









## Research

# Understanding infant and young child feeding (IYCF) practices among Muslim mothers/caregivers: A qualitative study in the Bangsamoro Autonomous Region in Muslim Mindanao, Philippines

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## Background

The study focused on understanding infant and young child feeding practices (IYCF) among Muslim mothers in the Bangsamoro Autonomous Region in Muslim Mindanao (BARMM), Philippines.

## Objective

Recognizing the cultural and religious sensitivities associated with these practices, the research aimed to identify influencing factors and assess the influence of advertisements on maternal decisions regarding infants' and children's diets.

## Methods

A total of 74 Muslim mothers with infants 6-23 months old were recruited and participated in the focus group discussions (FGD). Ten FGD sessions were conducted in Maguindanao Province, Philippines from July to August 2021. Verbatim transcriptions of audio-recorded discussions were transcribed into Microsoft Word files and QSR NVivo version 12 was used in the coding and analysis of the transcripts.

## Results

Mothers exhibited limited awareness of such important complementary feeding issues as preferring fruits and vegetables while avoiding junk food as chips. IYCF information came primarily from health workers and other mothers - their own mothers, mothers-in-law, and midwives. Television commercials were identified as particularly influential in shaping maternal feeding decisions.

## Conclusions

There was a diversity of breastfeeding practices and limited knowledge, especially of complementary feeding among these Muslim mothers. Both traditional beliefs and marketing were said to influence feeding choices. This underscores the need for culturally-sensitive interventions and targeted educational initiatives to enhance maternal knowledge and advocate for optimal infant feeding practices within Muslim communities, as well as regulation of the marketing of commercial infant foods.

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## INTRODUCTION

The promotion of proper infant and young child feeding (IYCF) practices may have a significant impact on child health among all (WHO, 2020). Proper implementation of IYCF could substantially reduce morbidity and mortality among young children (WHO and UNICEF 2003). Black et al. (2013) considered the promotion of sound IYCF practices as one of the solutions to address child malnutrition. However, challenges persist, with poor IYCF practices noted worldwide, including the Philippines where suboptimal feeding practices are reported. The infant and young child feeding database from UNICEF suggests that globally only about 44% of infants less than six months of age were currently exclusively breastfed (based on a 24-hour recall, that is, the day before a survey). In addition, only about 29% of children 6–23 months of age are meeting the minimum dietary diversity (MDD), 52% meeting the minimum meal frequency (MMF), while only about 18% are meeting the minimum acceptable diet (MAD) (UNICEF, 2021).

In the Philippines, IYCF practices are considered sub-optimal. The mean duration of exclusive breastfeeding was reported at 4.2 months (DOST-FNRI, 2022). The prevalence of children meeting the MAD decreased from 18.6% in 2015 to 11.7% in 2018-2019 while the prevalence of children meeting the MDD decreased from 29.2% in 2015 to 21.6% in 2018-2019 (DOST-FNRI, 2022). The first set of solid foods commonly introduced to infants are commercially-prepared baby foods (49.6%) and less than 40% were consuming iron-rich foods (39.0%) and vitamin A-rich foods (18.7%).

The Bangsamoro Autonomous Region in Muslim Mindanao (BARMM) was inaugurated by the Philippine Government in 2019. In this region, chronic conflicts, food insecurity, high poverty rates, sporadic outbreaks of violence, governance challenges, and the occurrence of natural hazards contribute to malnutrition (WFP, 2023). According to this WFP report (2023), 49% of the people in BARMM suffer from chronic malnutrition, while 45% of children under five years of age are affected by stunting, which is the highest prevalence of stunting in the country. Moreover, malnutrition in the region has increased due to the COVID-19 pandemic.

IYCF practices are influenced by a variety of factors including maternal knowledge, attitudes, socio-demographic, cultural and religious influences (Adepoju et al. 2019), including Islamic teachings on breastfeeding and other practices (Shaikh & Ahmed, 2006; Bensaid, 2019). Breastfeeding for the first two years of life is common among Muslim women. Weaning from the breast before this period is acceptable if it is agreed to by both parents (Shaikh & Ahmed, 2006).

