

Motivating and Hindering Factors Affecting Muslim Mothers' Infant and Young Child Feeding (IYCF) Practices in Select Municipalities of Maguindanao, BARMM, Philippines

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ABSTRACT

Objectives. This study aimed to determine the motivating and hindering factors affecting the Infant and Young Child Feeding (IYCF) practices of Muslim mothers in select municipalities of Maguindanao.

Methods. A pretested questionnaire was administered through face-to-face interviews conducted among 320 randomly selected Muslim mothers with a child aged 6-23 months.

Results. Results revealed that prelacteal feeding was practiced by 16.6% of the Muslim mothers, giving mostly plain water. Solid/semi-solid foods were introduced at a mean age of 6.1 ± 1.4 months, with home-cooked lugao (porridge) (55.0%) and commercial baby food (31.3%) as the top foods introduced. The majority of Muslim mothers (82.5%) fed processed foods as complementary food to their children, including instant noodles (85.2%) and canned goods (51.5%). These processed foods were mostly obtained from sari-sari stores, with TV as the top source of information. More than 80% of the Muslim mothers cited food availability, economic reasons, and convenience in food preparation as the top three motivating factors in the practice of complementary feeding (CF). In addition, almost all the Muslim mothers (~97%) mentioned seeing their children grow healthy as the top reason for improving their food preparation practices, followed by positive feedback from their families. Meanwhile, household duties, low milk output, and a new pregnancy make it difficult to continue breastfeeding, while high complementary food costs, a limited budget, and a lack of food make it difficult to provide complementary food. The preparation of food for infants and young children is hindered by an increased workload and a lack of understanding.

Conclusion. The results revealed suboptimal practices in prelacteal feeding and the reliance on processed foods among Muslim mothers, with economic factors, availability, and convenience as motivating factors in complementary feeding practices. Challenges such as household duties, low milk output, and financial constraints hinder breastfeeding and nutritious food provision for infants and young children. The study reinforced the necessity for holistic strategies in IYCF promotion among Muslim mothers.

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INTRODUCTION

Globally, the recent data on undernutrition reveals that 22.3% of children are stunted and 6.8% are wasted.¹ Children aged 6-23 months who were not breastfed had mortality and infection-related mortality risks of about 2.0 times higher as compared to breastfed children.² In the Philippines, malnutrition continues to afflict children under two years old, with stunting, underweight, wasting, and overweight reported to be 29.5%, 19.0%, 5.7%, and 3.5%, respectively.³ In addition, the same report revealed that anemia was also prevalent among 6-11-month-old infants, 1-year-olds, and 2-year-olds children at 43.1%, 30.8%, and 14.4%, respectively.

Over the last 20 years, there have been increased global and national efforts to combat child malnutrition and mortality by implementing Infant and Young Child Feeding (IYCF) strategies and initiatives.^{4,5} Good nutrition is critical throughout the first 1,000 days of life since this is the time for rapid brain growth and development, as well as for laying down the foundation of good health for a lifetime⁶, in fact, promotion of proper complementary feeding (CF) practices could prevent six percent of child deaths in nations with a high child mortality rate.⁷ In IYCF, mothers play a critical role in ensuring proper feeding practices wherein a good understanding of optimal CF practices and food preparation is important for nurturing and nourishing children to optimize their growth potential and nutritional status.⁸ Recognizing the important contribution of the IYCF strategy to child health, the IYCF Infant and Young Child Feeding 2019 to 2030 Strategic Plan was formulated and circulated to guide its implementation through DOH Department Circular No. 2019-0537.⁹

In developing nations, such as the Philippines, inadequate complementary feeding remains as a public health issue among children of 6-23 months¹⁰, contributing to poor nutrition and growth retardation, increased child morbidity and death¹¹. In the Philippines, Filipino infants and young children meeting the minimum acceptable diet (MAD) and minimum dietary diversity (MDD) were very low at 11.7% and 21.6%, respectively.³ Of the 17 regions in the country, Bangsamoro Autonomous Region in Muslim Mindanao (BARMM) has the highest prevalence of stunting, with 45 percent of children under the age of five stunted. The region faces high poverty incidence, food insecurity, and malnutrition due to natural hazards, persistent conflicts, and intergenerational setbacks.¹² The available literature and evidence indicate that IYCF practices tend to be generally poor in areas affected by conflict, which can be attributed to factors such as displacement, stress, maternal malnutrition, mental health challenges, and family casualties.¹³ In the Philippines, IYCF practices in such areas are not well documented and data on IYCF practices from National Nutrition Surveys are not disaggregated by province or region.³

Given the prevalence of undernutrition and lack of detailed information on IYCF practices in BARMM,

especially among Filipino Muslim women, the present study was conducted to determine the IYCF-related practices and the motivating and hindering factors on proper IYCF feeding practices of Muslim mothers in select municipalities in Maguindanao, BARMM, Philippines. Identifying the motivating and hindering factors affecting the IYCF practices of mothers in specific communities with a high burden of malnutrition, particularly in the areas of BARMM, would be useful for planning and implementing programs to promote and improve proper IYCF practices.

METHODS

Study Design

This study used the data from the project entitled "A Formative Study on Food Preparation Practices of Households in Relation to Complementary Feeding Practices of Infants and Young Children 6-23 months old in Selected Areas of the Bangsamoro Autonomous Region of Muslim Mindanao (BARMM): Infant and Young Child Feeding (IYCF) Practices in the Islamic Context". The survey used a cross-sectional design that was conducted among Muslim mothers with children aged 6-23 months from two municipalities of Maguindanao province.

Study Sites and Participants

The study was conducted in Datu Paglas and Datu Anggal Midtimbang, Maguindanao province, one of the provinces in the BARMM. Both municipalities are project areas of the United Nations-Food and Agriculture Organization Philippine Office, which is one of the selection criteria. These areas were also selected given that they met the other inclusion criteria: 1) no or a low number of COVID-19 cases during the time of data collection; 2) availability of local enumerators; 3) willingness of the LGU to accept/approve the study; 4) availability of a list of children 6-23 months old; and 5) good communication connections, i.e., cellphone signal, internet connection.

Sampling Design and Sample Size

The study participants were mothers/caregivers who were included based on the following criteria: living in Maguindanao, BARMM, which is a recently established region in the Philippines, having children under 2 years old, and being of the Muslim faith. The respondents per municipality were selected using a two-stage random sampling method in which the barangays and the Muslim mothers with a child aged 6-23 months served as the primary and secondary sampling units, respectively. In the first stage of selection per municipality, barangays were selected using a simple random sampling method. Then children per sampled barangay were drawn from the list of children aged 6-23 months in the second stage of selection by employing again the simple random sampling method.

