



# Breastfeeding, Science, and Islam: A Study of Knowledge Among Islamic College Students

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## Abstract

Stunting in early childhood remains a serious problem in Indonesia, one of the main causes of which is suboptimal breastfeeding practices. Breastfeeding is a practice recommended by both science and Islam. Although the majority of Indonesians are Muslim, the rate of exclusive breastfeeding remains low, especially among working and highly educated mothers. This study aims to analyze the knowledge of early childhood Islamic education students, who represent prospective mothers with academic backgrounds in child development and Islamic law. The research uses a mixed-method (convergent) approach. Data was collected through questionnaires and analyzed simultaneously. Findings indicate that while 97% of respondents believe in the superiority of breast milk, only 18% are aware of its immune benefits. All respondents also agreed that the Qur'an encourages breastfeeding, but only 15% could correctly cite the relevant verse. Additionally, many viewed formula milk as the primary solution to breastfeeding challenges and had limited knowledge about maternal nutrition or breastfeeding counseling. These results indicate that while respondents believe in the importance of breastfeeding from both scientific and Islamic perspectives, their understanding is superficial. Therefore, integrated education is needed, involving the government, educational institutions, the community, and religious leaders to strengthen knowledge about breastfeeding among expectant mothers, focusing not only on the benefits of breast milk but also on lactation management.

**Keywords:** Breastfeeding, Science, Islamic

## Abstrak

*Stunting pada anak usia dini masih menjadi masalah serius di Indonesia, yang salah satu penyebab utamanya adalah praktik menyusui yang belum optimal. Menyusui merupakan praktik yang dianjurkan baik dalam sains maupun Islam. Meskipun mayoritas penduduk Indonesia beragama Islam, tingkat pemberian ASI eksklusif tetap rendah, terutama di kalangan ibu bekerja dan berpendidikan tinggi. Studi ini bertujuan untuk menganalisis pengetahuan mahasiswa Pendidikan Islam Anak Usia Dini, yang mewakili calon ibu dengan latar belakang akademis tentang perkembangan anak dan syaria Islam. Penelitian ini menggunakan metode campuran (konvergen). Data dikumpulkan melalui kuesioner dan dianalisis secara bersamaan. Temuan menunjukkan bahwa meskipun 97% responden meyakini keunggulan ASI, hanya 18% yang mengetahui manfaat imunitasnya. Semua responden juga menyetujui bahwa Al-Qur'an menganjurkan praktik menyusui, namun hanya 15% yang dapat menyebutkan ayat tersebut dengan benar. Selain itu, banyak yang menganggap susu formula sebagai solusi utama untuk kendala menyusui dan memiliki pengetahuan yang terbatas tentang nutrisi ibu atau konselor menyusui. Hasil ini menunjukkan bahwa meskipun responden meyakini keutamaan menyusui baik dari perspektif ilmiah dan Islam, pemahaman mereka bersifat dangkal. Oleh karena itu, edukasi terintegrasi diperlukan dengan melibatkan pemerintah, institusi pendidikan, masyarakat, dan tokoh agama untuk memperkuat pengetahuan tentang menyusui di kalangan calon ibu yang tidak hanya berfokus pada keunggulan ASI tetapi juga manajemen laktasi.*

**Kata kunci:** Menyusui, Sains, Islam

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## Introduction

Stunting in early childhood remains a major issue in Indonesia. The prevalence rate of stunting in Indonesia in 2022 is 21.6% (BPS, 2022). The condition of stunting in children can cause disruption to the process of development of the brain's neurons as well as changes to the structure and function of the brain. This condition can cause disruption to children's thinking and learning abilities, thereby reducing attendance levels and learning achievement (Sutarto et al., 2018). Therefore, the problem of stunting needs serious attention.

Stunting is a condition of impaired growth resulting from chronic malnutrition that begins during pregnancy and continues through the first two years of life. The causes of stunting are complex and interconnected, ranging from inadequate nutritional intake during pregnancy, suboptimal early initiation of breastfeeding (EIBF), premature cessation of breastfeeding before six months, insufficient breastfeeding frequency, to the inappropriate timing of complementary feeding—either too early (<6 months) or too late (>12 months). In addition, non-diverse complementary feeding in terms of texture and feeding frequency inappropriate for the child's age also contributes to the occurrence of stunting (Anggryni et al., 2021).

One of the most prominent risk factors identified is the lack of optimal exclusive breastfeeding. Studies show that children who are not exclusively breastfed have a much higher risk of stunting. One study reported that toddlers who are not exclusively breastfed have a 6.7 times higher risk of stunting compared to those who are exclusively breastfed (Komang et al., 2025). This finding is supported by another study involving 70 toddlers, which revealed a significant association between exclusive breastfeeding and reduced stunting risk, where 57.1% of stunted toddlers were found not to have received exclusive breastfeeding (Ode Novi Angreni et al., 2024). Furthermore, an international meta-analysis including data from several countries such as Ethiopia, Indonesia, and Ecuador concluded that children who were breastfed had a 0.62 times lower risk of stunting compared to those who were not breastfed (Azizah et al., 2022). These findings highlight the critical role of exclusive breastfeeding as a primary preventive measure against stunting.

However, the current phenomenon is that the practice of breastfeeding is starting to be abandoned. With the rise of breast milk substitute products, humans' perspective on the breastfeeding process has been reduced to nutrition that can be calculated and manipulated industrially. World Health Organization data shows that the percentage of mothers who give breast milk to babies only reached 69.7% in 2021 and decreased by 2% in 2022 (WHO, 2023). Based on the results of Indonesian National Socioeconomic Survey in 2020, the lowest percentage of exclusive breastfeeding was actually shown in mothers with a high level of education (Badan Pusat Statistik, 2022). Even though the percentage of exclusive breastfeeding for mothers who graduated from college increase in 2022, it is still lower than for mothers with elementary school/equivalent education.

Apart from highly educated mothers, low rates of exclusive breastfeeding are also found among working mothers. The low breastfeeding

rates in this group are due to a lack of information on lactation management provided by healthcare providers (Prihatini et al., 2023). Research by Rahmah (2018) also shows that the education level, knowledge, and attitudes of breastfeeding mothers are determining factors in the failure of exclusive breastfeeding among working mothers. This indicates that many working mothers still lack a good understanding of the breastfeeding problems they face and the appropriate solutions to overcome them.