Despite the high moral and spiritual emphasis Islam places on breastfeeding, suboptimal practices are observed among Muslim mothers elsewhere, including prelacteal feeding and early initiation of complementary feeding (Manghat & Thulaseedharan, 2018). Prelacteal foods, which include dairy products, water and certain plant species, can reduce the duration of exclusive breastfeeding. This practice also increases the likelihood of formula consumption particularly in lower-middle income countries (Neves et al., 2022) and is associated with diarrhea and lower respiratory tract infections (Wondemeh, 2024).

Beyond breastfeeding practices, there is also concern about the nutritional quality of the marketed products. Reliance on processed foods can lead to inadequate nutrient intake and excessive consumption of sugar and salt. A study conducted among Thai mothers found that exposure to marketing significantly shaped their views on commercial baby food products and their feeding practices (Cetthakrikul et al., 2022). Specifically, mothers exposed to baby food marketing in health facilities were four times more likely to feed their children commercial milk formula compared to those who did not encounter such marketing.

Understanding the factors influencing mothers' motivation to improve food preparation and complementary feeding practices is important to help improve IYCF practices in the province and region of the Philippines. Due to limited information on IYCF practices among Filipino Muslim mothers, this study aimed to comprehensively understand these practices within the Muslim communities in the BARMM.

## MATERIALS AND METHODS

### STUDY LOCATION AND PARTICIPANTS

The study was conducted in two municipalities: Datu Paglas and Datu Anggal Midtimbang in Maguindanao Province, Philippines. Datu Paglas is a 4<sup>th</sup> class municipality while Datu Anggal Midtimbang is a sixth-class municipality. According to the Central Bank of the Philippines, as of August 27, 2024, fourth-class municipalities have an average yearly income ranging from P25 million to P34,999,999, which is approximately equivalent to USD 442,478 to USD 619,469 at an exchange rate of P56.50 to 1 US dollar. Sixth-class municipalities, with an average yearly income of less than P15 million, would have an income of less than approximately USD 265,487. Both municipalities have a predominantly Muslim population (PSA, 2017).

### DATA COLLECTION

We conducted focus group discussions (FGDs) with Muslim mothers/caregivers who had children 6 to 23 months old. The study commenced with a briefing session conducted by the researchers, with the attendance of barangay officials and local health workers from the two municipalities. The objectives of the study and the research procedures were explained to the participants, and their informed consent was obtained. A total of 74 mothers/caregivers were recruited for the study, with the inclusion criteria being mothers of children aged 6-23 months. The recruitment process was purposive and based on a list of mothers/caregivers provided by community nutrition workers. The list is based on a master list of children 0-59 months old which is used in the Operation Timbang Plus (OPT+), which is the annual mass weighing and measurement of height of the Department of Health. The participants were recruited so as to ensure a broad range of infant ages and thus maternal experiences and perceptions regarding IYCF and cooking preparation: mothers/caregivers of a 6-8 months old child (n=13), mothers/caregivers of a 9-11 months old child (n=26), and mothers/caregivers of a 12-23 months old child (n=35).

Focus group discussion (FGD) is an interactive group discussion approach that enables participants to express their experiences, perceptions, and beliefs about a specific

issue. FGD is recognized as a valuable approach for collecting data that can offer valuable insights into the research topic (Bloor, Frankland, Thomas et al., 2001). A total of ten FGD sessions were conducted in these two municipalities, with five sessions per municipality.

The number of participants in each FGD varied from 6 to 8 per session. Two researchers facilitated the FGDs, with one acting as moderator and the other as a notetaker. The sessions were held in barangay (village) health centers and lasted from one to two hours. The moderator used a FGD question guide pretested among Muslim mothers in a barangay in another province in BARMM. The participants provided consent for the audio recording of the sessions and for taking of some pictures for documentation purposes.

The FGD guide questions focused on six key topics on infant and young child feeding practices. The FGD guide questions were written in English and translated to Maguindanaon which is the local dialect. These questions were also pretested among Muslim mothers in a barangay in another province in BARMM. Specifically, the questions focused on continued breastfeeding, complementary foods, complementary feeding practices, influencers in the household and their perceived impact on feeding practices as well as sources of information, and the influence of food marketing and advertisements on feeding practices of mothers/caregivers.

