

## REVIEW ARTICLE

**Influences on Infant Feeding Practices: An Ecological Perspective**Naleena Devi Muniandy<sup>1,2</sup><sup>1</sup> Centre of Dietetics Study, Faculty of Health Sciences, University Teknologi MARA Selangor, Puncak Alam Campus, 42300 Puncak Alam Selangor, Malaysia<sup>2</sup> Maternal, Infant and Young Child Nutrition (MiChild) Research Group, Universiti Teknologi MARA, Cawangan Selangor, 42300 Puncak Alam, Selangor, Malaysia**ABSTRACT**

Nutrition in infancy contributes to a significant portion on the notion of the importance of nutrition during the first 1000 days of life. A vast pool of literature exists on the importance of nutrition during this phase of life with future diseases, obesity and mental health. However, despite the availability of many guidelines and policies revolving around infant feeding practices, adherence to it remains poor. This review explains factors that influence infant feeding practices from an ecological point of view. A Bronfenbrenner ecological model was used to argue the influence and interaction of various ecological factors on infant feeding practices. The review highlights that the way these factors affect infant feeding differs according to populations and settings. This review suggests the need for more robust and population sensitive interventions to improve infant feeding practices globally.

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**INTRODUCTION**

The theory of Development Origins of Health and Diseases (DoHAD) highlights the importance of nutrition during the first 1000 days of life and future health outcomes (1,2). A vast pool of literature has reported the affect of nutrition from conception to the end of a child's second year with the future development of health and disease. Nutrition during infancy is of great concern because of the importance of the nutritional intake during this period and the programming of taste and food preference that pave the pathway of lifetime food choices (3,4).

Nutrition during infancy is essential for the optimum physical and mental development of a child. Ideal nutrition increases the child's immunity and promotes good cognitive performance. Recent studies highlighted the importance of nutrition during infancy with the development of obesity and other Non-Communicable Diseases (NCDs) in adulthood (5). Global statistics on the nutrition status of children under five indicated 150 million were stunted, 50.5 million were wasted, and 38.3 million were overweight. Although the report documented an incline in stunting and a steady

increment in childhood obesity from 2000 to 2017, this trend shows the existence of a dual burden of malnutrition worldwide (6). These findings and reports highlight the importance of implementing a more robust intervention on infant feeding worldwide.

Nutrition during infancy includes breastfeeding and complementary feeding practices. Despite the abundant guidelines and policies revolving around breastfeeding and complementary feeding practices, however global prevalence of breastfeeding is still low (7). A recent report indicated that only 41% of infants under six months old were exclusively breastfed while 71% were breastfed at one year old and only 45% were breastfed at two years old worldwide (8). The prevalence of exclusive breastfeeding in Malaysia is 47.1% according to the National Health and Morbidity Survey which was conducted in 2016 (9) Studies indicate a poor diversity of complementary food in certain countries and a delayed or early introduction of solid and semisolid in both urban and rural populations (10,11). These findings suggest a poor adherence to infant feeding guidelines.

A significant setback in adherence to policies and guidelines would be following a "one model fits all" strategy. Nutritional intake and feeding practices of a child is a complex process that involves the child, the caregiver, the people around the caregiver and the child, the environment, and the belief system of the community they live in. Hence, policies and guidelines

involving infant feeding should be planned according to a population.

With regards to the above argument, this review will discuss the various individual and environmental factors that influence infant feeding practices. The review is expected to enlighten about the differences and challenges that influence infant feeding practices in populations. Studies often report on the association between a single or few factors with behavioural nutrition. Most of these studies lack an explanation of how these factors interact with each other to affect nutritional intake or eating practices (12).

An ecological model is best used in this context to discuss this as ecological models describe the interaction between human behaviour and their environment. Hence, In order to explain this complex relationship between the mother, child, the people around them and the environment they are placed in, the Bronfenbrenner ecological model was chosen to discuss all these interactions (12–14). The purpose of the review was not to scrutinize every risk factor in each layer or the ecological framework but to rather discuss selected aspects from the microsystem, exosystem and macrosystem layer.

### THE BRONFENBRENNER ECOLOGICAL MODEL

The Bronfenbrenner's Ecological Model (Figure 1) was used as a base in this review to understand and report the direct and indirect effect of the setting within which the child exists and the factors that influence maternal feeding decisions (15). For the purpose of this study, Mothers of the infants were placed in the centre of the model to understand and report factors that influence her feeding decisions as infants are unable to make their own decisions on their food intake or dietary practices. The first layer surrounding the child is referred to as the microsystem layer. The microsystem represents the interaction of the child with the immediate people and setting around the child. In this study, the immediate

people and settings around the mother that influence her feeding decisions were discussed. Friends, family members, especially mothers or mothers in law, were identified as people who have direct contact with the mother.

