

ORIGINAL ARTICLE

Determinants of Caregiver's Knowledge of Infant's Early Nutrition in Indonesia

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ABSTRACT

Introduction: The knowledge of early nutrition for infants is fundamental for mothers and caregivers. This study aimed to investigate the determinants of caregiver's knowledge of Infant Early Nutrition in Indonesia. **Materials and methods:** This study used secondary data from the World Bank, Indonesia High-Frequency Monitoring of COVID-19 Impacts in 2023. The total sample of this study was 4,098 caregivers for children under five years old. **Results:** According to the colostrum, the factors associated are the kid's age, caregivers are not the main family members/ others, and did not know about stunted children. The knowledge about exclusive breastfeeding duration revealed that kids' age was correlated, for age one, not knowing stunting is also significant, caregivers age 55 years or older, caregivers' education level with tertiary, and grandmothers as caregiver. **Conclusion:** There is a need for collaboration among stakeholders to increase the knowledge of caregivers about infant early nutrition.

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INTRODUCTION

Understanding the knowledge of caregivers about colostrum and breastmilk in Indonesia is crucial for comprehending infant feeding practices and addressing potential challenges. For instance, a study in Indonesia aimed to determine the prevalence of prelacteal feeding and associated risk factors, highlighting the importance of understanding caregivers' knowledge and practices related to early infant feeding (1). Additionally, a study in Bandung City, Indonesia, explored breastfeeding and breastmilk substitute use, shedding light on the motivations and practices of mothers in the region (2). Furthermore, a study in Indonesia assessed the promotions of breastmilk substitutes and commercial complementary foods, emphasizing the need to understand the marketing and availability of such products and their potential impact on infant feeding practices (3). Additionally, a study in Indonesia focused on the factors related to colostrum feeding, highlighting the importance of understanding caregivers' knowledge

and practices regarding colostrum, a critical component of early infant nutrition (4). Moreover, a study in Indonesia explored the knowledge, attitudes, and behavior of Indonesian breastmilk donors via the internet, providing insights into the factors influencing breastmilk donation practices in the country (5). In conclusion, the knowledge of caregivers about colostrum and breastmilk in Indonesia is essential for understanding and addressing various aspects of infant feeding practices, including early feeding practices, breastfeeding motivations, marketing influences, and cultural factors.

Breastmilk, particularly colostrum, plays a crucial role in providing essential nutrition to infants, especially preterm infants. The American Academy of Pediatrics emphasizes the superior nutritional value of breastmilk, particularly for preterm infants, and recommends that all preterm infants receive human milk (6). Colostrum, the initial breastmilk, is rich in leukocytes and exhibits variations in composition based on factors such as lactation stage, pregnancy term, and the health status of the mother and infant (7). Furthermore, breastmilk composition has been shown to differ based on the sex of the offspring, suggesting a tailored approach to early life nutrition for optimal health and development of

infants (8,9). In terms of nutritional content, colostrum has a higher protein content compared to mature breastmilk, with approximately 1.5-2.0 g of protein per 100 mL, highlighting its significance in providing essential nutrients to newborns (10). Additionally, early postnatal growth of preterm infants has been shown to be improved through prioritizing early nutrition, including the introduction of parenteral nutrition and enhanced nutritional provision (11). The World Health Organization advocates exclusive breastfeeding as the optimal nutrition for infants during the first 6 months due to its numerous benefits, including nutritional, gastrointestinal, immunological, developmental, and psychological advantages (12). Moreover, breastfeeding has been linked to numerous physical health benefits for both the infant and the mother, emphasizing its indispensable role in infant nutrition (13). Early nutritive interventions have been suggested to be effective for infants who are HIV-exposed and may mitigate the adverse effects of suboptimal nutrition during the early stages of life (14). This study aimed to examine the determinants of caregiver's knowledge about early nutrition for infant such as colostrum and duration of exclusive breastfeeding.

MATERIALS AND METHODS

This study used secondary data from High-Frequency Monitoring of COVID-19 Impacts Rounds. This current study focused on early nutrition. The dependent variables of this study consisted of two, including exclusive breastfeeding duration. The original questions asked whether the caregivers think exclusive breastfeeding duration? Another dependent variable is colostrum's knowledge. That question asked hot to do with first breastmilk?. The independent variables were including child's age, caregiver's age, sex, education, relationship with kids, working status, and knowledge about stunted child. Total sampling after data management were 4,098 caregivers. The analysis of this study including univariate, bivariate using Chi-square and multivariate using binary logistic regression. All the statistic analysis was done using STATA version 17.

