture are soft" - [U12]

Another participant explained that she chose to follow the suggestions that she read from the internet compared to the advice that she received from the nurse at the health clinic:

"I always read it through the internet to find out all the information regarding food for my baby.... Nurses here in the health clinic always gave me the information but I prefer reading it from the internet..... -[U13]

The wrong information obtained by the mother had led her to practice giving cereals with formula milk in bottle feed. Feeding via bottle may lead to overfeeding and the addition of cereals in the bottle feed not only adds calories but also increases risk of choking in the infants. High calorie intake in infancy results in rapid growth in this period which is a predictor for obesity in the future

Perception

Perception of the mothers can also lead to obesogenic feeding practice in their infants. Interview with a participant revealed that an infant's weight was a parameter used to judge the health status of the child. The mother believes that a healthy infant should be heavy. This believes, resulted in her introducing solids before six months.

" If the baby is big, it means he is healthy". -[UM6]

Another respondent started feeding solids early to her infant because she felt that her child was always hungry. *"I started to give solid to my baby early because my baby seems hungry."-[UM1]*

A mothers' perception that her infant will hurt her during breastfeeding was the reason for her to stop breastfeeding and to start with solid food before six months.

"Because I think my baby already has teeth and she will bite my nipple every feeding..... and it will hurt!"-[U13]

Findings suggest that wrong perception had led these mothers to quit breastfeeding and introduce solids early, which in both cases are factors that are associated with future obesity.

Perceived Breast Milk Insufficiency

Perceived insufficiency of breast milk is a common problem among lactating mothers even if they already have the initiative to breastfeed their baby. This effort was seen in the participants, who claimed that they tried to express their breast milk using breast pumps when they felt that their infant was not suckling enough. However, these mothers quit breastfeeding, when they could not express sufficient breastmilk (according to their expectation) leading them to believe that they had

insufficient breast milk.

"I did try to pump but I only got 1 ounce only. My milk was insufficient for my baby"-[UM5]

"I did try to pump my breast for milk. But even if I pump there was no milk ."-[UM6]

These perceptions resulted in the mothers to quit breastfeeding which has been reported to have protective effect over the development of obesity.

Employment

Maternal employment emerged as a factor that influenced obesogenic feeding among the studied participants. Two participants reported that employment was the reason they had to terminate breastfeeding early and introduce solid food early in life. Interviews revealed that they were too tired to breastfeed after they reached home from work, and the working schedule was challenging.

"The main reason why I stopped breastfeeding is that I had started to work again. Sometimes my work finishes late... I started to bottle feed when my child was 2 months old.....it was difficult to continue breastfeeding."-[U11]

"I stopped breastfeeding him because I did not have enough time to breastfeed after I had started working. I was unable to pump my milk because I felt tired".-[U12]

The hectic lifestyle of employed mothers resulted in early termination of breastmilk, and early introduction to formula milk and solids which is linked with future obesity.

Religious Practice

Religious practice has emerged as another factor that contributes to obesogenic feeding in this population. A participant narrated that she gave her infant dates before six months. However, she argued that this was not considered as feeding the infant or introducing sugar earlier than six months, as she believed that, the dates is "makanan sunnah" (religious food in Islam) and it is supposed to be part of the feeding practice during the first 6 months. The participant believed that the dates given had a lot of benefit to the infant.

"I do not give my baby any food, however, I usually give him all the 'makanan sunnah' like raisins and dates as it has a lot of benefits". -[UM4]

It is common for mothers to follow religious or cultural feeding practices. In this case, the introduction of dates before six months will have the same effect of introduction of any solids before six months.

External factors

Lack of support during breastfeeding

Breastfeeding and complementary feeding practices in the first year of life requires support from family members, especially from the father of the child. An interview with a participant who had to stop breastfeeding due to perceived less milk supply revealed that she was

frustrated with her husband, who did not seem to be bothered about her worries and the situation she was in.