Each FGD session began with an introduction by the moderator of the purpose and procedure, followed by an explanation of the FGD objectives, informed consent, and rules for participation. During the main discussion, the participants were asked a series of questions about continued breastfeeding, complementary foods, complementary feeding practices, as well as barriers, and facilitating factors to optimal complementary feeding practices. Furthermore, the participants were asked about their primary sources of information on food and nutrition and IYCF practices, the types of media channels utilized in their households or communities, their preferred source of information, and the reasons for these preferences. At the end of the FGD session, the moderator summarized the entire discussion, and the participants were allowed to make final comments or raise any questions. The FGDs were conducted from July to August 2021.

#### DATA ANALYSIS

The demographic characteristics of the participants were summarized using frequency and percentage distribution to provide a clear overview of the study sample. The FGD sessions were recorded and transcribed to accurately capture participants' responses. Before analysis, a thorough data-cleaning process was conducted. QSR NVivo version 12 software was used to organize and manage the data for thematic analysis. The analysis followed a deductive thematic analysis, with themes predefined based on the FGD guide questions. This approach ensured that the analysis remained focused and structured. To further enhance the interpretation of the findings, participant quotations were categorized by their role (mothers/caregivers) and municipality of residence.

#### ETHICAL CONSIDERATIONS

In accordance with the ethical guidelines on research in

humans, all the documents and tools used in the study were reviewed and 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). Informed consent was obtained from the study participants. The consent form was verbally explained to the participants, and each was asked to sign. The researchers followed health protocols in place at the time to prevent the transmission of COVID-19. Additionally, coordination with the local government units was done before the start of data collection.

## RESULTS

### PROFILE OF THE FGD PARTICIPANTS

A total of 74 mothers with infants aged 6-23 months were invited to participate in the focus group discussions (FGDs). All were Muslims. A summary of additional participant characteristics is presented in Table 1.

**Table 1. Profile of FGD participants (mothers with children aged 6-23 months old)**

Characteristics	Frequency	Percent
Number of mothers/caregivers		
Datu Piglas	36	48.6
Datu Anggal Midtimbang	38	51.4
Total	74	100.0
Educational background		
Elementary level	26	35.1
High school level	43	58.1
College level	5	6.8
Total	74	100.0
Age of the mother (years)		
< 20	2	2.7
20-25	28	37.8
26-30	28	37.8
31-35	14	18.9
36 and above	2	2.7
Total	74	100.0

### CONTINUED BREASTFEEDING

At both study sites, almost all mothers claimed to be currently breastfeeding their children. The frequency of breastfeeding varied, with many breastfeeding on demand. Only a minority of them reported supplementing their breastmilk with breastmilk substitutes. Some mothers responded:

“Uway, papedusu ako pon ugayd aden anto paginggan ko sa nakamamadol a gatas” [Yes, I’m breastfeeding but sometimes I also offer infant formula]– Mother, Datu Anggal Midtimbang

“Meto bon e laki, Nestogen bo pedsusun nen. [The same with my child, he only likes Nestogen].” – Mother, Datu Paglas.

The majority of the participants reported that they breastfed their children between 3 and 12 times per day, with some simply saying as often as possible, especially when the baby cried. A few mothers felt the need to breastfeed their children as often as the baby requested and that there should be no limit to breastfeeding. Some mothers mentioned that they had started to breastfeed less frequently as their children had begun to eat solid foods. One mother shared:

“Depende Maam, maldita ged na meka mulyang na nya

mawli ulyang na suso [It depends, if she doesn't get what she wants, she's going to cry and will demand to be breastfed]" – Mother, Datu Anggal Midtimbang

Their intended duration of breastfeeding varied according to their perception of their children's needs. While a few mothers expressed their intention to breastfeed their children indefinitely, the majority stated that they would breastfeed until their children reached two years of age. Some mothers planned to breastfeed beyond the age of two until the child was 3 to 4 years old. Several mothers said that their breastfeeding duration may be influenced by factors such as the child's age and pregnancy status.