The second layer of the ecological model is the mesosystem. This layer comprises the interaction between two or more immediate people or settings in which the child belongs. In this study, the effect of family income on maternal feeding practices was discussed.

The third level refers to the exosystem layer, which includes linkages and processes of two or more settings that may or may not contain the child but will indirectly affect the child. This study reports the influence of mass media, community, health care professionals and geographical settings on maternal feeding decisions.

The last level, the macrosystem, refers to the influence of belief systems, religion and culture on the overall decision making that concerns a child. In this study, the role of ethnicity and culture on maternal feeding decisions were discussed.

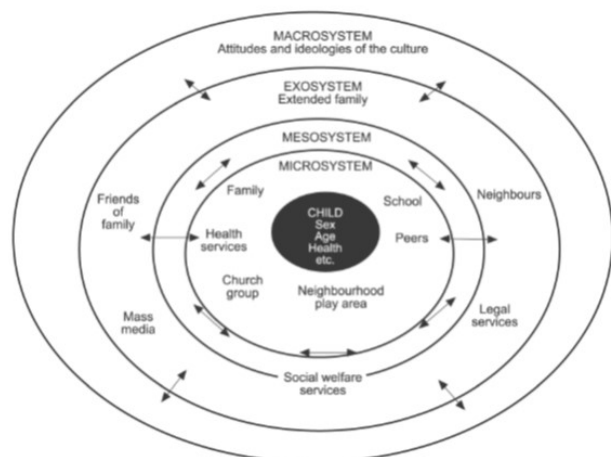
### MOTHERS AS THE MAIN STAKEHOLDER OF INFANT FEEDING PRACTICES

Mothers are the primary caregiver who molds the eating preference and habits of a child as the growing child is entirely dependent on their mother in the first few years of life (16).

#### Maternal Education

Maternal education is an essential factor associated with the feeding practices of a child. Generally, mothers with a higher education attainment were reported to comply with the infant feeding guidelines. A study comprising five European countries involving 2071 first time mothers indicated that these mothers tend to rely more on written sources compared to advice or suggestion from family and friends (17). The study also reported that mothers with higher education tend to breastfeed longer than those with a lower level of education. A study in Poland involving mothers of children aged nine to four months also reported a similar finding. Mothers with higher education tend to practice exclusive breastfeeding longer and introduce complementary food only at six months compared to those who had a lower level of education (tertiary education versus secondary education) (18).

However, contrary to these findings, a study conducted in China involving 10408 mothers of infants aged zero to twelve months reported that a higher level of maternal education was inversely associated with exclusive breastfeeding (19). The study further added that mothers who had a higher level of education were also mainly from a higher income indicates that household income



**Figure 1: Ecological determinants on a developing child according to the Bronfenbrenner Ecological Model (15).**

plays a role in infant feeding decisions. Mothers from a higher household income may end up not adhering to guidelines due to purchasing power despite attaining a higher education level.

### **Maternal Employment**

Maternal employment leads to an increase in household income and purchasing power of the mothers. Employed mothers have more freedom and autonomy to buy and prepare food for their infants without being dependent on their husbands (20). This gives the mothers the liberty to feed their infants whatever they want. Studies show that employed women with children had higher purchasing power and a higher minimum dietary diversity than employed women without children (21,22). However, contrary to these findings, maternal employment may not have the best effect on infant feeding practices.

Prevalence of breastfeeding is lower in employed mothers compared to unemployed mothers (22) as employed mothers often complain of lack of time and facilities to express breastmilk (23). Employed mothers are also reported to introduce solids and semi solids to their infants before six months (24,25). Studies also indicate that many employed mothers fed their infant commercially prepared food or instant baby food. These mothers were reported to introduce unhealthy food such as fries and sweetened beverages into their children's diets earlier in the life cycle (22,26). Time limitation, together with autonomy to spend their money were the main factors that resulted in these practices. Although most working mothers are aware of the potential risk of poor infant feeding practices, the benefits that they may obtain from working outweighs any perceived dietary harm (27).