In the case of Muslim mothers, breastfeeding practices are not only related to scientific knowledge but are also closely tied to Islamic sharia. Islam places great emphasis on the health of both mother and child, and the Qur'an explicitly encourages the practice of *raḍā'ah* (breastfeeding) for a full two years as part of a child's right to proper care and nutrition. As stated in Surah Al-Baqarah (2:233): *"Mothers may breastfeed their children two complete years for whoever wishes to complete the nursing [period]."* This recommendation not only aligns with modern health guidelines but also highlights the spiritual and moral responsibility of mothers to ensure the optimal growth and development of their children.

However, studies on Muslim mothers' understanding of the Qur'anic recommendations on breastfeeding reveal a gap between their knowledge and actual breastfeeding practices. A study conducted by (Sri Nurhayati, 2015) found that although verses such as Surah Al-Baqarah (2:233) and Luqman (31:14) are well known among mothers, many still choose to feed their babies with formula milk for practical or aesthetic reasons. This study highlights that suboptimal religious understanding can be a significant barrier to implementing breastfeeding practices in accordance with Islamic values.

This shows that knowledge about breastfeeding recommendations, both from a scientific and Islamic perspective, is not sufficient if relied upon alone. Therefore, expectant mothers need comprehensive information not only about recommended breastfeeding practices, but also about proper lactation management. This knowledge is essential to help anticipate potential challenges in breastfeeding and identify effective solutions. Given the phenomenon of low breastfeeding rates among highly educated and working mothers, this study aims to explore expectant mothers' knowledge of breastfeeding recommendations from both scientific and Islamic perspectives, as well as their understanding of lactation management.

Most existing studies on breastfeeding have focused on mothers who are already practicing it. However, breastfeeding is a complex process that requires sufficient preparation and knowledge even before a woman becomes a mother. Adequate understanding of both scientific and religious perspectives is essential for successful breastfeeding practices.

Therefore, this study aims to examine the level of knowledge and understanding among students of the Early Childhood Islamic Education (PIAUD) program as prospective mothers who have higher education and a foundation in Islamic values. Specifically, the research explores their comprehension of breastfeeding recommendations based on scientific evidence and Islamic teachings, as well as their awareness of common breastfeeding problems and the appropriate strategies to overcome them. Given their dual roles as future mothers and educators, these students

represent a key group for assessing the integration of scientific literacy and religious guidance in promoting successful breastfeeding practices.

These findings are expected to form the basis for the development of a more holistic and integrated educational approach that links scientific literacy with Islamic teachings. Such an approach can be strengthened through the involvement of various stakeholders, including educators, health workers, religious leaders, and policymakers, to ensure comprehensive and value-based breastfeeding education for Muslim women in the digital and modern era.

### **Literature review**

The practice of exclusive breastfeeding is a human behavior that is influenced by several factors. According to Green & Kreuter (2005), on the theory Health Promotion Planning-An Educational and Ecological Approach, human behavior is influenced by 3 factors, namely predisposing, enabling, and reinforcing. *Predisposing factors* include knowledge, beliefs, attitudes, and values that motivate an individual to adopt a behavior. In the context of breastfeeding, a mother's understanding of the benefits of exclusive breastfeeding and her religious or cultural beliefs play a major role in shaping her intention to breastfeed. *Enabling factors* refer to the availability of resources, accessibility to health services, and supportive policies that make the behavior possible. This includes access to lactation counseling, maternity leave policies, and the presence of breastfeeding-friendly environments. Meanwhile, *reinforcing factors* involve the influence of social support systems, such as encouragement from family members, peers, and healthcare providers, which can strengthen a mother's commitment to continue exclusive breastfeeding. Therefore, promoting exclusive breastfeeding requires a holistic approach that addresses all three of these dimensions to effectively support mothers in initiating and maintaining optimal breastfeeding practices.

This study specifically focuses on predisposing factors, which include knowledge, beliefs, attitudes, and values that motivate an individual to adopt a particular behavior. In the context of breastfeeding, these internal factors are crucial in shaping a mother's intention and commitment to exclusively breastfeed her child. Research by Fadila & Komala (2018), Nurlili et al. (2018), and Damanik (2020) confirms a significant correlation between a mother's knowledge and her decision to practice exclusive breastfeeding. Similarly, findings by (Kamoun & Spatz, 2018) and (Ervina et al., 2019) highlight that one of the main factors contributing to the low rates of exclusive breastfeeding is the lack of awareness among prospective mothers and their surrounding families regarding the benefits and importance of breastfeeding. These studies collectively underscore that maternal knowledge is a key determinant in the successful implementation of exclusive breastfeeding practices. A mother's knowledge about the health benefits of exclusive breastfeeding, combined with her religious understanding—such as the Islamic teachings that emphasize breastfeeding for two full years—can serve as strong motivators for practicing optimal breastfeeding behavior.

The essential knowledge about breastfeeding that prospective mothers need to possess includes an understanding of the definition and benefits of breast milk, awareness of the recommendations for exclusive breastfeeding- viewed from both scientific and Islamic perspectives; as well as knowledge of lactation management and common breastfeeding challenges with their solutions. The knowledge is outlined as follows.

### **Breastmilk and Breastfeeding form Scientific Perspective**

Breastmilk is a biological fluid produced by the mother. Breast milk contains various nutrients and bioactive components. One of these variations is influenced by the age of the baby. Breast milk is a fat emulsion that is secreted by the mother's mammary glands and contains protein, lactose, and inorganic salts, which are useful as food for the baby (Rahmawati & Ramadhan, 2019). Besides, breast milk contains bioactive substances that are useful for providing immunity for babies (Wijaya, 2019). These bioactive factors are part of breast milk which have an effect on biological processes in babies. In addition, breast milk content is easily digested by the baby's digestive enzymes. Therefore, the contents of breast milk are superior and some cannot be substituted by formula milk.

Based on the production phase, breast milk is divided into 3 phases, namely early breast milk, transitional breast milk and mature breast milk (Wijaya, 2019). It was further explained that at the beginning of birth (0-7 days), breast milk contains a lot of colostrum which contains high protein, small amounts of carbohydrates, fat, salts and minerals, water, and fat-soluble vitamins, secretory immunoglobulin A (*IgA*), lactoferrin, leukocytes, as well as developmental factors such as epidermal growth factor, and functions as a laxative to cleanse the baby's digestive tract. During the transition period (days 7-14), the breast milk that comes out is a transition from colostrum to the mature breast milk phase. The protein content is decreasing, but the fat content, lactose, water-soluble vitamins and breast milk volume are increasing. Furthermore, the breast milk that comes out after day 14 is mature breast milk. The composition of mature breast milk is relatively stable. At the beginning of the breastfeeding process, the breast milk that comes out is called foremilk which contains a lot of water and lactose. The breast milk that comes out at the end of breastfeeding contains a lot of fat. The perfection of breast milk composition shows that breast milk has superiority compared to formula milk.