The number of children per municipality was determined using Cochran's formula:

$$n_0 = \frac{Z_{\alpha/2}^2}{d^2} P(1-P)$$

where the Z value corresponds to the level of confidence, P is the estimated proportion of children meeting the minimum acceptable diet, and d is the estimated margin of error. The effective sample size was computed using the formula:

$$n = \frac{n_0}{1+(n_0/n)}$$

To compensate for the complexity of the sampling method and possible non-response, the sample size was recalculated by multiplying it by the design effect and response rate. Thus, setting assumptions that a level of confidence was 95%, the margin of error was 6%, the estimated proportion of children meeting the minimum acceptable diet in BARMM was 7.2%¹⁴, and with a response rate of 90% and with the design effect of 2.0, the number of sampled children considered per municipality was 160, with a total of 320 for the two municipalities.

Data Collection

Before data collection, local enumerators were trained to conduct face-to-face interviews. The study questionnaire was formulated based from the research objectives and was translated to the Maguindanaoan dialect. The questionnaire was also pretested in respondents with similar characteristics as the target participants. The questionnaire aimed to gather detailed information on the socio-economic characteristics, and factors that motivate or hinder the respondents to practice infant and young feeding practices. Informed consent was secured, and study details were discussed with each respondent before the start of the interview. To avoid COVID-19 infections, the enumerators followed safety precautions throughout the data gathering process. The data collection period was from July to August 2021.

Data Processing and Analysis

Data processing activities such as reviewing, checking, and encoding were done after the data collection. Frequency and percentage distributions were constructed to establish the distributional properties of the data. In addition, summary statistics such as measures of location and dispersion were generated to summarize the distributional aspects of quantitative data. Moreover, Pareto charts were created to provide invaluable insights into the primary factors or barriers hindering Muslim mothers from sustaining IYCF practices. Through its visual representation, the Pareto chart enables the identification of key areas where interventions or support mechanisms can be targeted to yield the most impactful

enhancements in IYCF practices among Muslim mothers. All analyses were done using the Statistical Package for Social Sciences (SPSS) software version 23.

Ethical Approval

The conduct of the study was approved by the Research Institute for Health Sciences - Ethics Review Committee of the University of East Ramon Magsaysay Memorial Medical Center (RIHS ERC Code: 1045/E/2021/126). All respondents have completed and signed informed consent forms.

RESULTS

Profile of Respondents

Table 1 shows that 96.9% of the Muslim mothers were married and had a mean age of 28.8 years ± 7.3 years, mostly housewives (82.8%), and some were vendors or business owners (8.4%). There was a large variation in the observed monthly income of the households which could have affected

Table 1. Personal Information of Surveyed Muslim Mothers/ Caregivers

Personal Information	
Age (in years)	
Mean ± SD	28.8 ± 7.3
Minimum	18.0
Maximum	63.0
Civil Status, n=320, n (%)	
Single	3 (0.9)
Married	310 (96.9)
Separated	5 (1.6)
Live-in	1 (0.3)
Widowed	1 (0.3)
Highest Educational Attainment, n=320, n (%)	
Did not attend school	12 (3.8)
Elementary	133 (41.6)
High School	137 (42.8)
College	36 (11.3)
Vocational Course	1 (0.3)
Post Graduate	1 (0.3)
Occupation, n=320, n (%)	
Housewife	265 (82.8)
Vendor/business owner	27 (8.4)
Farmer/ agriculture worker	8 (2.5)
Government worker	7 (2.2)
Private employee	6 (1.9)
Teacher	2 (0.6)
Student	5 (1.6)
Monthly Household Income (Php)	
Mean ± SD	5,540 ± 9,116
Minimum	100
Maximum	120,000
Median	3,500
Mode	3,000

Table 2. Frequency and Percentage Distribution of Children 6-23 Months by Consumption of Solid or Semi-solid Foods

	n (%)
First solid/semi-solid food (n=320)	
Porridge	176 (55.0)
Commercial baby food	100 (31.3)
Biscuit	14 (4.4)
Fruit	13 (4.1)
Vegetable	5 (1.6)
Rice	3 (0.9)
Tapong*	2 (0.6)
Honey	1 (0.3)
Su-am	1 (0.3)
Don't know	5 (1.6)
Received any liquid or food before initiating breastfeeding (n=320)	
No	265 (82.8)
Yes	53 (16.6)
Don't know	2 (0.6)
Kind of liquid or food received (n=33)	
Formula milk	13 (39.4)
Water	16 (48.5)
Simbog**	2 (6.1)
Water with sugar	2 (6.1)
Age (in months) when the child received first solid/semi-solid food (n=313)	
Mean + SD	6.1 ± 1.4
Minimum	2
Maximum	12

* Tapong is ground rice cooked into porridge or lugao

** Simbog is a mixture of hot water and brown sugar, stirred until sugar are completely dissolved and when cooled enough, transferred in a feeding bottle then given to babies as milk substitute.

the average using the mean; thus, the median and mode were also computed which equate to PhP3,500 (US\$70 at PhP50/dollar) and PhP3,000 (US\$60) a month, respectively. According to the 2021 data from the Philippine Statistics Authority, this reported median monthly household income falls below the BARMM monthly poverty threshold for a family of five, which is PhP11,789 (US\$235.8).¹⁵

Complementary Feeding (CF) Practices

Table 2 shows that 98.4% of children eat solid or semi-solid food, with porridge (55.0%) and commercial baby food (31.3%) being the most consumed. Very few mentioned fruits (4.1%) and vegetables (1.6%) as part of the first solid or semi-solid food given to young children. Prolactal feeding was observed in 16.6% of children. Plain water and formula milk were provided to the children.

Most Muslim mothers (82.5%) feed their children processed complementary foods. The types of foods given include instant noodles (85.2%), commercial baby food (59.8%), and canned foods (51.1%). The age of children varies when they are given processed foods. Some children were fed commercial baby food at less than six month old, while

Table 3. Distribution of Surveyed Muslim Mothers by Information on Processed Food

	n (%), n=320
Proportion of children given processed complementary foods	
Yes	264 (82.5)
No	56 (17.5)
Processed complementary foods given to child*	
Canned goods	135 (51.1)
Instant noodles	225 (85.2)
Commercial baby food	158 (59.8)
Yogurt	7 (2.7)
Biscuit	44 (16.7)
Fruits, vegetables, egg	1 (0.4)
Yakult	1 (0.4)
Where the processed complementary foods are bought*	
Sari-sari store	198 (61.9)
Grocery store	136 (42.5)
Market	155 (48.4)
Pharmacy	7 (2.2)
Supply	1 (0.3)
Source of information about processed food*	
Radio	50 (15.6)
Television	173 (54.1)
Social media	46 (14.4)
Magazine/newspaper	7 (2.2)
Family and relatives	15 (4.7)
Internet/social media	5 (1.6)
Health center	12 (3.8)
Neighbor	17 (5.3)
Friends	2 (0.6)
Own idea	44 (13.8)
Mean ± SD of age (in months) when the child received processed food	
Canned goods	11.0 ± 3.0
Instant noodles	8.6 ± 3.3
Commercial baby food	5.4 ± 2.0
Yogurt	1.2 ± 3.4
Biscuit	7.6 ± 3.0
Fruits, vegetables, egg**	7.0
Yakult**	7.0

* with multiple responses; ** only one response

older children were given canned foods and instant noodles. It was also observed that 61.9% of the processed foods were commonly purchased from sari-sari stores. Television was indicated as the primary source of information about processed foods (54.1%). Details are shown in Table 3.