The majority of the mothers reported that their breastfeeding practices did not change even when their babies were sick. However, one mother reported that she gave her sick baby biscuits, rice or whatever the child wanted. She also noted that in certain instances, she encouraged her baby to breastfeed even if the baby was sick:

"Depende sa wata ko ngen kalinyan nin, umengka kalini pedsusu salaki o pegkan bu sa biscuit o emay, dili ko pamegesen pegkan sa Apiya ngen. [It depends on my child's preference, if she wants to be breastfed or to eat biscuits or rice, I don't force her to eat anything]" – Mother, Datu Paglas

#### COMPLEMENTARY FEEDING PRACTICES

To evaluate the participants' knowledge regarding complementary foods and complementary feeding, they were asked if they had ever heard these terms. The majority of mothers had not. Some mothers said that they were aware of the concepts, but many declared that they had no idea of their meanings. When the moderator explained and described these concepts, some mothers stated that they knew the ideas after all, while most affirmed that they had no idea about them. Mothers aware of complementary foods mentioned fruits and vegetables as the common types. They fed their child with a limited range of home-prepared foods like porridge, fish, fruits, and vegetables. A mother shared:

"Emay endo umbos na ube, dabong i pinakamalmo a pegken pangandenin [rice and "talbos ng kamote", bamboo shoot is the easiest food we can provide]" – Mother, Datu Anggal Midtimbang

Several mothers also mentioned commercial foods such as biscuits and crackers and complementary foods with brand names like Cerelac and Gerber. Interestingly, few mothers shared that they fed their children with vegetable soup without vetsin (monosodium glutamate), or they gave them porridge that is enriched with malunggay (Moringa oleifera; horseradish), a vegetable rich in vitamin A. Some mothers of one year old children claimed they had already fed their children with table food like rice and other family foods, while one mother reported that she fed her child with porridge without any other ingredients:

"Papegkanin ko i wata ko sa Gerber endo sao na kamo a dala betsina nin. [I feed my child with Gerber and vegetable broth that has no vetsin (monosodium glutamate).]" – Mother, Datu Paglas

Using fortified foods as complementary foods was not common among the participants. Most mothers had no idea about fortified foods, though a few identified milk as a fortified food that they knew of. Table 2 provides a

summary of the foods identified by the mothers that they were giving to their children. Table 2 provides a summary of the foods identified by a small group of mothers that they were giving to their children.

**Table 2. Summary of the foods that the mothers stated they were currently giving to children aged 6-23 months**

Common food given at 6-8 months	Common foods given at 9-11 months	Common foods given at 12-23 months
<ul style="list-style-type: none"> <li>• Porridge</li> <li>• Biscuits</li> <li>• Fruits (i.e., banana, apple)</li> <li>• Breast milk</li> <li>• Gerber (brand name of a commercial-prepared complementary food)</li> <li>• Vegetable soup without monosodium glutamate</li> </ul>	<ul style="list-style-type: none"> <li>• Porridge</li> <li>• Rice (boiled)</li> <li>• Milk</li> <li>• Root crops (ube)</li> <li>• Vegetables (squash, okra, eggplant, malunggay)</li> <li>• Egg</li> <li>• Noodles</li> <li>• Cerelac (brand name of a complementary food)</li> <li>• Breast milk</li> </ul>	<ul style="list-style-type: none"> <li>• Rice (boiled)</li> <li>• Rice with water and salt</li> <li>• Breast milk</li> </ul>

Table 3 shows the foods Muslim mothers viewed as "good" or "bad" for their children. Most mothers saw fruits and vegetables as "good" because of their health benefits, so they often offered them to their children. Common "good" foods included bananas, noodles with malunggay, mashed potatoes, meat, chicken, and eggs. Interestingly, eggplant was considered both good and bad by different mothers, reflecting diverse beliefs about certain foods.