Apart from being superior in terms of composition and nutrition, breastfeeding is more important than giving formula milk in terms of psychology. Children who are exclusively breastfed have relatively no mental-emotional problems at the age of 3-4 years compared to children who are not exclusively breastfed (Setyarini et al., 2017). The process of providing breast milk through direct breastfeeding (DBF) allows for direct contact between mother and baby. This can increase inner contact between mother and baby. Psychologically, this causes the baby to have an attachment to the mother, because in the breastfeeding process affection, love and protection flows from the mother to the baby (Zusy (2015); Setyarini et al., (2017); and Suryani et al., (2017)). With these advantages, the practice of exclusive

breastfeeding needs to be conveyed on a massive scale, especially through direct breastfeeding. According to Zusy (2015), breastfeeding is not only beneficial for the baby's physical health, but also builds a psychological bond between a baby and their mother. The attachment or emotional bond formed between mother and baby will be useful for providing informal education for early childhood.

Apart from the perspective of medieval knowledge, the problem to exclusive breastfeeding faced by mothers were not overcome by providing animal milk substitutes or complementary foods, but by breastfeeding the baby from another mother. Based on history of Islamic culture, Rasulullah had some wet mothers, namely Thuaibah and Halimmatus Sya'diyah (Pamungkas & Rosyid, 2022). With the development of science and technology, humans have developed formula milk for babies who do not receive breast milk from their mothers. However, research states that there are risks posed by giving formula milk without medical indications. Health risks posed by formula milk include digestive problems, allergies, and obesity (Chong et al., 2022). The existence of evidence of the risks of giving formula milk shows that the recommendations of the Islamic perspective do not conflict with modern science.

### **Breastmilk and Breastfeeding from Islamic Perspective**

The recommendation for exclusive breastfeeding is not only based on science and medical aspects. From the Islamic perspective, breastfeeding is recommended for mothers. Several verses in the Koran contain recommendations for mothers to practice *raḍā'ah* (breastfeeding) and fathers to provide adequate living for mothers as a form of support for breastfeeding mothers.

The word *raḍā'ah* is found 10 times in the Koran, namely in al-Baqarah [2]: 233, al-Nisā' [4]: 23, al-Hajj [22]: 2, al-Qaṣaṣ [28]: 7 and 12, and al-Ṭālāq [65]: 6 (Nurfitrani, 2022). The recommendation for mothers to breastfeed their babies certainly has advantages, as stated in the Koran, Surah al-Baqarah verse 233, which means "Mothers shall suckle their children for two full years, —that for such as desire to complete the suckling— and on the father shall be their maintenance and clothing, in accordance with honourable norms". In al-Baqarah verse 233, there is word *raḍā'ah* that means "breastfeeding". Therefore, breastfeeding is a form of recommendation in Islam that must be carried out by mothers for their babies.

Apart from the explicit recommendation in the form of the word *raḍā'ah*, the practice of breastfeeding is found in several other verses. Several of these verses relate to the command for children to honor both parents, one of whom is the mother who has weaned them. According to the term, weaning can be interpreted as stopping the process of breastfeeding. Some verses related to weaning include:

- a. Q.S Luqman [31]:14, which mean "and We have commanded people to 'honour' their parents. Their mothers bore them through hardship upon hardship, and their weaning takes two years. So be grateful to Me and your parents. To Me is the final return."

- b. Q.S al-Ahqaf [46]:15, which mean " We have commanded people to honour their parents. Their mothers bore them in hardship and delivered them in hardship. Their 'period of' bearing and weaning is thirty months...."

These two verses show that breastfeeding is something that is prescribed in the Koran. Even though the period is stated in different units (years and months), the two verses have the same meaning. The weaning period referred to in Surah Al Ahqaf "bearing and weaning for 30 months" or تَلْثُونَ شَهْرًا refers to the phenomenon of premature babies, so it is possible that the pregnancy phase only lasts 6 months and the breastfeeding period is 24 month (Rohmah, 2017). Thus, the total period of a mother's struggle is 30 months (pregnancy is 6 months and breastfeeding 24 months or 2 years)

The practice of giving exclusive breast milk through direct breastfeeding (DBF) not only has advantages from nutritional and health aspects, but also psychological aspects. Providing breast milk through Direct Breastfeeding (DBF) activities allows contact between the mother's body and her child's. From the contact that occurs, a child will feel the warmth and love of his mother. This is narrated in the Al-Quran surah al-Qaṣaṣ [28]: 12-13 which means:

"We had forbidden him to be suckled by any nurse since before. So, she said, 'Shall I show you a household that will take care of him for you and will be his well-wishers?'. Thus, We restored him to his mother so that she might be comforted and not grieve, and that she might know that Allah's promise is true, but most of them do not know."

The Qur'anic narrative illustrates the divine power of Allah SWT when Prophet Moses was able to distinguish the warmth of breastfeeding from his biological mother compared to another woman. This highlights not only the biological connection but also the emotional comfort that breastfeeding provides—suggesting that the bond between a mother and her child is deeply rooted in both physical and spiritual dimensions. The Qur'an's recommendation to breastfeed, therefore, offers comprehensive benefits—biological, psychological, and spiritual.

Moreover, human behavior related to maintaining health is often influenced by religious knowledge. In Islam, maintaining health is seen not only as a practical need but also as a religious duty. Various studies support the idea that spiritual awareness derived from religious teachings can motivate individuals to adopt healthier lifestyles. One study analyzing verses of the Qur'an within the Health Belief Model framework revealed that fear of harm and hope for benefit—motivated by a consciousness of servitude to Allah—can drive individuals toward preventive health behaviors (Dewi & Mutawakkil, 2023). Similarly, research conducted in Malaysia found that religious behaviors significantly influence Muslims' health-related lifestyle choices, both directly and indirectly, through daily adherence to Islamic teachings (Hassan, 2015). Together, these findings affirm the important role of spiritual knowledge in shaping health-conscious behaviors among Muslims.