## **MICROSYSTEM**

### **Influence of Grandmothers**

Immediate family support is essential for a successful and healthy infant feeding. Maternal decision on infant feeding practices is often influenced by her immediate family members like her husband, other children or siblings of the infants, her mother or mother in law and her friends. Studies indicate that most grandparents of infants, especially in the Asian context, would like to be involved in parenting and have a role in feeding their grandchild (28). One of the most influential people whose advice on infant nutrition the mothers are usually forced to follow is her mother-in-law (29). This is prominent and unavoidable if the mother lives together in an extended family that includes her mother in law. Ignoring the request or suggestion by this elder lady is considered disrespectful (30).

A study in Singapore, in which grandparents are mostly the child's caregivers, reported that the grandmothers often accept the responsibility to nourish the child. They usually take the trouble to prepare a wide range

of food throughout the week (31). In rural Uganda, grandmothers are also accepted as cultural practitioners and often interfere in infant feeding practices. Mothers often follow the infant feeding practices such as offering tomato juice as early as three months of age and early introduction to solids as preached by their mothers and grandmothers (32). They believe that these feeding practices will help to fatten up the child as preferred by their community.

### **Father**

Paternal involvement in infant feeding practices differs according to a population. Fathers support in breastfeeding practices have increase the prevalence of exclusive breastfeeding in an urban community in Malaysia (33). However, a study conducted in the UK, reported that fathers involvement in infant feeding resulted in early termination of breastfeeding(34). These findings suggest that paternal involvement may be positively associated with breastfeeding prevalence in developing countries and negatively associated in developed countries. The higher purchasing power and the availability of commercial infant food in a developed country may be the reason for this scenario. The literature suggest that early introduction of complementary food is associated with early termination of breastfeeding (18).

### **Peers**

Mothers often refer to their friends for recommendations or to discuss problems regarding infant feeding. This is because most of their friends have a child around their infants' age and are easy to be contacted. Hence they are often the point of fast and reliable reference (35). However, the influence of peers may be contraindicated in different populations. Peers provide emotional, appraisal and information support to mothers which makes information seeking fast and reliable to mothers(36). A study in the United Kingdom stated that peer pressure resulted in mothers introducing complementary food early to their infants (37). This practice resulted in the early termination of exclusive breastfeeding. However, contradicting this finding, a study in China reported that peers support increased the length of breastfeeding (38). This is because, peer support is not much included as a standard post natal care in the UK and other high income countries (36).

### **Healthcare Services**

Healthcare plays a vital role in infant feeding practices. A health care professional, a nurse, midwife or doctor has a direct contact with the mother of the infant and play an essential role in educating them on breastfeeding and complementary feeding practices. However, studies show inconsistent findings on the level of support from the healthcare team (39,40).

A study in UK reported that mothers complain that advice given by healthcare practitioners were just idealistic and not practical. Health care practitioners

were reported to advice on how to breastfeed and did not expose the mothers to challenges that they might face breastfeeding a new-born. This resulted in the mothers being unprepared to face the situation, resulting in them quitting breastfeeding (40). Nevertheless, a recent survey conducted in the UK among Healthcare practitioners revealed that these team of people had time constrain to engage with mothers to explain on infant feeding practices. The lack of workforce often results in doctors choosing to attend to critical and clinical complications and dieticians giving nutrition education to cases with clinical issues, leading to the lack of priority to indulge in preventive nutrition education (41).

## MESOSYSTEM

### Family Income

The mean dietary diversity of infants' is influenced by family income. Infants from families with higher incomes have reported having a better dietary variety than those from lower family incomes (42). However, family income is not the sole factor that is associated with mean dietary diversity. A study from a rural setting in southern Benin reported that infants from both higher and lower-income families have a low minimum dietary diversity. This study suggests that, although higher family income leads to higher purchasing power, the type of food fed to the infant depends on the availability in the local setting (43). This study shows that geographical setting is a higher predictor of infant nutritional intake compared to family income.

## EXOSYSTEM

### Urbanization

Guidelines state that infants should be exclusively breastfed for six months, followed by the introduction of solids with breastmilk continuation until two years (44). However, a Global report indicated that only 41% of infants were exclusively breastfed for the first six months(8). Variations in the timing of introduction to solids also exist between low and higher income countries. Infants from lower-income countries are more likely to be introduced to solids before six months (11,45).

Although there is a high awareness of infant feeding recommendations in high-income countries, studies indicate that there are populations in these countries that may not adhere to it. A survey conducted in the UK reported that mothers living in a more deprived setting within Scotland introduced complementary food earlier to their infants (46). This group of mothers was also more likely to give commercial complementary food than homemade complementary baby food. This shows that the degree of urbanization of a country may not be a sole indicator of adherence to infant feeding guidelines.