**Table 3. Summary of foods considered as good or bad by sample mothers**

Good Food/Foods given to children	Bad Food/Foods avoided or not given to children
<ul style="list-style-type: none"> <li>• Vegetables (i.e., malunggay [horseradish], squash, carrots, eggplant, spinach)</li> <li>• Porridge with malunggay or squash</li> <li>• Instant noodles with camote tops [sweet potato leaves]</li> <li>• Legumes (i.e., green munggo)</li> <li>• Root crops (i.e., sweet potato)</li> <li>• Fruits (i.e., banana)</li> <li>• Meat</li> <li>• Chicken</li> <li>• Egg</li> </ul>	<ul style="list-style-type: none"> <li>• Vegetables (i.e., eggplant, string bean)</li> <li>• Fruits (i.e., guava, unripe banana)</li> <li>• Fish</li> <li>• Candies</li> <li>• Ice pop</li> <li>• Ice cream</li> <li>• Other ultra-processed foods (e.g., chips, sugary beverages)</li> </ul>

Most mothers mentioned avoiding giving their children foods that are highly sweet or salty such as ice candy, and ice cream. These are ultra-processed foods with low nutritional value, often in the form of packaged and processed snacks. They also identified some foods they perceived as difficult to digest, such as string bean, eggplant, guava, and unripe banana. Additionally, one mother expressed her concern about a specific brand of chips that she knew contained haram (forbidden) ingredients, so she would not give it to her child. Few mothers mentioned avoiding meat due to a concern about a young child's ability to digest it. Some mothers considered fish as being unsuitable for young children; they avoided giving their children fish for fear that it may infect them with worms.

"Para salaki, samayaba umol nin diko paganggan sa

sagutong endo linggay sa wata ko kasi malegen pon matunag [for me, at this age I don't give eggplant and string beans to my child because they're hard to digest." – Mother, Datu Anggal Midtimbang

"Su mga pegken nasublan a kamis endo katimos sabap na su tiyan nin di pegkasakit, endo maiwasan i lewate [foods that are super sweet and super salty so that her stomach wouldn't ache, to prevent infection with worms] – Mother, Datu Anggal Midtimbang

#### COMPLEMENTARY FEEDING PRACTICES

Most mothers believed that complementary feeding should start at six months, while some believed in introducing at four or seven months.

Almost all mothers demonstrated confidence in preparing complementary food for their children, and some mentioned that their husbands or older children assisted in this task. Most mothers believed that complementary feeding should start at six months, while others believed in introducing it at four or seven months. The variety of foods given included biscuits, porridge, *arroz caldo* (a Filipino rice congee usually made with chicken, rice, and ginger), boiled rice, instant noodles, banana, and rice water with brown sugar, salt, or milk. One mother reported giving commercial complementary food (Cerelac) at four months, while most introduced complementary foods at seven months.

"Umengka su prutas pagedsan na saging na aden, pegkeluden ko i saging gamit i salidot, tinikawan ko mapakan sa apple juice, cerelac endo emay sa imbaydo bu. [When fruits such as banana are available, I scrape the banana using a spoon, I try feeding him the apple juice, Cerelac, and rice little by little]" – Mother, Datu Anggal Midtimba.

The decision to introduce these complementary foods was primarily driven by health reasons, ensuring that the foods were appropriate for the child's digestive capacity, and the goal of not letting the child get hungry.

Water was the first liquid introduced to children. Most mothers acknowledged giving water to their children at one month, with one mother mentioning giving water right from birth:

"Kinambata ko sa wata ko na pinainum ko den sa ig [when I give birth to my child, I already let him drink water]." – Mother, Datu Paglas

#### RESPONSIVE FEEDING

Most mothers had trouble feeding their children, with some sharing experiences on how they managed these challenges. Some mothers found it effective to remove distractions such as toys while their children were eating. On the other hand, others admitted to being the source of distractions themselves, by holding a spoon, giving their children a mobile phone, or letting them watch television while eating. Some mothers also shared to being impatient and occasionally resorted force-feeding their children. While a few mothers mentioned that their children had personal plates or bowls, others said they share food and used the mother's spoon to feed their children. All mothers stated that they washed their hands and their children's hand before and after eating.

#### FEEDING A SICK CHILD

Most mothers mentioned that their children lacked

appetite when feeling unwell. Instead of forcing the children to eat, they gave them breastmilk, water, soft drinks, biscuits, or water and medicine. Some mothers recognized the importance of eating enough food to recover from sickness, so they fed their children to help them recover sooner:

"Ipagenggay nami ngen kalinyan nilan, umengka di pegkan sa emay na pagenggan nami sa biskwit, umengka kalini silan sa gatas na ipagenggay nami bun, di nami silan pamegesen umengka di silan kalini pegkan. [We give them what they want, if they don't eat rice then we give them a biscuit, if they want milk then we give them milk, we don't force them if they don't want to eat.] - Mother, Datu Paglas