However, in the context of breastfeeding practices, studies on Muslim mothers' understanding of Qur'anic recommendations reveal a noticeable gap between religious knowledge and actual practices. For instance, a study by Sri Nurhayati (2015) found that although verses such as Surah Al-Baqarah (2:233) and Luqman (31:14) are widely recognized, many mothers still opt for formula feeding due to practical or aesthetic considerations. In a similar manner, research conducted in Yogyakarta revealed that while many breastfeeding mothers acknowledge breastfeeding as a religious obligation, they often lack understanding of its broader health benefits (Astari et al., 2024). This limited awareness stems from the lack of socialization and education about the content of Qur'anic verses related to breastfeeding.

### **Breastfeeding Problem and Solution**

Breastfeeding is a natural process for a child to obtain nutrition for the first time after birth. This assumption causes the process of breastfeeding carried out by mothers to be considered a natural process that can be done easily like other mammals. However, the breastfeeding process is actually very complex because it is related to the mother's nutrition, hormones and psychology. Apart from that, the baby's condition, especially the oral motoric aspect, also influences the success of the breastfeeding process. Not everyone understands that this process must be protected and maintained, and understood comprehensively without being impacted by any conditions, including working mothers.

In connection with the complexity of the breastfeeding process in humans, mothers have found many problems. Problems in breastfeeding among working mothers include less flexible breastfeeding schedules and the lack of available lactation room (Apriliani et al., 2022; Wulandari et al., 2014). In addition to breastfeeding problems, self-motivation and family support are also factors in the success of breastfeeding practices. One form of family support is the process of providing expressed breast milk through media other than pacifiers to prevent nipple confusion in babies. Problems that are considered trivial and have not yet received effective solutions mean that breastfeeding practices are still not optimal.

With the rise of formula milk brands and the ease with which they are available, people's view of breast milk has become simpler. Many mothers who have problems with breastfeeding take a solution by giving formula milk. The research results show that the knowledge about solutions to breastfeeding conveyed by respondents is diverse.

According to theory, breast milk can be produced by the mother due to the influence of the hormones prolactin and oxytocin (Geddes & Perrella, 2019). The prolactin hormone is a hormone related to the production of milk (lactose) in the breast, while the oxytocin hormone is a hormone related to the process of removing breast milk from the mother's breasts (Wijaya, 2019). Therefore, the stability of these two hormones must be maintained so that the breast milk production process can be optimal and meet the baby's needs.

The prolactin hormone can be maintained through nutrition, but the oxytocin hormone is influenced by the mother's psychological condition.

Mothers must feel happy so that the oxytocin hormone is stable and the process of producing breast milk can run smoothly. Therefore, a thorough analysis is needed in every case of mothers experiencing problems in breastfeeding. Apart from being related to hormonal instability in the mother, breastfeeding problems can also be caused by less optimal breastfeeding position and attachment and/or the baby's oral motor condition. Therefore, breastfeeding problems need to be consulted with parties who understand the complexity of the breastfeeding process. Several parties that mothers can contact when experiencing breastfeeding problems are midwives, pediatricians, physiotherapists, and lactation counselors. A lactation counselor is a profession that plays a role in exploring and investigating problems to the breastfeeding process. Lactation counselors can come from individuals or non-governmental organizations. With the respondents' lack of knowledge about the lactation counselor profession who can be contacted to help provide solutions to problems to the breastfeeding process, more massive outreach about this profession is needed. This is because the lactation counselor profession has been proven to have a crucial role in providing advice and solutions to problems to the breastfeeding process (Liliana et al., 2017).

## **Method**

This study focuses on the issue of exclusive breastfeeding among Muslim women, particularly prospective mothers enrolled in Islamic higher education institutions. The rationale for choosing this focus stems from the dual influence of scientific understanding and Islamic teachings on breastfeeding practices. Scientifically, breast milk is regarded as the most complete and natural source of nutrition for infants, rich in antibodies and essential nutrients that support optimal growth and immune defense. From an Islamic perspective, breastfeeding is not only a health recommendation but also a spiritual obligation, as emphasized in the Qur'an (Surah Al-Baqarah 2:233), which advocates breastfeeding for two full years. Therefore, examining how scientific knowledge and religious values intersect in shaping students' attitudes toward breastfeeding is a meaningful area of study—especially considering their academic background in early childhood education and their potential future roles as mothers and educators.

This research adopts a mixed methods approach with a convergent design (one-phase mixed methods) and employs a descriptive survey method for quantitative data collection. The core of this methodology is the integration of qualitative and quantitative data, achieved through data transformation—where narrative responses are systematically categorized and quantified. Such an approach allows for a more comprehensive understanding of the complex issues surrounding breastfeeding beliefs and practices (Fetters et al., 2013).

The data were collected from students enrolled in the Early Childhood Islamic Education (PIAUD) program. These respondents were selected purposively, as they represent a population of educated Muslim women with an academic focus on child development. Their dual identity—as future mothers and educators—makes them an ideal group for exploring knowledge

and perspectives on exclusive breastfeeding from both scientific and religious viewpoints.

To gather data, a questionnaire consisting of seven open-ended questions was designed. These questions aimed to assess respondents' awareness of exclusive breastfeeding recommendations, their understanding of breastfeeding benefits, the influence of Islamic teachings, and their knowledge of solutions to common breastfeeding problems. The questionnaire was distributed via Google Forms, ensuring ease of access and allowing participants to respond thoughtfully and reflectively.

**Table 1.** The list of Questions

No.	Questions
1.	Have you heard about the recommendation for exclusive breastfeeding? From whom did you hear the recommendation?
2.	What is the meaning of exclusive breastfeeding?
3.	What is the recommended time limit for exclusive breastfeeding?
4.	What are the advantages of breast milk compared to formula milk?
5.	Is there any verse in the Koran that recommends the practice of breastfeeding?
6.	Are you planning to become a working mother? If yes/possible, how do you give breast milk to your baby?
7.	If there are problems in providing breast milk, what will you do?

The data analysis process involved several key steps. First, coding was conducted to categorize qualitative responses into meaningful themes. Next, data entry was performed to organize the categorized data into tables. This was followed by editing, which involved reviewing the responses for accuracy and consistency. In cases of incomplete responses, imputation was applied to address missing data. Weighting was used to adjust for potential biases arising from nonresponse or uneven sampling. Finally, sampling variance estimation was employed to assess the reliability of survey statistics and account for possible errors in the sample design. Quantitative data were presented using descriptive statistics, particularly frequency and percentage calculations, using the formula:

$$P = \frac{\text{number of respondents' answers}}{\text{total number of respondents}} \times 100\%$$

This study does not aim to test hypotheses but rather to describe, explain, and draw conclusions about students' knowledge and perspectives on exclusive breastfeeding—emphasizing both the scientific and Islamic dimensions, as well as common problems and potential solutions.