Motivating Factors

Seeing a child grow healthy (96.6%) is considered the main motivating factor for Muslim mothers to practice optimal breastfeeding and complementary feeding (Figure 1). This is followed by cheaper cost of breastmilk compared to milk formula (89.4%), availability of food (83.8%), having enough budget (83.1%), and affordability of food (80.9%). Child's need for optimum health is also an important factor in motivating the Muslim mothers to continue breastfeeding

(76.9%) and practice complementary feeding (74.7%). Aside from these, about 80% of the Muslim mothers also cited that it would motivate them to improve their food preparation practices if their husbands, family, and children would like and eat more of the food that they cooked.

Hindering Factors

Muslim mothers face challenges in continued breastfeeding due to household chores, insufficient breast milk, and new pregnancies. The Pareto chart in Figure 2 shows that more than 80% of the reasons for the Muslim mothers were from these three factors. Moreover, work for economically active mothers, disease, and belief that their child is old enough for table food corresponds to more than 60% of the reasons that prevented Muslim mothers from continuing breastfeeding.

Most Muslim mothers face barriers in providing complementary foods to their children due to the high cost

of food and a limited budget. More than 70% of the recorded responses are about these two economic concerns (Figure 3). Other noteworthy impediments found include a shortage of food, the labor required to prepare food, a child's lack of hunger, and a lack of practical recipes.

Figure 4 shows that over 80% of the hindering factors in CF practices include the unavailability of services from health facilities and extra effort dedicated to food preparation. In addition, lack of CF knowledge (59.3%) and inaccessibility of food (76.2%) were also cited by Muslim mothers as significant concerns for their CF practice.

Figure 5 shows that the Muslim mothers' primary concern for improving food preparation methods is financial constraints, with about 85% mentioning "no money". Nearly one-third lack knowledge of how to cook complementary foods (65.5%) and lack the time to prepare food since they are too busy working (84.9%).

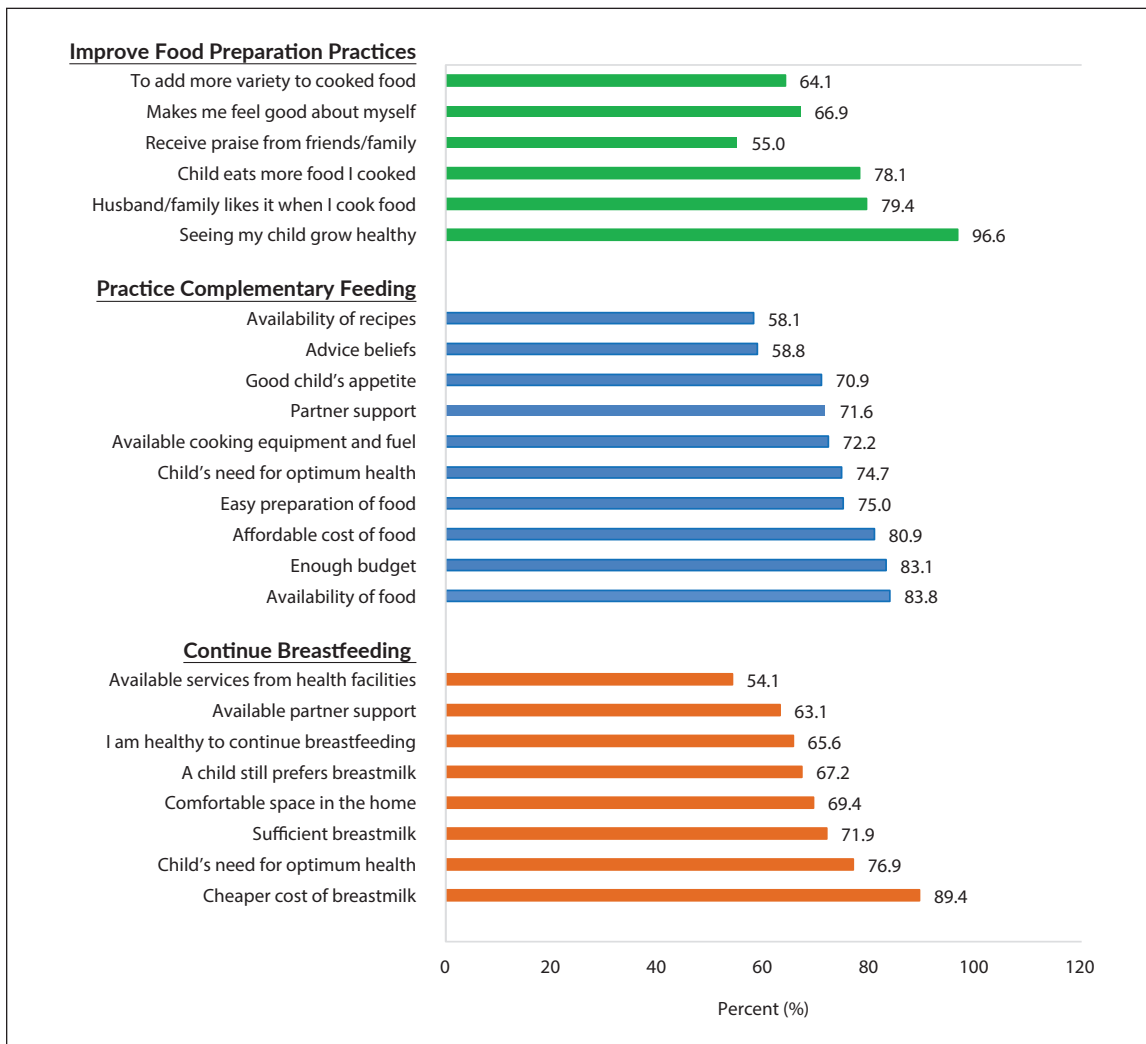


Figure 1. Distribution of Muslim mothers by factors that could motivate them to continue breastfeeding (orange), practice complementary feeding (blue), and improve food preparation practices (green).