RESULTS

The result in this study consists of univariate, bivariate which using Chi-Square test to test the correlation between each independent variable and dependent variables, and multivariate analysis using binary logistic regression. Knowledge about early nutrition including colostrum intake and exclusive breastfeeding is very low which showed 9.7% of caregivers known that colostrum has to be thrown away and 49.5% did not known about the duration of exclusive breastfeeding (Table I). According to child characteristics, most of them children were in aged three years (25.70%). Moreover,

for caregiver's characteristics, most of the them were in aged 15 – 34 years, (43.41%), were female (51.10%), graduated from primary school or less (50.00%), were the mothers (94.63%), did not work (52.86%), and have the knowledge about stunted kids (57.74%).

Table I: General Characteristics of Respondents

Predictors (n=4,098)	Frequency (%)
Colostrum	
Gives to baby	3,701 (90.31)
Thrown away	397 (9.69)
Exclusive breastfeeding duration	
6 months	2,068 (50.46)
Not 6 months	2,030 (49.54)
Age's child (years)	
0	524 (12.79)
1	718 (17.52)
2	902 (22.01)
3	1,053 (25.70)
4	901 (21.99)
Caregiver's age group	
15 – 34 years	1,779 (43.41)
35 – 54 years	1,650 (40.26)
55 years or older	669 (16.33)
Caregiver's sex	
Female	2,094 (51.10)
Male	2,004 (48.90)
Education level	
Primary or less	2,049 (50.00)
Secondary	1,481 (36.14)
Tertiary or higher	568 (13.86)
Relationship with child	
Mother	3,878 (94.63)
Grandmother	89 (2.17)
Others	131 (3.20)
Working status	
Yes	1,932 (47.14)
No	2,166 (52.86)
Knowledge about stunted child	
Yes	2,366 (57.74)
No	1,732 (42.26)

The bivariate analysis in this study aimed to examine the correlation between each independent variable and exclusive breastfeeding practice and colostrum intake as some indicators of early nutrition. For determinants of exclusive breastfeeding, it was found that the factors of children's age, caregiver's educational level, relationship with the child, and knowledge about stunted child were statistically significant with knowing that exclusive breastfeeding duration is not six months (Table II). Moreover, for the determinants of colostrum intake, it revealed that children's age, relationship with the kids, and knowledge about stunted child were significantly associated with knowledge about colostrum intake (Table 2). However, these variables including caregiver's age group, caregiver sex, and working status did not significantly correlated with early nutrition (exclusive breastfeeding and colostrum).

Table II: The correlation between each independent variable and early nutrition

Predictors (n=4,098)	Exclusive breastfeeding practice duration		Total	Colostrum intake		Total
	6 months	Not 6 months		Gives to baby	Thrown away	
Age's child (years)			**			***
0	294 (56.11)	230 (43.89)	524 (100)	497 (94.85)	27 (5.15)	524 (100)
1	330 (45.96)	388 (54.04)	718 (100)	651 (90.67)	67 (9.33)	718 (100)
2	476 (52.77)	426 (47.23)	902 (100)	793 (87.92)	109 (12.08)	902 (100)
3	509 (48.34)	544 (51.66)	1,053 (100)	932 (88.51)	121 (11.49)	1,053 (100)
4	459 (50.94)	442 (49.06)	901 (100)	828 (91.90)	73 (8.10)	901 (100)
Caregiver's age group						
15 – 34 years	889 (49.97)	890 (50.03)	1,779 (100)	1,606 (90.28)	173 (9.72)	1,779 (100)
35 – 54 years	831 (50.36)	819 (49.64)	1,650 (100)	1,486 (90.06)	164 (9.94)	1,650 (100)
55 years or older	348 (52.02)	321 (47.98)	669 (100)	609 (91.03)	60 (8.97)	669 (100)
Caregiver's sex						
Female	1,057 (50.48)	1,037 (49.52)	2,094 (100)	1,902 (90.83)	192 (9.17)	2,094 (100)
Male	1,011 (50.45)	993 (49.55)	2,004 (100)	1,799 (89.77)	205 (10.23)	2,004 (100)
Education level			***			
Primary or less	978 (47.73)	1,071 (52.27)	2,049 (100)	1,847 (90.14)	202 (9.86)	2,049 (100)
Secondary	741 (50.03)	740 (49.97)	1,481 (100)	1,329 (89.74)	152 (10.26)	1,481 (100)
Tertiary or higher	349 (61.44)	219 (38.56)	568 (100)	525 (92.43)	43 (7.57)	568 (100)
Relationship with child			**			***
Mother	1,978 (51.01)	1,900 (48.99)	3,878 (100)	3,516 (90.67)	362 (9.33)	3,878 (100)
Grandmother	32 (35.96)	57 (64.04)	89 (100)	83 (93.26)	6 (6.74)	89 (100)
Others	58 (44.27)	73 (55.73)	131 (100)	102 (77.86)	29 (22.14)	131 (100)
Working status						
Yes	972 (50.31)	960 (49.69)	1,932 (100)	1,745 (90.32)	187 (9.68)	1,932 (100)
No	1,096 (50.60)	1,070 (49.40)	2,166 (100)	1,956 (90.30)	210 (9.70)	2,166 (100)
Knowledge about stunted child			***			***
Yes	1,337 (56.51)	1,029 (43.49)	2,366 (100)	2,239 (94.63)	127 (5.37)	2,366 (100)
No	731 (42.21)	1,001 (57.79)	1,732 (100)	1,462 (84.41)	270 (15.59)	1,732 (100)