## Result

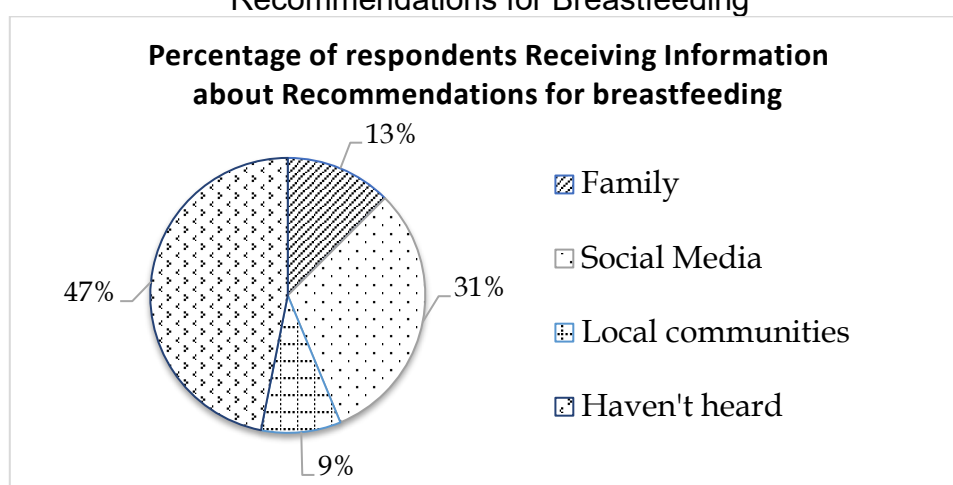
In accordance with the research objectives, this section presents the findings on the knowledge and understanding of students in the Early Childhood Islamic Education (PIAUD) program regarding breastfeeding

practices. As individuals who are both academically trained in early childhood care and grounded in Islamic values, these prospective mothers offer a valuable perspective on breastfeeding practices. The results are described as follows.

### Knowledge about Breastfeeding Recommendation form Science Perspective

Based on the data obtained, it was found that 53% of respondents had received information about recommendations regarding exclusive breastfeeding. Information about recommendations for breastfeeding was obtained from family (13%), local communities (9%), and social media (31%).

**Figure 1.** Percentage of Respondents Receiving Information about Recommendations for Breastfeeding



Source. Interview

Furthermore, information about the practice of exclusive breastfeeding has not been well understood by respondents. Regarding the meaning of exclusive breastfeeding, 39% respondent knew that the period for exclusive breastfeeding is 6 months. Meanwhile, 61% respondents did not know the meaning of exclusive breastfeeding. Respondents' answers regarding the period of exclusive breastfeeding varied, namely 1 year, 1.5 years, and 2 years.

Apart from relating to knowledge about recommendations for breastfeeding, this research also explored respondents' knowledge about the importance of breastfeeding for babies. The research results show that respondents' knowledge varies regarding breastfeeding practices.

Some students' answers regarding breast milk content that is not present in formula milk:

*"Tidak tahu"* (Don't know)

*"Protein. Mineral. Vitamin larut lemak (A, E dan K)"* (Proteins. Mineral. Fat soluble vitamins (A, E and K))

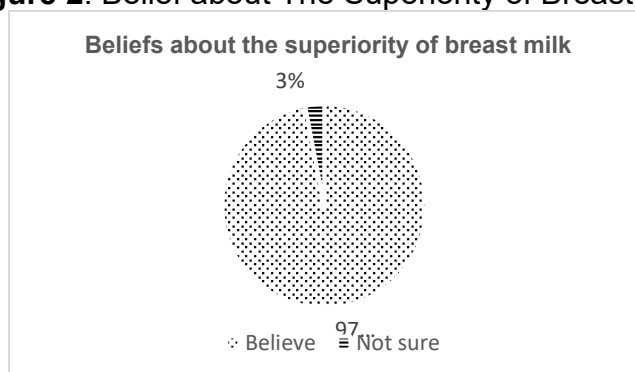
*"Zat gizi"* (Nutrition)

*"Susu ASI kandungannya proteinnya lebih tinggi"* (Breastmilk has a higher protein content)

*"Protein, vitamin"* (Proteins, vitamins)

In general, respondent stated that breast milk was beneficial for babies. As many as 97% of respondents believe that the nutritional content of breast milk is different from formula milk as represented in Figure 2.

**Figure 2.** Belief about The Superiority of Breast Milk



Source. Interview

However, not all respondents who believe that breast milk has better content than formula milk also know for sure what breast milk contains. They just believe that the nutrition in breast milk is better than formula milk. Only 18% know that breast milk contains antibodies. Antibodies are substances that are very useful for maintaining baby's immunity. The antibody content in breast milk cannot be substituted by formula milk.

### **Knowledge about Breastfeeding Recommendation form Islamic Perspective**

From the Islamic perspective, the recommendation for mothers to breastfeed their children is mentioned in several verses of the Koran. All respondents expressed confidence in the existence of recommendations for breastfeeding in the Koran. The respondents have heard or read this recommendation. Some samples of student answers are:

"*Surat Al Baqarah ayat 233*" (Surah Al Baqarah verse 233)

"*Surat Al Baqarah*" (Surah Al Baqarah)

"*Al quran surah al Baqarah ayat 233*" (Al Quran surah al Baqarah verse 233)

"*Tidak yakin*" (Not sure)

"*Tidak tahu*" (Don't know)

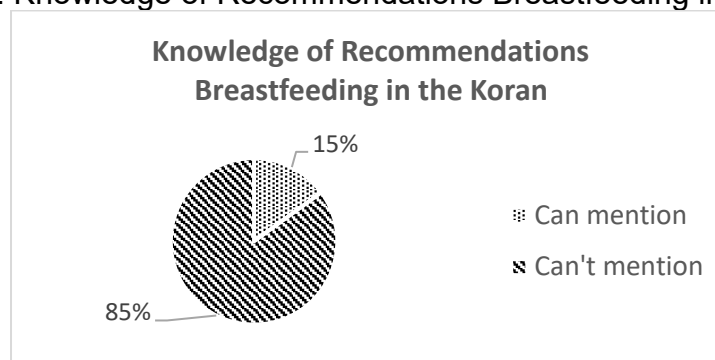
"*Kurang tau si Bu*" (I don't know, ma'am)

"*Kurang paham*" (Not really understand)

"*Kalo tidak salah surah Al Baqoroh ayat 233*" (If I'm not mistaken, Surah Al Baqarah verse 233)

"-(did not mention the answer)

**Figure 3.** Knowledge of Recommendations Breastfeeding in the Koran



Source. Interview

However, only 15% of respondents correctly mention the verse from the Koran which contains recommendations for breastfeeding. Respondents' knowledge about the recommendation for breastfeeding in the verses of the Koran is depicted in Figure 3.