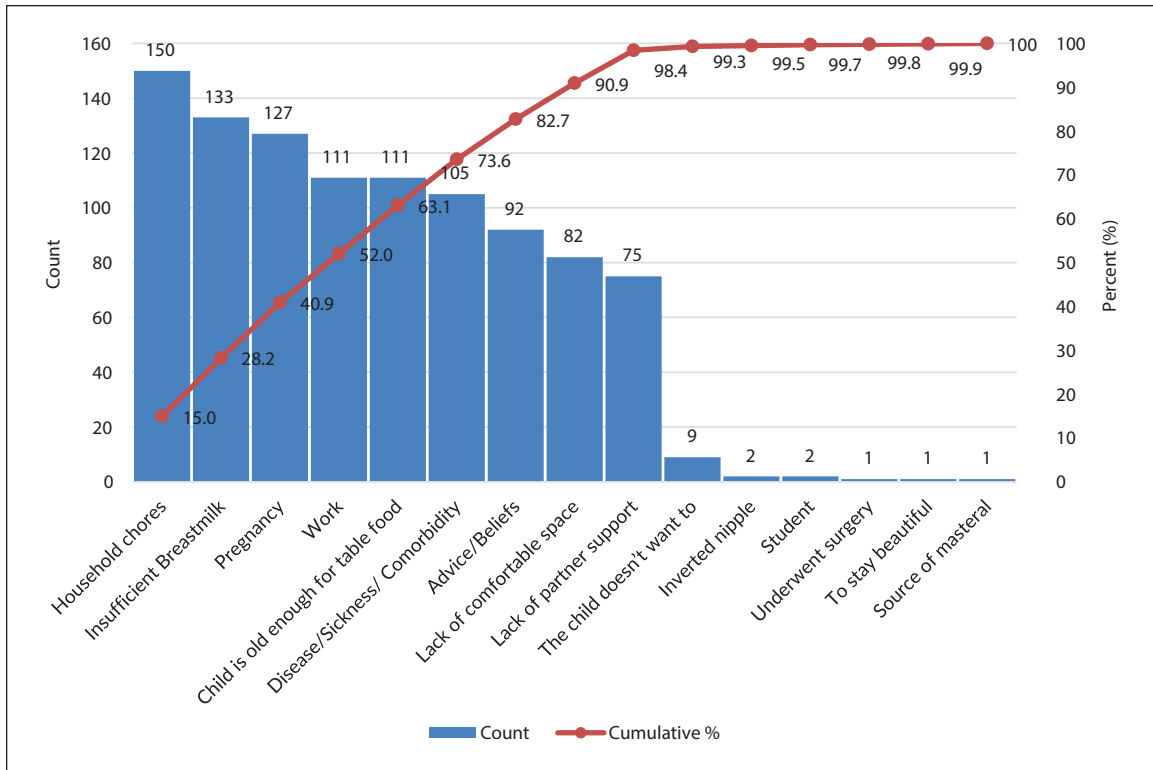


Figure 2. Pareto chart for the factors preventing the Muslim mothers to continue breastfeeding.

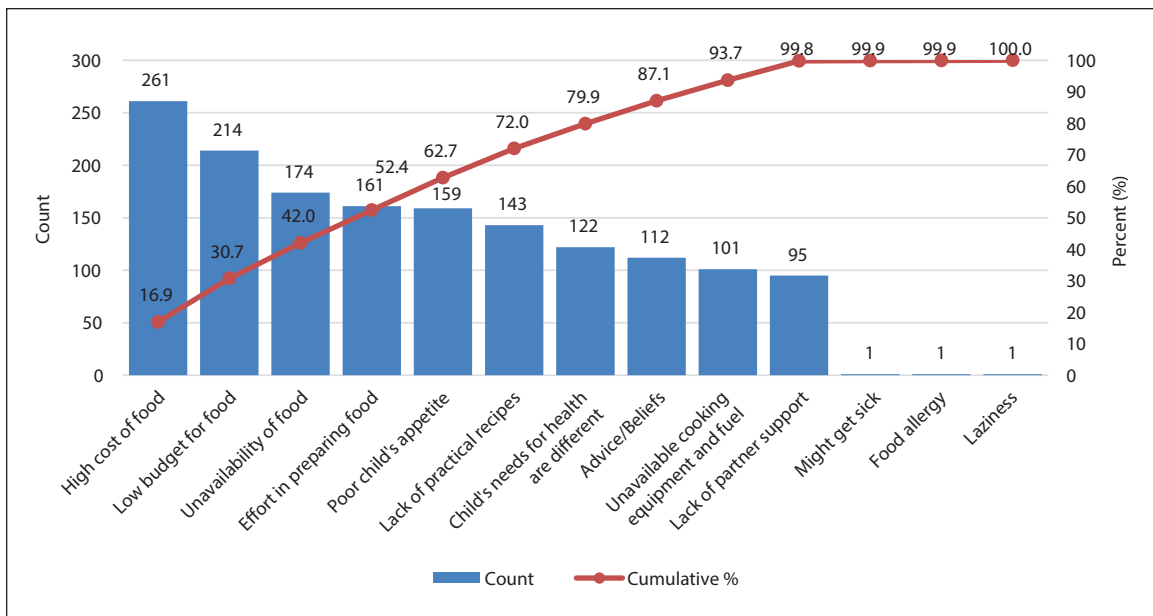


Figure 3. Pareto chart for the factors that hinder Muslim mothers in giving complementary food.

DISCUSSION

Muslim women view pregnancy, childbirth, breastfeeding, and child-rearing as spiritual endeavors and it is also a religious obligation for them to breastfeed their children for up to two years.¹⁶ However, WHO's recommendation to start complementary feeding at six months while continuing

breastfeeding up to 24 months⁴ were not being followed by most of the Muslim mothers. Some of them provided complementary foods either too early (e.g., two months) or too late (e.g., 12 months). For instance, Muslim mothers gave yogurt and commercial baby food to their children before the age of six months.

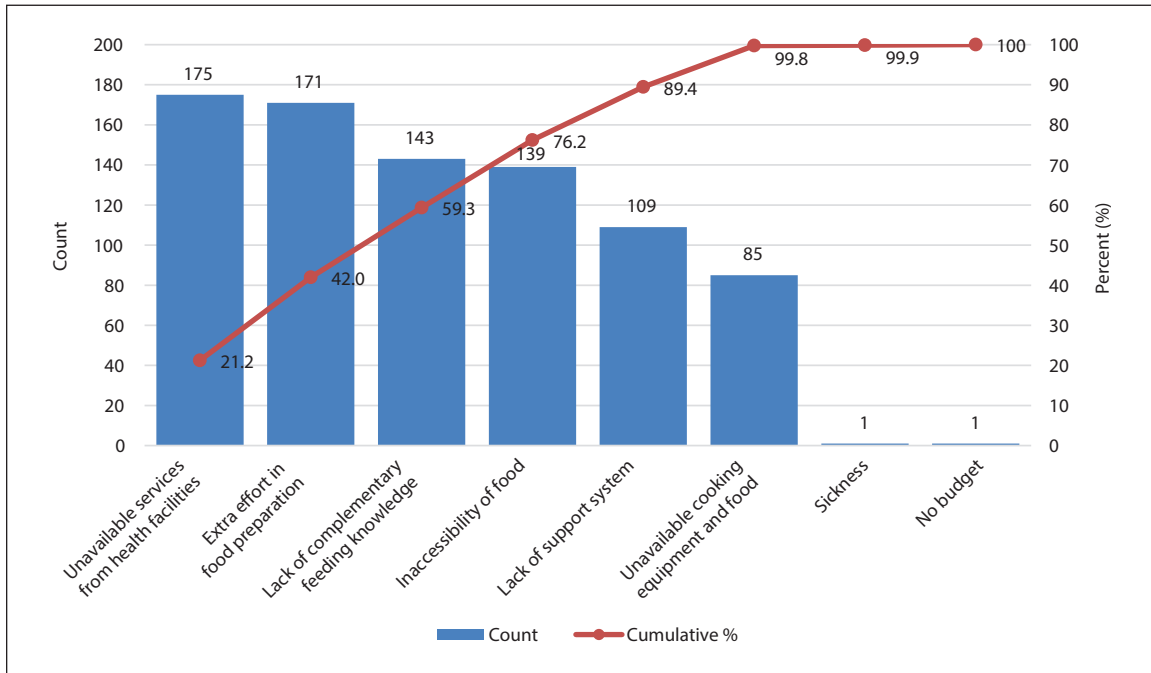


Figure 4. Pareto chart for the factors hindering complementary feeding (CF) practices of Muslim mothers.