"Umengka di sekanin kalini pegkan, na papedarayn ko den, Makin ko sekanin papagenimen sa gamot endo pedsabar ako pangata kano kambalingan na kalini nin keman. [When he doesn't want to eat, I just let it, I just make him take medicine and patiently wait until he regains his appetite.]" – Mother, Datu Anggal Midtimbang

#### AGE-APPROPRIATE COMPLEMENTARY FEEDING

Some mothers of 6-8 month-old children continued breastfeeding while introducing solid foods, primarily porridge, biscuits, and commercial baby foods. However, many acknowledged a lack of knowledge about complementary feeding and expressed concerns about choking and indigestion. As their children grew older, mothers of 9-11 month-old children commonly began introducing more varied foods, such as root crops and vegetables, though the use of commercial baby foods persisted. Additionally, traditional beliefs, such as avoiding certain foods due to fears of illness, continued to influence feeding practices. Mothers of 12-23 month-old children introduced family foods, but some still relied heavily on porridge and boiled rice.

#### INFLUENCERS AND SOURCES OF INFORMATION ON BREASTFEEDING AND COMPLEMENTARY FEEDING.

The mothers' most cited influencers of complementary feeding were their own mothers or parents, elders, health workers (i.e., midwives, nurses, and doctors), and mothers-in-law. A few mothers mentioned their husbands as influencers. These individuals played a crucial role in educating mothers about the appropriate timing for introducing solid foods typically at six months, advising on foods to avoid because they may be harmful to their children, and the first foods to give their children. Some mothers mentioned that their mothers cautioned them against giving their children vegetables as they might cause choking. Additionally, some mothers mentioned that the advice against giving unfamiliar foods to their children had been passed down to them by their ancestors. Mothers followed the advice of their influencers because they believe that the advice is sound, acceptable, and would, thus, contribute to their children's overall health and immunity from illness.

A few mothers reported receiving information about breastfeeding from doctors, midwives, and their mothers. Specifically, they mentioned that midwives advised them to breastfeed exclusively for six months. When asked about the sources of information they trusted the most, mothers mentioned their mothers, mothers-in-law, and midwives.

One mother responded that she trusted her midwife's advice about breastfeeding:

"Kano lu ako pan sa center ka asal kabakunahan su wata ko, nya pedtalo na midwife na dili padsimbolen sa apiya ngen a pegken nyataba gatas na ina taman sa 6months. [When I was at the center to get my child vaccinated, the midwife told us not to mix/feed him with any other food except breastmilk up to 6 months.]" - Mother, Datu Anggal Midtimbang

#### FOOD MARKETING AND ADVERTISEMENTS

Most mothers reported having favorite TV commercials, and a few admitted that these advertisements impacted their decisions on feeding their babies or what vitamins to give them. One mother mentioned that she occasionally selected a product for her child based on advertisements because she believed that it was appropriate for her health:

"Nya pedtalon na patalastas, su gatas pakainggay sa mapia kanggugulawas kano mga wata tano. [According to the commercial, the milk will give good health to our babies]" - Mother, Datu Paglas

Other mothers admitted that their decisions are affected by favorite TV commercials promoting brands like Ceelin and Tiki-tiki (vitamin supplements), Lactum and Bear Brand (breastmilk substitutes), Cerelac (complementary food), and Milo (chocolate drink).

#### DISCUSSION

This study conducted focus group discussions with Muslim mothers/caregivers to gather insights on IYCF and cooking practices. Using focus group discussions helped achieve a culturally specific understanding since all study participants were from the Muslim community. This method has been used by several authors with the same topic on IYCF (Pareek et al. 2023; Dharmasoma, et al., 2020; Gizaw et al. 2023).

Studies have shown that religion can influence IYCF practices. In Muslim communities, religious beliefs affect when and what types of complementary foods are given to children (Adepoju et al. 2019; Shaikh & Ahmed, 2006). Muslim mothers commonly practice pre-lacteal feeding (Adepoju et al. 2019). Additionally, there are unscientific food taboos for children, such as avoiding fish to prevent intestinal worms and nuts to prevent stomach aches or bloating (Maryanti et al., 2018).