*"I don't know what to say. As for me, the support that he gave was not enough *almost crying*, I don't know if he cares if I breastfeed or not. When I explained my situation to him, he didn't seem to care about it. Maybe for him, since it is not related to him, he does not care much". - [UM6]*

Interviews with participants also revealed that the overwhelming household chores that require them is one of the reasons for early termination of breastfeeding. Mothers expressed that it would be helpful if their partners could help with the household chores so they can have time and are more relaxed to breastfeed.

Breastfeeding requires support from the immediate people around the mother and child. Depression and frustration during this period is common among breastfeeding mothers. In this study, the lack of support by the husband also had resulted in the mother to quit breastfeeding which is known to have a protective effect over future obesity.

Influence from family and friend

Influence from family and friends is one of the reasons that contributed to obesogenic feeding practice among infants in this study. Interview with one of the mothers indicated that a relative had encouraged her to introduce complementary feeding earlier than six months.

"I decided to give nestum (baby cereals) as the first food based on a recommendation from my sister-in-law as she has previous experience in giving complementary food to her baby". - [UM1]

Also, a mother who is a housewife stated that she added salt in her baby's food according to her sister's recommendation.

"As he reached 8, 9 months old, I added a pinch of salt in his porridge to taste.My sister taught me as she knows more". - [UM2]

It is common for mothers to follow feeding recommendations by a senior person in the family. Most of the time, this person will be older than the mother or had previous experience with a child. In this study, the advice given to the mother by relatives resulted in introduction to complementary food before six months and the addition of salt into their infant's food. Early introduction to solids has been reported to increase the risk of future obesity.

The findings from this study is shown in figure 1. The obesogenic feeding practices that were identified include early termination of breastfeeding, early introduction to solids, early introduction to bottle feeding, addition of cereals in bottle feed and introduction of sweet food during infancy. The model shows the factors that

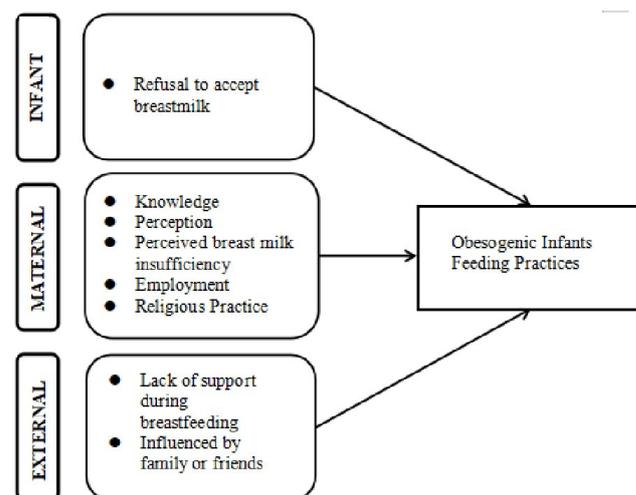


Figure 1: Model of factors influencing obesogenic infants feeding practices among participants in selected urban community in Malaysia

have led to obesogenic feeding practices in the studied population.

DISCUSSION

Nutritional intake and feeding practices in the first year of life is associated with future obesity (24,25). However the feeding practices of a child is a complex process that involves the child, the mother and the environment that they reside in. The literature suggests that the prevalence of childhood obesity is at a rise globally and in Malaysia (18,19). Existing report has also highlighted that the proportion of childhood obesity is higher in the urban setting compared to the national statistic (21). Hence, the purpose of this study was to explore the factors that influence obesogenic feeding practices among infants in the first year of life in an urban setting.

A model on factors influencing obesogenic feeding practice in the studied population was developed based on the themes and sub themes generated from the study. The themes and subthemes that emerged include Infant: refusal to accept breastfeeding, Maternal: perceived breastmilk insufficiency, knowledge, perception, employment, religious practice, external :lack of support during breastfeeding, influenced from family and friends. Infant's refusal to breastfeed had also been identified as a factor for mothers to quit breastfeeding in a previous study (26). The literature suggests that infants sometimes lose interest in breastfeeding or consuming breast milk because of suckling problems or a change in feeding pattern (26). The findings of this study suggest that most of the infants refused to be breastfed after the mothers resumed work. The infants in this study may have experienced a change in the feeding pattern after the mothers resumed work that may have led to the refusal to breastfeed.