The multivariate analysis result in this study is showed in Table III. It was found that after adjusted to other independent variables, there are some of them significantly associated with breastfeeding practice duration including child aged 1,3, and 4, caregivers aged 55 years or older, tertiary or higher educational level, were a grandmother of the kid, and have no knowledge about stunted child with odds ratio 1.53, 1.38, 1.27, 0.76, 0.53, 1.69, and 1.78 respectively (Table III). Moreover, the variables that significantly correlated with knowledge of colostrum intake were such as child aged 1, 2, 3,4, other's relationship with the kids, and have no knowledge about stunted child with odds 2.08, 2.60, 2.61, 1.77, 2.56, and 2.63, respectively. In more details, compared to caregivers with children aged below one years, the caregiver with children aged one, three, and four years were 1.53, 1.38, and 1.27 times more likely to have knowledge that exclusive breastfeeding is not 6 months. However, compared to caregivers aged 15 to 34 years old, caregivers aged 55 years or older were decrease the likelihood 24% of having lack

information about exclusive breastfeeding. About the education, compared to caregivers with primary or less education level, those graduated from tertiary or higher decreases the probability to have lack information about exclusive breastfeeding by 47%. Compared to mother as the caregiver, grandmother were 1.69 times more likely to have lack information about exclusive breastfeeding. Moreover, caregivers without knowledge about stunted child were 1.78 times more likely to have lack knowledge about exclusive breastfeeding (Table 3). According to knowledge of colostrum intake, it was found caregivers with children age 1,2,3,4 was 2.08, 2.60, 2.61, 1.77 times more likely to have wrong information about colostrum compared to caregivers with kids aged under 1 year. Caregivers who were not the mother or grandmother were 2.56 times more like to have incorrect understanding of colostrum. Additionally, caregivers with no knowledge about stunted child were 3.29 times more likely to have incorrect knowledge about colostrum.

Table III: The binary logistic regression result (n= 4,098)

Predictor	Breastfeeding practice			Colostrum intake		
	AOR	95% CI	p-value	AOR	95% CI	p-value
Age's child (years)						
0 (ref)						
1	1.53	1.21 – 1.93	0.000***	2.08	1.30 – 3.33	0.002**
2	1.08	0.86 – 1.35	0.495	2.60	1.66 – 4.06	0.000***
3	1.38	1.11 – 1.72	0.004**	2.61	1.67 – 4.06	0.000***
4	1.27	1.02 – 1.59	0.035*	1.77	1.11 – 2.82	0.017*
Caregiver's age group						
15 – 34 years (ref)						
35 – 54 years	0.99	0.86 – 1.14	0.945	0.99	0.78 – 1.26	0.944
55 years or older	0.76	0.62 – 0.93	0.007**	0.80	0.57 – 1.13	0.204
Caregiver's sex						
Female (ref)						
Male	0.98	0.87 – 1.12	0.818	1.12	0.90 – 1.38	0.311
Education level						
Primary or less						
Secondary	0.89	0.77 – 1.02	0.107	1.09	0.85 – 1.38	0.497
Tertiary or higher	0.53	0.44 – 0.65	0.000***	0.80	0.56 – 1.14	0.223
Relationship with child						
Very religious (ref)						
Grandmother	1.69	1.08 – 2.64	0.022*	0.49	0.21 – 1.15	0.102
Others	1.22	0.85 – 1.74	0.282	2.56	1.65 – 3.99	0.000***
Working status						
Yes (ref)						
No	0.96	0.84 – 1.09	0.534	1.08	0.87 – 1.34	0.469
Knowledge about stunted child						
Yes						
No	1.78	1.57 – 2.02	0.000***	3.29	2.63 – 4.11	0.000***