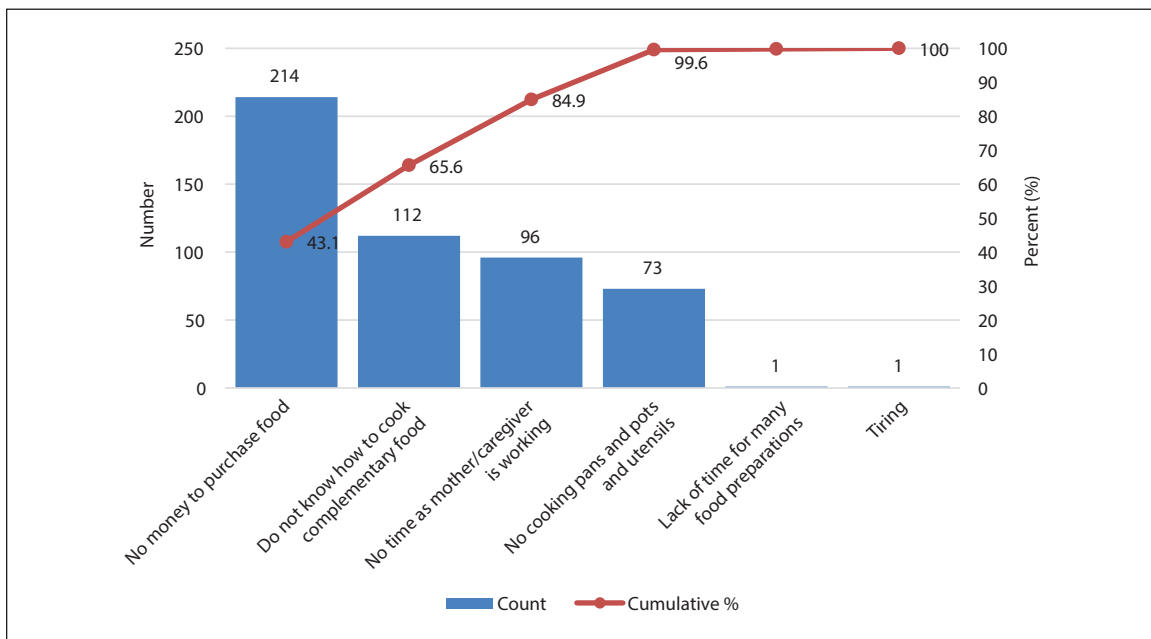


Figure 5. Pareto chart for the factors that hinder improvement in food preparation practices of Muslim mothers.

Prelacteal Feeding

Prelacteal feeding was observed to contribute to the suboptimal breastfeeding practices of the Muslim mothers. Prelacteal feeds are any substances other than breast milk that are given to infants before the start of breastfeeding, generally within the first three days of life.¹⁴ The proportion of Filipino children given prelacteal feeds declined from 26.1% in 2015 to 16.5% in 2019.³ Further, pre-lacteal feeding was found to be more prevalent among infants living in urban areas (18.9%) and those from the wealthiest families (26.3%) compared to those in rural settings (14.6%) and less affluent families (with the poorest at 10.5% and poor at 14.8%). Moreover, the practice was more frequently observed in infants whose mothers were employed (21.8%) and had received a college-level education or higher (21.2%) than among those with mothers who were not working or had lower levels of education.³ An earlier study showed that prelacteal feeding was already being practiced by Filipino mothers wherein the prevalent pattern on the first day was the provision of prelacteal foods and exclusive breastfeeding emerged as the predominant practice on the following day.¹⁷ In Indonesia, about 45% received prelacteal food, with the formula being the most common (25%), followed by other milk (14%), plain water (5%), and honey (3%).¹⁸ Plain water was the most common prelacteal liquid given at average age of 4.5 months. Prelacteal feeding also delayed Cambodian children's first breast milk consumption, depriving them of the benefits of colostrum and breastfeeding.¹⁹

Complementary Foods

Porridge and commercial baby food were the top responses of the Muslim mothers for the first solid/semi-solid food given to their children. Fruits and vegetables were mentioned only by very few Muslim mothers. At the national level, commercial baby food and porridge are also the top two consumed complementary foods among young children aged 6-23 months.³ Another study analyzing national data also revealed that the consumption of nutrient-dense food among Filipino infants and toddlers is low.²⁰ This practice could have been improved if there had been an increase in the intake of nutrient-dense food items like fruits, vegetables, and meats since rice and plain porridge are deficient in minerals like iron and zinc.

The limited amount and variety of complementary food given to young children can be attributed to high food costs, limited fresh produce availability, inadequate nutrition education, and family eating habits.²¹ This highlights the need for quality complementary foods for young children. Infants normally consume foods in relatively small quantities; as a result, the foods to be given to them must have a high nutritional density.²²

Processed and commercial complementary foods were also provided to the young children. The nutritional value of these commercial and processed complementary foods varies greatly, with some of them offering micronutrients that are lacking in the regular diets of young children while others are

of concern due to excessive amounts of added salt or sugar or the presence of trans-fatty acids.²³ Nonetheless, caution should be taken when giving commercial complementary foods as these are associated with a shorter duration of breastfeeding.²⁴

Moreover, processed and high-sodium foods like instant noodles and canned goods given by Muslim mothers to their children starting at the age of 8.6 months and 11 months, respectively, should also be avoided. According to WHO and UNICEF, growing infants should be provided with nutritionally adequate, safe, and appropriate complementary foods to satisfy increasing dietary needs for optimum growth, development, and good health.⁴ Based on the results of the study, sari-sari stores, nearby markets, and grocery stores are the common access points for the food of Muslim mothers thus these locations may be strategically utilized for selling nutrient-dense food items for CF.