This study identified maternal knowledge as a factor that contributed to obesogenic feeding the infants. Similar

trend has been reported from a study in the Middle east in which mothers prefer to browse the internet for information in regards to feeding their infants compared to seeking help from health care personnel (27,28). A recent systematic review reported that most of the information regarding infant feeding practices in the internet may be misleading hence resulting in wrong infant feeding practices (27). Hence maternal knowledge seeking through social media that is reported in this study may be a reason for the obesogenic feeding practices in this studied population.

Maternal perception on infants' weight and health status was also a factor that contributed to obesogenic feeding practices in this study. Mothers tend to associate heavier babies as healthier babies, and this was also reported in other studies(29). Bigger, chubbier babies tend to be viewed as healthier thus leading to obesogenic feeding practices such as early introduction to formula milk, solids, and addition of cereals in bottle feeds (30-32).

Perceived insufficiency of breast milk emerged as a contributor to obesogenic feeding practice in the studied population. This finding was reported in a previous study which stated that perceived insufficient milk supply was a major reason for mothers to practice inappropriate feeding that resulted in weight gain (33). This is because mothers who perceived that they don't have adequate milk or their milk alone is not sufficient for their infants, provided their infants with formula milk and solids to substitute with breast milk before six months. This will eventually create strong preferences of the infants towards high sugary food and beverages leading to long term weight gain (34). Mothers often complained of insufficient time to express breastmilk or preparation of a nutritionally balanced meal and tiredness to direct breastfeed after resuming work (35-37). These can be the major reason for mothers in this study to also quit breastfeeding as the findings show that mothers complain of tiredness and constrain in time to both direct breastfeed the child or to express their breast milk.

Previous studies have reported that parent's specific cultural beliefs and attitudes towards food and nutrition resulted in them offering their seven to eight months old infants sweet drinks and desserts (34, 38). Sugary products provided excess calories and less nutrients which would increase the risk of obesity during early life (38). The practice of giving the infant dates before six months among the study participants may result in the development of future obesity as studies have shown early introduction of food and introduction to sweet food early in the life cycle are predictors of future obesity.

External influence such as lack of support during breastfeeding and influence of family and friends has resulted in obesogenic feeding practice in this study. Existing literature reported that mothers that

do not receive support from their husband in terms of breastfeeding and household responsibilities tend to lose motivation in breastfeeding (39). Encouragement received from husbands during breastfeeding had shown to result in sustaining breastfeeding for a longer period compared to those who did not receive any support from their husbands (40). In this study, the attitude of the partner that does not express interest in the participant's breastfeeding journey resulted in early termination of breastfeeding.

Family and friends emerged as a factor that contributed to obesogenic feeding practice in the studied population. This finding was supported by a systematic review that reported family influence has a strong impact on infant feeding decisions and behaviour by the caretakers (40). However, family advice often contraindicates with infant feeding guidelines, but some mothers often follow the recommended feeding practice suggested by a family member to show respect to them (41).

CONCLUSION

Infant, maternal, and external factors have been found in this study in influencing obesogenic feeding practice. Infant's refusal such as rejecting breastmilk leading to inappropriate feeding thus contributes to obesity in early life. Breast milk insufficiency, employment, knowledge, perception, and religious practice from the mother became the reason why the mother decided to practice obesogenic feeding practice. Furthermore, from this study, external support has a profound effect on obesogenic feeding as the previous study also stated that families have a strong impact towards feeding decisions. However, this study has a small sample size that it may not generalize into a population and may confound with other factors such as sociodemographic and socio-economical factor. Despite that, this qualitative study offered insight in exploring factors that influence obesogenic feeding practice among infants during their first year of life. Further research is recommended to use a mixed-methods approach by exploring the factors as well as including infants weight status and its relationship with feeding practices in order to have a broader look at obesogenic feeding practice with better understanding. Also, future research may offer intervention towards early childhood obesity.

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