Another study in Canada indicated that middle eastern mothers in the country tend to terminate breastfeeding

earlier and introduce their infants to complementary food earlier because of being ashamed to breastfeed in public (47). Studies show Muslims tend to breastfeed their infants as it is intertwined with their religious beliefs (48). However, despite being a Muslim in a high-income country, these mothers terminate breastfeeding much earlier due to the stigma of breastfeeding in public.

### Mass media

The internet is an interactive medium of mass media and a powerful communication and knowledge dissemination tool which has a high influence on infant feeding practices (49). Technology advancement has led to an increase in social networking platforms such as Facebook, Twitter, Instagram, etc. that has become a significant source of information seeking by mothers and caregivers and knowledge sharing by healthcare professionals (50). Advancement in communication technologies has led to many communication software such as skype, Whatsapps, Weechat etc that has made mothers and caregivers to be able to seek advice and suggestion regarding infant feeding from their family and friends from any part of the world (51).

Mobile application is a standard tool used by many people as it is cost-effective, flexible and assessable to people from various socio-economic and geographical backgrounds (52). There have been many mobile applications targeted at infant feeding practices globally. However, a systematic review on the content and quality of infant feeding smartphone applications reported that 64% of the application had a poor content of information, and more than 50% had incomplete or incorrect information regarding infant feeding guidelines (53). This might be the reason for low-income mothers in the US prefer to surf the Internet to get targeted information or specific information compared to using a mobile application (54).

A study conducted in France regarding the perception and needs of French parents and paediatricians regarding infant feeding practices reported that the Internet is the most assessed platform for knowledge-seeking by the parents (50). However, the study further reported that although parents browse the Internet the most for infant feeding information, advice and suggestions from peers and relatives had the most influence on their feeding decisions. This finding highlights the strong influence of the inner circle, in this context peers and relatives on parental feeding practices.

## MACROSYSTEM

### Cultural / Ethnicity

Cultural practice is a significant factor that influences infant feeding practices globally. The availability of food in a region affects the first food fed to the infants. In addition, religious practices and cultural believes in a particular ethnic group may also influence infant



feeding practices.

The introduction of prelacteal feed is expected in a few cultures (55,56). Prelacteal feed is food, liquid or any substances given to the infants in the first few days of life (55). The low levels of exclusive breastfeeding in certain cultures may have been the result from them giving prelacteal feed to their infants. Prelacteal feed is given in certain populations in India within the first few days of life as a traditional/ cultural practice (56). Infants in Papua New Guinea are fed with prelacteal feed for a few days as mothers believe colostrum is dirty and may harm their baby (57).

Studies show that migrant mothers often practice feeding their infants according to the feeding practices from their original place. A study in China comparing the infant feeding practices of Chinese born mothers and Australian born mothers reported that Chinese born mothers were more likely to introduce complementary food earlier and are less likely to provide cow milk to their infant (58). They prefer to give their infants formula milk.

Another study conducted in the UK involving 110 parents from a diverse culture, White British, Pakistanis, Bangladeshis, Africans and Polish, also reported a strong cultural influence on infant feeding practices (59). Infants from the African, Pakistani and Bangladeshi group were introduced to complementary food earlier than six months. Their first food was mostly pureed compared to infants from the white and polish group that were introduced to finger food and porridge. The type of carbohydrate given to the infants also varied in which Pakistani and Bangladeshi infants were given rice, African infants were given semolina, while the white infants were given potatoes, and polish babies were given maize.

Cultural influence in infant feeding may not only be in just the types of food given to a child but may also refer to an expected behaviour within the society or population. In many cultures and traditions, the mothers of the infant are expected to follow the feeding instructions by their mother in-laws (30,60). Failure to follow these suggestions is considered disrespectful (30). Hence, in this situation, education on infant feeding provided to these mothers may not be helpful as the person who controls the food purchasing and dictates these mothers are their mother in-laws.

## CONCLUSION

Infant feeding practices is vital for an optimum physical and mental development of a child. Current literature highlights the association between nutritional intake during infancy and the future development of health and behavioural problems. Although guidelines and policies on infant feeding exist, it is still a struggle to

ensure adherence to these guidelines, given the complex relationship between the child, the mother, the people around them and the environment they live.

This paper discussed factors that influence infant feeding practices highlighting that mothers are not the only stakeholders that should be targeted for improvisation. It can be concluded that a policy or intervention plan to improve infant feeding practices globally need to involve people in the household, such as fathers and mother-in-laws. Healthcare professionals should be equipped with culturally sensitive complementary feeding advice while taking into consideration of food affordability. More vigorous research should focus on barriers and facilitators in accepting infant feeding guidelines within a community.

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