Source of Information

Muslim mothers often receive information on processed foods on TV, radio, and social media. Because of the child- or mother-targeted marketing strategies of these products, commercially produced snacks and beverages, which are typically loaded with extra salt or sugar, are increasingly fed to young children.²³ This suggests that these media can be used as leverage points to promote IYCF messages and practices. Concerns have been raised about how commercial marketing affects customers' attitudes and behaviors, especially when it comes to digital platforms that enable individualized and targeted advertising to parents and caregivers.²⁵

Motivating Factors

Breastfeeding is primarily motivated by the cost of breastmilk, which is cheaper than other options, followed by child health. This reasoning was documented by Sanie et al. among non-Muslim Filipino mothers in various study sites such as Naga City, Cebu City, Iloilo City, Zamboanga City, and Manila City.²⁶ Moreover, breastfeeding can result in savings of about P130,000 for three years with the assumption of decreased milk spending between the second and third year as the child consumes more solid foods.²⁷ Globally, breastfeeding is one of the investments to enhance social, health, and economic development outcomes leading to more than \$16 million in savings in treatment costs related to inadequate breastfeeding, an additional \$3.8 billion for the Philippine economy or about 1.05% of the country's gross national income, and reduce family out-of-pocket spending to treat pneumonia and diarrhea.²⁸

Rising food prices in the country have affected the diet and mother's feeding practices. The cost of a nutritious diet in the Philippines has been consistently rising from P226.60 (US\$3.84) a day in 2017 to P236.04 (US\$4.00) in 2018, to P238.9 (US\$4.05) in 2019, and to P242.53 (US\$4.11) in 2020.²⁹ One way to address these economic constraints is by encouraging mothers to utilize a wide array of indigenous food readily available in the community.^{30,31}

The majority of the Muslim mothers cited child-centered responses (e.g., seeing my child grow healthy, the child reacts positively to CF, and the child eats more food I cooked) and family-centered responses (e.g., positive reactions and social support from their partner and family) when it comes to facilitating factors for improvement of child feeding and food preparation practices. This has been previously reported in a systematic review done by Manikam et al. wherein a child's taste and behavioral response to CF is a strong promoter of CF practices.³² Available partner support was also one of the motivation for most Muslim mothers to continue breastfeeding (63.1%) and to practice CF (76.1%). This might be related to the Islamic religious belief that the father of the infant is responsible for supporting his wife under any circumstances that may impact breastfeeding, even in the event of a divorce.³³

These results indicate leverage points wherein health authorities and volunteers can design nutrition messages and interventions in a family-centered context to encourage improved IYCF practices and positive behavior change.

Hindering Factors

The findings of this present study in terms of factors hindering breastfeeding are similar to the study of Nankumbi and Mulijira where household chores and the burden of other responsibilities were reported to be one of the major reasons for inadequate breastfeeding or CF practices.³⁴ Non-working mothers or housewives were more likely to adhere to appropriate breastfeeding practices than their working counterparts.^{35,36} This was associated with the working mothers' lack of knowledge to sustain the practice while working, unfavorable working environment³⁵, limited workplace breastfeeding support, and the short duration and limited coverage of maternity leave.³⁷

This present study observed that the support system including family and relatives influenced the type of complementary foods and practices of mothers. Nankumbi and Muliira pointed out that cultural customs coming from the influence of revered community or family members stood up as a major impediment to proper baby and early child feeding techniques since the cultural practices appear to be deeply ingrained by respected family members or seniors in the community.³⁴ This barrier must be addressed with care since the caregivers such as grandmothers have strong social networks and exert significant collective influence on practices surrounding pregnancy, the behavior of young women, and the care of sick children.³⁸

In relation to the previously mentioned hindering factors, about a quarter of the respondents of this present study mentioned that the unavailability of cooking equipment and fuel were barriers to giving appropriate complementary foods and improved food preparation practices. WHO mentioned that appropriate CF frequency can be facilitated by increasing fuel availability and providing cooking utensils, especially in areas where these materials may be difficult to obtain.³⁹ There

was also a study showing that it was impossible to prepare special meals for infants and young children if mothers' houses were not supplied with gas.⁴⁰ This result suggests that aside from the provision of food and technical knowledge, the proper practice of infant and child feeding among Muslim mothers can be promoted by supplying necessary cooking fuel and supplies. Conducting recipe trials and participatory cooking demonstrations are activities that could address this concern.^{41,42}

Lastly, the unavailability of services from health facilities was the top reason cited by Muslim mothers concerning hindrances in their CF practices. In the Islamic context, midwives are encouraged to assist breastfeeding women fasting during Ramadan, ensuring that any maternal or neonatal concerns are effectively communicated to empower informed decision-making.¹⁶ In the Philippines, the lack of health services usually translates into insufficient nutrition education programs at the primary point of care, and eventually poor IYCF practices among mothers. This situation was also documented in other countries, including Cambodia⁴³, Uganda³⁴, Ethiopia⁴⁴, China⁴⁵, Bangladesh³², and India⁴⁶. To address this concern, improving health services for mothers should be prioritized as empirical evidence suggests that increased access to health services can improve many maternal and child health domains, including positive behavior change and decision-making processes.⁴⁷

Limitation of the Study

One of the study's limitations is that because the respondents' religion was predetermined at the outset, no direct questions were asked about how religion affected respondents' decisions regarding IYCF practices. The questions were formulated taking into consideration the religious beliefs of the Muslim mothers. Furthermore, considering that the data collection took place amid the peak of the COVID-19 pandemic, there is a likelihood that the pandemic influenced the responses of the Muslim mothers. Other possible limitations of the study might be linked to the presence of recall and social desirability biases.

CONCLUSION

The study revealed that one of the good IYCF practices among the majority of Muslim mothers involved the timely introduction of complementary foods to their children at age of six months. However, there were cases of prelacteal feeding and limited inclusion of fruits and vegetables as the first solid/semi-solid food given to infants and young children. Additionally, the provision of processed foods like instant noodles and canned goods as complementary foods was observed. The motivating factors affecting IYCF practices include having an adequate budget, access to affordable food, and positive child- and family-centered responses. On the other hand, hindering factors encompass challenges such as high cost of food, limited budget, unavailability of health

services, and extra effort required for food preparation. The findings highlight the need for holistic approaches in promoting optimal IYCF practices focused on Muslim mothers. Hence, it is recommended that there is a need to leverage the identified motivating and hindering factors in crafting nutrition interventions to enhance IYCF practices among Muslim mothers. Further research is warranted to delve into the connection and underlying reasons for the motivating and hindering factors on IYCF that have been observed.

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Statement of Authorship

All authors certified fulfillment of ICMJE authorship criteria.