### **Knowledge about Breastfeeding Problem and Solution**

The respondents in this study were college students, a highly educated layer of society, most of whom were motivated to continue their studies at university to become working mothers. Based on the research results, it was found that 99% of respondents had dreams or plans to become mothers. However, only 62% are sure and have an idea about breastfeeding, namely through expressed breast milk. The rest do not have a view on how to provide breast milk to working mothers.

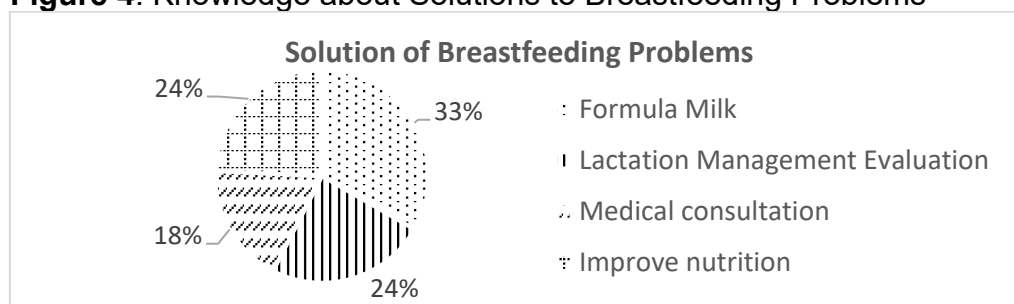
**Table 2.** Respondents' tendency to be Working Mothers and The Process of Breastfeeding

Desire to be a working mother	Provide expressed breast milk	Don't know how yet
Yes (78%)	62,5%	15%
Maybe (21%)	6,5%	15%

Source. Interview

With the rise of formula milk brands and the ease with which they are available, people's view of breast milk has become simpler. Many mothers who have problems with breastfeeding take a solution by giving formula milk. The research results show that the knowledge about solutions to breastfeeding conveyed by respondents is diverse. The following are the opinions of respondents regarding solutions of breastfeeding problems.

**Figure 4.** Knowledge about Solutions to Breastfeeding Problems



Source. Interview

From these data, it can be concluded that giving formula milk is still the solution most widely known by respondents. Meanwhile, several respondents said that solutions to breastfeeding problems could be overcome through evaluating breast milk expression schedules, improving nutrition, and consulting medical personnel (doctors and midwives).

Based on the data was obtained, the professions of physiotherapist and lactation counselor were still not familiar to the respondents. As many as 26% of respondents stated that problems with breastfeeding could be consulted with a doctor. Not a single respondent mentioned the profession of lactation counselor. A lactation counselor is a profession that plays a role in exploring and investigating problems to the breastfeeding process. Lactation counselors can come from individuals or non-governmental organizations. With the respondents' lack of knowledge about the lactation counselor profession who can be contacted to help provide solutions to problems to the breastfeeding process, more massive outreach about this profession is needed. This is because the lactation counselor profession has been proven to have a crucial role in providing advice and solutions to problems to the breastfeeding process (Liliana et al., 2017).

This shows that respondents do not have comprehensive knowledge about the superiority of breast milk compared to formula milk. According to theory, breast milk is a biological fluid produced by the mother. Breast milk contains various nutrients and bioactive components. One of these variations is influenced by the age of the baby. Based on Rahmawati & Ramadhan (2019) and Silaen et al. (2020), breast milk is a fat emulsion that is secreted by the mother's mammary glands and contains protein, lactose, and inorganic salts, which are useful as food for the baby. Breast milk is also rich with bioactive component that are beneficial for providing immunity to babies (Wijaya, 2019). Therefore, the contents of breast milk are superior and some cannot be substituted by formula milk.

Based on the production phase, breast milk is divided into 3, namely early breast milk, transitional breast milk and mature breast milk (Wijaya, 2019). It was further explained that at the beginning of birth (0-7 days), breast milk contains a lot of colostrum which contains high protein, small amounts of carbohydrates, fat, salts and minerals, water, and fat-soluble vitamins, secretory immunoglobulin A (IgA), lactoferrin, leukocytes, as well as developmental factors such as epidermal growth factor, and functions as a

laxative to cleanse the baby's digestive tract. During the transition period (days 7-14), the breast milk that comes out is a transition from colostrum to the mature breast milk phase. The protein content is decreasing, but the fat content, lactose, water-soluble vitamins and breast milk volume are increasing. Furthermore, the breast milk that comes out after day 14 is mature breast milk. The composition of mature breast milk is relatively stable. At the beginning of the breastfeeding process, the breast milk that comes out is called foremilk which contains a lot of water and lactose. The breast milk that comes out at the end of breastfeeding contains a lot of fat. The perfection of breast milk composition shows that breast milk has superiority compared to formula milk.

Apart from being superior in terms of composition and nutrition, breastfeeding is more important than giving formula milk in terms of psychology. Children who are exclusively breastfed have relatively no mental-emotional problems at the age of 3-4 years compared to children who are not exclusively breastfed (Setyarini et al., 2017). The process of providing breast milk through direct breastfeeding (DBF) allows for direct contact between mother and baby. This can increase inner contact between mother and baby. Psychologically, this causes the baby to have an attachment to the mother, because in the breastfeeding process affection, love and protection flows from the mother to the baby (Zusy (2015); Setyarini et al., (2017); and Suryani et al., (2017)). With these advantages, the practice of exclusive breastfeeding needs to be conveyed on a massive scale, especially through direct breastfeeding.

## **Discussion**

Building upon the methodological approach and focus of this study, the following discussion analyzes how students of the Early Childhood Islamic Education (PIAUD) program perceive and understand exclusive breastfeeding. These respondents, purposively selected for their dual roles as future mothers and educators, provide a meaningful lens through which to explore the intersection of scientific knowledge and Islamic values through the anthropobiology course (Tantri & Fransisca, 2021). Their academic background in child development and their exposure to religious teachings make their insights particularly relevant in examining breastfeeding practices.

The integration of both qualitative and quantitative data enables a holistic understanding of respondents' knowledge and beliefs. The findings reflect not only what students know about breastfeeding, but also reveal important gaps—such as limited awareness of the immunological benefits of breast milk and a lack of familiarity with professional lactation support. Furthermore, although respondents demonstrate awareness of Islamic recommendations on breastfeeding, many could not specify the relevant verses in the Qur'an.