Improvements in complementary feeding practices, such as responsive feeding and feeding a sick child, are still needed among the study participants. These findings are similar to those of other studies, regardless of religion. In a study of Bangladeshi mothers, a third of the mothers practiced force feeding with their children (Hassan et al., 2021). Another study found that very few Bangladeshi mothers tried to feed their babies by playing, while around half of the mothers resorted to force feeding (Gain et al., 2020). Similarly, less than 50% of Ethiopian mothers fed their sick child, with factors affecting this practice including place of residence, employment status, counseling, postnatal care, and the involvement of the father (Hailu et al., 2023).

The present study found that most Muslim mothers had limited knowledge regarding complementary foods. For instance, instead of giving a variety of food, boiled rice was

the most common complementary food given to 12-23 months old children. Rice is the staple food in the Philippines including BARMM. It is available, affordable, and one of the top sources of carbohydrates. At this age, children eat food from the family pot and rice is the most common complementary food given (Talavera et al., 2014; Jacquier et al., 2020). This finding is consistent with that of previous studies in the Philippines and other countries, which have reported low levels of knowledge among Muslim and non-Muslim mothers regarding appropriate complementary feeding practices (Saniel et al. 2021; DOST-FNRI, 2022; Uusimaki et al., 2022; Jacquier et al., 2020).

Processed foods such as Cerelac, Gerber products, biscuits, and crackers were mentioned as complementary foods by some mothers. However, relying predominantly on these foods for feeding young children may not provide adequate nutrients and other healthy ingredients for their growth and development. Additionally, it may lead to a higher intake of sugar and/or salt in their diets (Zehner et al. 2019). Furthermore, the limited understanding among mothers about the benefits of fortified foods is concerning, as these foods can help prevent micronutrient deficiencies in young children.

In the current study, not all mothers knew about and practiced complementary feeding at six months. This contrasts with WHO's recommendation of exclusive breastfeeding for the first six months of life, followed by the introduction of complementary foods while continuing breastfeeding until two years or beyond for optimal growth and development (WHO, 2023). Solid foods can be introduced when a child is around 6 months old, can sit steadily with support, has control over head movements (Białek-Dratwa & Kowalski, 2023). Several aspects of complementary feeding, including diet composition and feeding patterns can potentially influence food preferences and dietary habits, and may predispose to obesity and NCD risk later in life (Adair, 2012). It is thus imperative for mothers to receive correct and accurate information about proper complementary foods and feeding practices. Meat is recommended as a complementary food for infants and toddlers due to its high content of bioavailable zinc and iron, as well as vitamin B12 and complete protein particularly in low resource settings (Tang et al., 2015).

Mothers in this study reported difficulty in feeding their children; some mothers admitted that they were impatient and were not practising responsive feeding. Responsive feeding involves encouraging infants to eat but also allowing them to control their intake (Black and Aboud, 2011). Failure to practise responsive feeding may result in undernutrition or over-weight in children (Victora, et al., 2008). Thus, it is crucial for mothers to receive adequate guidance and support to ensure optimal infant feeding practices. These knowledge and skills are essential for mothers to feed their infants properly, including food hygiene for the prevention of food-borne diseases.

Mothers play a vital role in safeguarding the nutrition and health of their children's health through proper IYCF practices, particularly complementary feeding; however, their knowledge on complementary feeding practices varied, depending on the source of information or message. In a study conducted in Kenya, grandmothers and fathers positively influenced mothers' feeding practices,

emphasizing the importance of health authorities engaging with these key influencers in introducing complementary feeding practices to mothers (Thuita et al. 2011).

Fasting during Ramadan can impact breastfeeding and complementary feeding practices, though this concern was not explicitly mentioned by respondents in this study. Ertem et al. (2001) noted that fasting during Ramadan is common among breastfeeding mothers, influenced by beliefs that it does not reduce breast milk, as well as factors like receiving well-child care and having multiple children.

While this study did not directly address concerns about babies preferring sweeter foods over breast milk, mothers did express worries about their children's preferences for certain foods, particularly commercial milk formulas. This concern is similar to what has been observed among Middle Eastern mothers, where Islamic beliefs strongly support breastfeeding, but early introduction of solids often arises from cultural traditions and misconceptions (Jessri et al. 2015).