Author Disclosure

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REFERENCES

1. United Nations Children's Fund (UNICEF), World Health Organization (WHO), International Bank for Reconstruction and Development/The World Bank. Levels and trends in child malnutrition: UNICEF / WHO / World Bank Group Joint Child Malnutrition Estimates: Key findings of the 2023 edition [Internet]. 2023 [cited 2023 Jan]. Available from: <https://iris.who.int/bitstream/handle/10665/368038/9789240073791-eng.pdf?sequence=1>
2. Sankar MJ, Sinha B, Chowdhury R, Bhandari N, Taneja S, Martines J, et al. Optimal breastfeeding practices and infant and child mortality: a systematic review and meta-analysis. *Acta Paediatr.* 2015 Dec;104(467):3-13. doi: 10.1111/apa.13147. PMID: 26249674.
3. Department of Science and Technology - Food and Nutrition Research Institute (DOST-FNRI). Philippine Nutrition Facts and Figures: 2018-2019 Expanded National Nutrition Survey (ENNS) [Internet]. 2022 [cited 2023 Jan]. Available from: https://enutrition.fnri.dost.gov.ph/uploads/2018-2019%20ENNS%20FACTS%20AND%20FIGURES_JULY182023.pdf
4. World Health Organization (WHO) and United Nation Children's Fund (UNICEF). Global Strategy for Infant and Young Child Feeding [Internet]. 2003 [cited 2023 Jan]. Available from: <https://iris.who.int/bitstream/handle/10665/42590/9241562218.pdf?sequence=1>
5. Dhami MV, Ogbo FA, Akombi-Inyang BJ, Torore R, Agho KE, Global Maternal and Child Health Research Collaboration (GloMACH). Understanding the enablers and barriers to appropriate infants and young child feeding practices in India: a systematic review. *Nutrients.* 2021 Mar 2;13(3):825. doi: 10.3390/nu13030825. PMID: 33801545; PMCID: PMC7998710.
6. Cusick S, Georgieff MK. The first 1,000 days of life: The brain's window of opportunity [Internet]. 2013 [cited 2022 Dec]. Available from: <https://www.unicef-irc.org/article/958-the-first-1000-days-of-life-the-brains-window-of-opportunity.html>
7. Jones G, Steketee RW, Black RE, Bhutta ZA, Morris SS; Bellagio Child Survival Study Group. How many child deaths can we prevent this year? *Lancet.* 2003 Jul 5;362(9377):65-71. doi: 10.1016/S0140-6736(03)13811-1. PMID: 12853204.
8. Tariqujjaman M, Hasan MM, Mahfuz M, Hossain M, Ahmed T. Association between mother's education and infant and young child feeding practices in South Asia. *Nutrients.* 2022 Apr 5;14(7):1514. doi: 10.3390/nu14071514. PMID: 35406127; PMCID: PMC9003257.
9. Department of Health. Department Circular No. 2019-0537 - Circulation of the Philippine Infant and Young Child Feeding (IYCF) 2019 to 2030 (#IYCF2030) Strategic Plan [Internet]. 2019 [cited 2023 Jul]. Available from: <https://dmas.doh.gov.ph:8083/Rest/GetFile?id=649310>.
10. Abeshu MA, Lelisa A, Geleta B. Complementary feeding: review of recommendations, feeding practices, and adequacy of homemade complementary food preparations in developing countries—lessons from Ethiopia. *Front Nutr.* 2016 Oct 17;3:41. doi: 10.3389/fnut.2016.00041. PMID: 27800479; PMCID: PMC5065977.
11. Effect of breastfeeding on infant and child mortality due to infectious diseases in less developed countries: a pooled analysis. WHO Collaborative Study Team on the Role of Breastfeeding on the Prevention of Infant Mortality. *Lancet.* 2000 Feb 5;355(9202):451-5. PMID: 10841125.
12. National Nutrition Council (NNC). Bangsamoro Autonomous Region in Muslim Mindanao - Regional Nutrition Action Plan [Internet]. 2021 [cited 2024 Mar]. Available from: https://www.nnc.gov.ph/phocadownloadpap/userupload/Robarmm-webpub/Final%20RAN%20BARMM_Feb262021.pdf
13. Rabbani A, Padhani ZA, Siddiqui FA, Das JK, Bhutta Z. Systematic review of infant and young child feeding practices in conflict areas: what the evidence advocates. *BMJ Open.* 2020 Sep 13;10(9):e036757. doi: 10.1136/bmjopen-2020-036757. PMID: 32928852; PMCID: PMC7488834.
14. Department of Science and Technology - Food and Nutrition Research Institute (DOST-FNRI). Maternal health and nutrition and infant and young child feeding survey. 2015 [cited 2023 Jan]. Available from: https://enutrition.fnri.dost.gov.ph/uploads/2015_MATERNAL_AND_IYCF_SURVEY.pdf
15. Philippine Statistics Authority. Highlights of the 2021 Full Year Official Poverty Statistics [Internet]. 2022 [cited 2023 Jul]. Available from: https://psa.gov.ph/system/files/phdsd2023-01/3-Highlights%2520of%2520the%25202021%2520Full%2520Year%2520Official%2520Poverty%2520Statistics%2520C%252012Aug2022_0.pdf
16. Zaidi F. Challenges and practices in infant feeding in Islam. *Br J Midwifery.* 2014 Mar;22(3):167-72. doi: 10.12968/bjom.2014.22.3.167.
17. Fernandez MEL, Popkin BM. Pre-lacteal feeding patterns in the Philippines. *Ecol Food Nutr.* 1988 Aug;21(4):303-14. doi: 10.1080/03670244.1988.9991044.
18. Rahmartani LD, Carson C, Quigley MA. Prevalence of pre-lacteal feeding and associated risk factors in Indonesia: Evidence from the 2017 Indonesia Demographic Health Survey. *PLoS One.* 2020 Dec 3;15(12):e0243097. doi: 10.1371/journal.pone.0243097. PMID: 33270720; PMCID: PMC7714248.
19. Som SV, Prak S, Laillou A, Gauthier L, Berger J, Poirot E, et al. Diets and feeding practices during the first 1000 days window in the Phnom Penh and Northeastern districts of Cambodia. *Nutrients.* 2018 Apr 18;10(4):500. doi: 10.3390/nu10040500. PMID: 29670006; PMCID: PMC5946285.
20. Jacquier EF, Angeles-Agdeppa I, Lenighan YM, Toledo MB, Capanzana MV. Complementary feeding patterns of Filipino infants and toddlers lack diversity, especially among children from poor households. *BMC Nutr.* 2020 Oct 26;6:51. doi: 10.1186/s40795-020-00376-1. PMID: 33117553; PMCID: PMC7586690.
21. Lopez-Madrid MM, Acuin CC, Orense CL, Duante CA, Tan RCA, Capanzana MV. Awareness of and adherence to the food based dietary guidelines among household meal planners in the Philippines. *Philipp J Sci.* 2018 Sep 1;147(3):523-35.