These outcomes are significant because they highlight how scientific and spiritual knowledge together influence breastfeeding intentions and practices. As such, the discussion below provides a detailed explanation of the study's key findings and their implications for health education, religious

instruction, and breastfeeding support strategies for future mothers in Islamic educational settings.

### **Knowledge about Breastfeeding Recommendation form Science Perspective**

Breastmilk is a biological fluid produced by the mother. Breast milk contains various nutrients and bioactive components. One of these variations is influenced by the age of the baby. Based on Rahmawati & Ramadhan, (2019), Breast Milk is an emulsion of fat in a solution of protein, lactose and organic salts secreted by the mother's breast glands, and is useful as baby food (Silaen et al., 2020). This bioactive content is useful for providing immunity for babies (Wijaya, 2019). These bioactive factors are part of breast milk which have an effect on biological processes in babies. In addition, breast milk content is easily digested by the baby's digestive enzymes. Therefore, the contents of breast milk are superior and some cannot be substituted by formula.

The recommendation for exclusive breastfeeding is not only based on science and medical aspects. From the Islamic perspective, breastfeeding is recommended for mothers. Several verses in the Koran contain recommendations for mothers to practice *radā'ah* (breastfeeding) and fathers to provide adequate living for mothers as a form of support for breastfeeding mothers.

These results show that information about breastfeeding recommendations is mostly obtained from social media. Information about the practice of exclusive breastfeeding in the family and community is still relatively low. This is supported by research results Ervina et al. (2019) and Kamoun & Spatz (2018) which states that the recommendation for exclusive breastfeeding in the community needs to be carried out massively.

The results can be input for policy makers to educate the public massively. Even though social media is a tool that is considered the most effective and efficient for sharing information, many members of society do not follow social media. Meanwhile, the success of breastfeeding is not only determined by the mother's knowledge. Successful breastfeeding also requires support from family and the surrounding environment.

The respondents did not have knowledge about the difference between the period of exclusive breastfeeding and the period of weaning. The data indicated that the respondents did not understand the meaning of exclusive breastfeeding as the practice of breastfeeding without any additional feeding until the baby is 6 months old. However, breastfeeding must still be continued for up to 2 years to meet the baby's needs and improve their health status as stated in Government Regulation of the Republic of Indonesia Number 33 of 2012 concerning Exclusive Breastfeeding (*Peraturan Pemerintah Republik Indonesia Nomor 33 Tahun 2012 tentang Pemberian ASI Eksklusif*).

According to the literature, the recommendation for exclusive breastfeeding until 6 months of age has taken several things into consideration. The main consideration for giving breast milk is because

newborn babies are still experiencing the process of developing intestinal motor function, sucking-swallowing coordination processes, controlling gastroesophageal sphincter tone, adequate gastric emptying processes, and intestinal peristalsis (Indrio et al., 2022). In this development phase, a complete nutritional source is needed, but is still easily digested by the baby. The source of nutrition needed by babies can be supplied through breast milk. Breast milk contains various mixtures of vitamins, proteins and fats, as well as the complete antibodies needed by babies (Wijaya, 2019). Even though formula milk is considered capable of manipulating cow's milk to suit the baby's needs, it is difficult to digest and has a higher risk of causing digestive disorders in babies (Iskandar & Maulidar, 2016).

### **Knowledge about Breastfeeding Recommendation from Islamic Perspective**

The verse of the Koran mentioned by 15% of respondents was Surah al-Baqarah verse 233. This verse is known as the verse that recommends breastfeeding for mothers. However, the statements about breastfeeding in the Koran are found in several other verses. Giving breast milk or the breastfeeding process is known as *raḍā'ah*. Discussion of *raḍā'ah* is found 10 times in several verses of the Koran (Nurfitriani, 2022). The word *raḍā'ah* is found 10 times in the Koran, namely in al-Baqarah [2]: 233, al-Nisā' [4]: 23, al-Hajj [22]: 2, al-Qaṣaṣ [28]: 7 and 12, and al-Ṭalāq [65]: 6 (Nurfitriani, 2022). The verse which is explicitly found in al-Baqarah [2]:233 in the form of command words. Meanwhile, in another verse, *raḍā'ah* relates to support from the husband/father in breastfeeding, and another verse relates to the command for children to honor the parents who have sacrificed for the child (one of whom has provided breast milk).

Apart from the explicit recommendation in the form of the word *raḍā'ah*, the practice of breastfeeding is found in several other verses. Several of these verses relate to the command for children to honor both parents, one of whom is the mother who has weaned them. According to the term, weaning can be interpreted as stopping the process of breastfeeding. Some verses related to weaning include:

- a. Q.S Luqman [31]:14, which mean "And We have commanded people to 'honour' their parents. Their mothers bore them through hardship upon hardship, and their weaning takes two years. So be grateful to Me and your parents. To Me is the final return."
- b. Q.S al-Ahqaf [46]:15, which mean " We have commanded people to honour their parents. Their mothers bore them in hardship and delivered them in hardship. Their 'period of' bearing and weaning is thirty months...."

These two verses show that breastfeeding is something that is prescribed in the Koran. Even though the period is stated in different units (years and months), the two verses have the same meaning. The weaning period referred to in Surah Al Ahqaf "bearing and weaning for 30 months" or تَلْتُونَ شَهْرًا refers to the phenomenon of premature babies, so it is possible that the pregnancy phase only lasts 6 months and the breastfeeding period is 24

month (Rohmah, 2017). Thus, the total period of a mother's struggle is 30 months (pregnancy is 6 months and breastfeeding 24 months or 2 years)

The lack of knowledge about the verses of the Koran relating to breastfeeding can potentially lead to failure in breastfeeding practices if not prevented by adequate education as the results of research conducted by Kamoun & Spatz (2018) and Ervina et al. (2019). Therefore, education is needed about breastfeeding recommendations for Muslim women considering that the practice of breastfeeding is clearly stated in Koran.

### **Knowledge about Breastfeeding Problem and Solution**

Breastfeeding is a natural process for a child to obtain nutrition for the first time after birth. This assumption causes the process of breastfeeding carried out by mothers to be considered a natural process that can be done easily. However, the breastfeeding process is actually very complex because it is related to the mother's nutrition, hormones and psychology. Apart from that, the baby's condition, especially the oral motoric aspect, also influences the success of the breastfeeding process. Not everyone understands that this process must be protected and maintained, and understood comprehensively without being impacted by any conditions, including working mothers.