In this study, mothers said their decisions were influenced by advertisements, similar to findings by Smith et al. (2015), which showed that advertising significantly impacted mothers' choices regarding foods and vitamins for their children. Sobel et al. (2011) also found in a Philippine study that mothers' decisions to use milk formula were heavily shaped by advertising, along with recommendations from doctors and relatives. Such influence was reinforced by exposure to community and health services, as well as various forms of media. Research across Cambodia, Indonesia, and the Philippines indicates that many commercially prepared complementary feeding products do not fully comply with international guidelines on nutrient composition, labeling, or promotion (UNICEF East Asia and the Pacific Regional Office et al., 2023).

In the present study, mothers frequently mentioned specific brands, such as Ceelin and Tiki-tiki for vitamin supplements, Lactum and Bear Brand for infant formulas, Cerelac for complementary commercial foods, and Milo for chocolate drinks, when discussing their favorite TV commercials. This suggests there may have been an influence of advertising on their infant feeding choices. To prevent inappropriate feeding practices, it is crucial to regulate marketing messages for complementary foods targeted at infants and young children. This issue is not unique to the Philippines, as misleading advertising has caused serious consequences in other countries as well. For example, in Lao PDR, food advertising led to misinformation and the inappropriate use of coffee creamer as infant food (Barennes et al., 2008).

Commercially-produced complementary food varies in their nutritional quality. Some essential micronutrients are missing from the products, thus, affecting the dietary quality of young children who consume the products; others contain high levels of added salt or sugar or industrially produced trans-fatty acids (Zehner et al. 2019). Another recent analysis found that 60% of commercial infant foods failed to meet WHO nutritional recommendations (<https://www.mdpi.com/2072-6643/16/16/2782>). Therefore, promoting the home preparation of complementary foods and the production and consumption of locally available, affordable, and nutrient-dense foods appropriate for children's dietary

needs is warranted.

The study's strength lies in its contribution to understanding the IYCF practices of Muslim mothers in the Philippines. The use of local researchers fluent in the dialect enhanced cultural sensitivity, ensuring better communication with participants. The limitations of the study include the selection of the participants from only two municipalities, which restricts the generalizability of the findings; and limited socio-demographic data which restricted a more detailed analysis. Additional research could be done to address the limitations including specific cultural, religious, and social aspects which were not included in the study such as whether a two-year breastfeeding limit is perceived, IYCF Ramadan fasting, and women's and men's perceptions of breastfeeding in public.

## CONCLUSION

This study examined the feeding practices of Muslim mothers and caregivers in the BARMM, focusing on continued breastfeeding, complementary feeding practices, influencers of mothers in their decision making, and the potential effect of infant food marketing. Sample mothers exhibited limited knowledge about complementary foods, relying on food items such as porridge, and incorporating a mix of locally-available foods such as fruits and vegetables and commercial and processed foods like Cerelac and Gerber. They indicated that their complementary feeding practices were influenced by health considerations, family advice, and media and advertisement influence. The study also highlights the challenge of addressing chronic malnutrition, as mothers and families may not recognize their children's suboptimal nutritional status, and community nutrition and health workers may also fail to recognize this.

Based on these conclusions, we make the following recommendations. First, there is a pressing need for improved education and awareness programs on optimal infant and young child feeding practices in the BARMM. Public health campaigns should prioritize increasing awareness and knowledge of appropriate feeding practices to enhance overall infant and young child health. The impact of the community nutrition and health workers cannot be overemphasized in educating mothers about the importance of breastfeeding and complementary feeding for healthy growth and development. Thus, they should be continuously trained. Additionally, reviewing and regulating laws governing the advertising of commercial complementary foods is recommended. Lastly, further research is advocated to identify effective approaches for promoting optimal complementary feeding practices in diverse contexts.

## AUTHOR CONTRIBUTIONS

DGCD, MTT, ARB, WTKL, MCFP conceptualized the study; LSA, ADRF, ATOO, JDB, NAT contributed to data curation and analysis; all authors participated in the drafting, revision, and finalization of the manuscript.

## CONFLICT OF INTEREST

All authors declare no conflict of interest.

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