22. United Nations Children's Fund (UNICEF). Programming Guide: Infant and Young Child Feeding [Internet]. 2011 [cited 2023 Jan]. Available from: <https://www.enonline.net/attachments/1470/unicef-iycf-programming-guide-may-26-2011.pdf>
23. Zehner E, Champeny M, Huffman SL. Marketing and infant and young child feeding in rapidly evolving food environments. *Matern Child Nutr*. 2019 Jun; 15(Suppl 4):e12810. doi: 10.1111/mcn.12810. PMID: 31225711; PMCID: PMC6618061.
24. Tzioumis E, Kay M, Wright M, Adair L. Health effects of commercially-available complementary foods: a systematic review [Internet]. 2015 [cited 2023 Jan]. Available from: <https://www.who.int/docs/default-source/nutritionlibrary/complementary-feeding/cf-health-effects-commercially-systematicreview.pdf>
25. Dearlove T, Begley A, Scott JA, Devenish-Coleman G. Digital marketing of commercial complementary foods in Australia: an analysis of brand messaging. *Int J Environ Res Public Health*. 2021 Jul 27;18(15):7934. doi: 10.3390/ijerph18157934. PMID: 34360227; PMCID: PMC8345376.
26. Saniel OP, Rabuco LB, Lebanan AO. Baseline Survey and Formative Research Ensuring Food Security and Nutrition among Children 0-23 Months of Age in the Philippines [Internet]. 2011 [cited 2023 Jan]. Available from: <https://www.gainhealth.org/sites/default/files/publications/documents/baseline-survey-and-formative-research-ensuring-food-security-and-nutrition-philippines.pdf>
27. Arevalo MC. How much can you save when you breastfeed? [Internet]. 2015 [cited 2023 Jan]. Available from: <https://www.rappler.com/moveph/105620-how-much-savings-breastfeeding/>
28. Walters DD, Phan LTH, Mathisen R. The cost of not breastfeeding: global results from a new tool. *Health Policy Plan*. 2019 Jul 1;34(6):407-17. doi: 10.1093/heapol/czz050. PMID: 31236559; PMCID: PMC6735804.
29. Baclig CE. World Food Day 2022: Rising costs keep millions in PH away from healthy diets [Internet]. 2022 [cited 2023 Jan]. Available from: <https://newsinfo.inquirer.net/1680910/world-food-day-2022-rising-costs-keep-millions-in-ph-away-from-healthy-diets>.
30. Chadha ML, Oluoch MO. Home-based vegetable gardens and other strategies to overcome micronutrient malnutrition in developing countries [Internet]. 2003 [cited 2023 Jan]. Available from: <https://www.fao.org/3/y8346m/y8346m02.pdf>.
31. Khor GL. Food-based approaches to combat the double burden among the poor: challenges in the Asian context. *Asia Pac J Clin Nutr*. 2008;17 Suppl 1:111-5. PMID: 18296315.
32. Manikam L, Robinson A, Kuah JY, Vaidya HJ, Alexander EC, Miller GW, et al. A systematic review of complementary feeding practices in South Asian infants and young children: the Bangladesh perspective. *BMC Nutr*. 2017 Jul 12;3:56. doi: 10.1186/s40795-017-0176-9. PMID: 32153836; PMCID: PMC7050712.
33. Shaikh U, Ahmed O. Islam and infant feeding. *Breastfeed Med*. 2006 Autumn;1(3):164-7. doi: 10.1089/bfm.2006.1.164. PMID: 17661593.
34. Nankumbi J, Muliira JK. Barriers to infant and child-feeding practices: a qualitative study of primary caregivers in rural Uganda. *J Health Popul Nutr*. 2015 Mar; 33(1):106-16. PMID: 25995727; PMCID: PMC4438654.
35. Goyena EA, Valdeabella-Maniego ML. Adherence to age-appropriate feeding practices among Filipino children under two: An analysis of the 2018-2019 Expanded National Nutrition Survey. *Mal J Nutr*. 2022 Dec 1;28(3):423-39. doi: 10.31246/mjn-2022-0037.
36. Gebeyehu NA, Tegegne KD, Shewangashaw NE, Biset G, Abebaw N, Tilahun L. Knowledge, attitude, practice and determinants of exclusive breastfeeding among women in Ethiopia: systematic review and meta-analysis. *Public Health Pract (Oxf)*. 2023 Mar 5;5:100373. doi: 10.1016/j.puhip.2023.100373. PMID: 36941951; PMCID: PMC10023906.
37. Samaniego JAR, Maramag CC, Castro MC, Zambrano P, Nguyen TT, Datu-Sanguyo J, et al. Implementation and effectiveness of policies adopted to enable breastfeeding in the Philippines are limited by structural and individual barriers. *Int J Environ Res Public Health*. 2022 Sep 1;19(17):10938. doi: 10.3390/ijerph191710938. PMID: 36078649; PMCID: PMC9517919.
38. Auel J. The role and influence of grandmothers on child nutrition: culturally designated advisors and caregivers. *Matern Child Nutr*. 2012 Jan;8(1):19-35. doi: 10.1111/j.1740-8709.2011.00333.x. PMID: 21951995; PMCID: PMC6860857.
39. World Health Organization (WHO). Guiding Principles for Feeding Infants and Young Children During Emergencies [Internet]. 2004 [cited 2023 Jan]. Available from: <https://iris.who.int/bitstream/handle/10665/42710/9241546069.pdf?sequence=1>
40. Goudet SM, Faiz S, Bogin BA, Griffiths PL. Pregnant women's and community health workers' perceptions of root causes of malnutrition among infants and young children in the slums of Dhaka, Bangladesh. *Am J Public Health*. 2011 Jul;101(7):1225-33. doi: 10.2105/AJPH.2010.300090. PMID: 21653248; PMCID: PMC3110238.
41. Talavera MTM, Narciso MH, Felix AdR. Recipe trials to improve complementary feeding: the Philippine experience. *Mal J Nutr*. 2014 Mar 1;20(2):183-95.
42. Ali SI, Begum J, Badusha M, Reddy ES, Rali P, Lalitha DL. Participatory cooking demonstrations: A distinctive learning approach towards positive health. *J Family Med Prim Care*. 2022 Nov;11(11):7101-5. doi: 10.4103/jfmpc.jfmpc_998_22. PMID: 36992985; PMCID: PMC10041296.
43. Reinbott A, Jordan I. Determinants of child malnutrition and infant and young child feeding approaches in Cambodia. *World Rev Nutr Diet*. 2016;115:61-7. doi: 10.1159/000444609. PMID: 27197522.
44. Demilew YM. Factors associated with mothers' knowledge on infant and young child feeding recommendation in slum areas of Bahir Dar City, Ethiopia: cross sectional study. *BMC Res Notes*. 2017 Jun 5;10(1):191. doi: 10.1186/s13104-017-2510-3. PMID: 28583203; PMCID: PMC5460351.
45. Wu Q, Scherpier RW, van Velthoven MH, Chen L, Wang W, Li Y, et al. Poor infant and young child feeding practices and sources of caregivers' feeding knowledge in rural Hebei Province, China: findings from a cross-sectional survey. *BMJ Open*. 2014 Jul 29;4(7):e005108. doi: 10.1136/bmjopen-2014-005108. PMID: 25079931; PMCID: PMC4120327.
46. Rana BM, Chandwani H, Sonaliya KN, Prajapati A. A descriptive study to assess factors affecting core indicators of infant and young child feeding practices in urban area of Gujarat State, India. *Int J Community Med Public Health*. 2016 May;3(5):1101-6. doi: 10.18203/2394-6040.ijcmph201611365.
47. Owais A, Suchdev PS, Schwartz B, Kleinbaum DG, Faruque ASG, Das SK, et al. Maternal knowledge and attitudes towards complementary feeding in relation to timing of its initiation in rural Bangladesh. *BMC Nutr*. 2019 Jan 30;5:7. doi: 10.1186/s40795-019-0272-0. PMID: 32153921; PMCID: PMC7050709.