Based on existing theory, a mother's ability to produce breast milk is regulated by the hormones prolactin and oxytocin (Geddes & Perrella, 2019). Prolactin plays a central role in stimulating the production of milk (particularly lactose) in the mammary glands, whereas oxytocin is essential for the milk ejection reflex, facilitating the release of milk from the breasts (Wijaya, 2019). Consequently, maintaining a balanced function of both hormones is crucial to ensure effective and sufficient milk production to meet the infant's nutritional needs.

The prolactin hormone can be maintained through nutrition, but the oxytocin hormone is influenced by the mother's psychological condition. Mothers must feel happy so that the oxytocin hormone is stable and the process of producing breast milk can run smoothly. Therefore, a thorough analysis is needed in every case of mothers experiencing problems in breastfeeding. Apart from being related to hormonal instability in the mother, breastfeeding problems can also be caused by less optimal breastfeeding position and attachment and/or the baby's oral motor condition. Therefore, breastfeeding problems need to be consulted with parties who understand the complexity of the breastfeeding process. Several parties that mothers can contact when experiencing breastfeeding problems are midwives, pediatricians, physiotherapists, and lactation counselors.

In connection with the complexity of the breastfeeding process in humans, mothers have found many problems. Problems in breastfeeding among working mothers include less flexible breastfeeding schedules and the lack of available lactation room (Apriliani et al., 2022; Wulandari et al., 2014). In addition to breastfeeding problems, self-motivation and family support are also factors in the success of breastfeeding practices. One form of family support is the process of providing expressed breast milk through media other than pacifiers to prevent nipple confusion in babies. Problems

that are considered trivial and have not yet received effective solutions mean that breastfeeding practices are still not optimal.

Based on research findings, the knowledge possessed by prospective mothers regarding breastfeeding is not yet comprehensive—both from scientific and Islamic perspectives. According to Green & Kreuter (2005), one of the key factors influencing human behavior is the *predisposing factor*, which includes knowledge and beliefs. In this context, the decision to practice exclusive breastfeeding is significantly shaped by the mother's understanding and belief. When a mother's knowledge about breastfeeding is limited, it increases the likelihood of failure to implement exclusive breastfeeding, as supported by findings from Kamoun & Spatz (2018) and Ervina et al. (2019). This issue is further compounded by the dual expectations placed upon women: although they contribute economically to meet family needs, they are still socially expected to fulfill domestic roles, particularly those related to reproductive functions such as breastfeeding Mahmudah et al. (2019). In addition, limited awareness of Qur'anic teachings that highlight the importance of breastfeeding could become a barrier to its practice if not supported by appropriate educational efforts. Therefore, it is essential to provide targeted education on breastfeeding recommendations to Muslim women, considering that the practice is explicitly mentioned and encouraged in the Qur'an.

Therefore, it is essential to provide targeted education on breastfeeding recommendations to Muslim women, considering that the practice is explicitly mentioned and encouraged in the Qur'an. Several studies have shown that educational interventions—when delivered effectively—can significantly enhance maternal knowledge, attitudes, and breastfeeding outcomes. For example, Wilson (2020) and Severinsen et al., (2024) show that social media platforms can serve as powerful tools for promoting breastfeeding by providing accessible information, emotional support, and a sense of community among mothers. These digital interventions have proven successful in increasing both the confidence and knowledge of mothers regarding exclusive breastfeeding. Given that many respondents in this study reported first encountering information about breastfeeding through social media, this platform holds great potential for broadening educational outreach.

Consequently, successful breastfeeding education requires a collaborative effort involving healthcare providers, educators, religious leaders, and digital content creators. These stakeholders play a crucial role in ensuring that breastfeeding messages are conveyed in a way that integrates both scientific facts and Islamic teachings. By addressing knowledge gaps and strengthening beliefs through multifaceted educational strategies, prospective mothers—especially those preparing for both professional and maternal responsibilities—can be better equipped to practice and promote exclusive breastfeeding confidently and consistently.

## Conclusion

The practice of exclusive breastfeeding is influenced by the knowledge of mothers or prospective mothers. Therefore, female students in Islamic college who are prospective mothers are expected to have adequate knowledge about the practice of exclusive breastfeeding. Based on the research results, it was found that most respondents have received information about recommendations for exclusive breastfeeding. However, respondents' knowledge regarding exclusive breastfeeding is still not comprehensive. Based on the research findings, several key areas need to be emphasized in promoting breastfeeding education among prospective mothers, particularly Islamic Early Childhood Education (PIAUD) students. First, while 97% of respondents acknowledged that breast milk is superior to formula milk, only 18% understood that breast milk contains antibodies essential for enhancing an infant's immune system—something that cannot be replicated by formula. This highlights the need to stress the unique immunological benefits of breastfeeding in educational campaigns. Second, although all respondents believed that the Qur'an contains recommendations for breastfeeding, only 15% could accurately mention the specific verse (Surah Al-Baqarah 2:233). Therefore, integrating Islamic teachings on breastfeeding more explicitly into educational programs is essential to strengthen both spiritual and practical motivations for breastfeeding. Third, many respondents viewed formula milk as the primary solution for breastfeeding difficulties, reflecting a lack of awareness about alternative strategies such as adjusting breastfeeding schedules, improving maternal nutrition, and consulting healthcare professionals. Moreover, the role of lactation counsellors remains largely unknown among respondents, despite the proven impact of such professionals in supporting successful breastfeeding practices. Introducing the lactation counsellor profession and its importance should therefore be a priority. Furthermore, because many respondents aspire to become working mothers, education must also address practical strategies for providing expressed breast milk and maintaining breastfeeding after returning to work. Lastly, given that prospective mothers are active users of social media, breastfeeding promotion should leverage digital platforms such as Instagram, TikTok, WhatsApp, and YouTube to disseminate accurate information on the scientific and Islamic perspectives of breastfeeding, solutions to common breastfeeding problems, and the available support systems.

This study has several limitations. It only involved students from the Early Childhood Islamic Education (PIAUD) program, so the results may not represent all Muslim women or students from other fields. The data were based on self-reported answers, which may not fully reflect the respondents' true knowledge. In addition, this study only looked at knowledge at one point in time, without seeing how it might change after marriage or childbirth. Therefore, future research should involve a more diverse group of respondents, use interviews to explore deeper factors influencing breastfeeding practices, and examine how social media or religious leaders can be involved in improving breastfeeding education among Muslim women.

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