DISCUSSION

Knowledge and practice regarding colostrum feeding among mothers in rural and urban areas vary (15). An assessment of knowledge and practices of breastfeeding among mothers in central Uttar Pradesh, India, revealed varying levels of knowledge about colostrum and breastfeeding practices (16). The knowledge and practices of caregivers regarding colostrum and breastmilk are crucial for the nutrition and well-being of children. Maternal nutritional knowledge is strongly related to children's healthy food consumption (17). Additionally, the height-for-age z-scores of children aged between 6 and 36 months have been significantly associated with maternal childcare knowledge, highlighting the impact of caregiver knowledge on children's nutritional status (18). Furthermore, the prevalence of colostrum avoidance practices among mothers of children aged less than six months has been studied, indicating the need for improved knowledge and awareness regarding the importance of colostrum feeding (19). Similarly, a study in South Ethiopia aimed to determine the prevalence of colostrum avoidance practices and associated factors among mothers of children aged less than 12 months, highlighting the need for targeted interventions to enhance caregiver knowledge about colostrum feeding (20). Moreover, the effectiveness of nutrition education on glycaemic control among children with type 1 diabetes mellitus in

Uganda underscores the role of caregivers empowered with updated nutrition knowledge in improving children's feeding behavior and health outcomes (21). Additionally, caregivers' nutritional knowledge and attitudes have been found to mediate seasonal shifts in children's diets, further emphasizing the influence of caregiver knowledge on children's dietary intake (22).

Research has indicated a significant relationship between caregivers' knowledge and education level, income, and feeding practices, emphasizing the influence of caregiver knowledge on children's nutrition (23). Additionally, a study in South Africa revealed a significant relationship between caregivers' knowledge of infant and young child feeding (IYCF) and education, highlighting the importance of caregiver knowledge in shaping children's feeding practices (18). Furthermore, the prevalence of colostrum avoidance practices among mothers of children under two years of age has been studied, emphasizing the need for improved knowledge and awareness regarding the importance of colostrum feeding (24). Similarly, the early initiation of breastfeeding and colostrum feeding among mothers has been associated with various factors such as home delivery, breastfeeding counseling, and maternal knowledge, underscoring the relationship between caregiver knowledge and feeding practices (20,25). Moreover, the promotion of antenatal care and strengthening service-based counseling on proper newborn feeding

practices has been recommended to improve colostrum feeding, highlighting the role of caregiver knowledge in promoting optimal infant feeding practices (26). Additionally, a study in Bangladesh reported that only 60 percent of infants were given colostrum, indicating the need for enhanced knowledge and practices among caregivers regarding the importance of colostrum feeding (27).

The knowledge of caregivers about stunting is closely related to their understanding of colostrum and breastmilk. For instance, a study in South Africa highlighted the need to enhance nutrition education and strategies for complementary feeding due to high rates of stunting and poor feeding practices, emphasizing the importance of caregiver knowledge in addressing stunting (18). Similarly, efforts to increase maternal stunting-related knowledge have been identified as an effective approach for preventing stunting, indicating the significance of caregiver knowledge in combating stunting (28). Furthermore, studies have shown that caregivers' knowledge about colostrum feeding is often unsatisfactory, with a significant proportion exhibiting poor practices, which may have implications for stunting prevention (29). Additionally, informants' knowledge related to stunting has been influenced by various factors, suggesting the interconnectedness of caregiver knowledge about stunting and related practices (30).

CONCLUSION

In conclusion, the knowledge of caregivers about stunting is intricately linked to their understanding of colostrum and breastmilk. Enhancing caregiver knowledge through targeted education and interventions is crucial for addressing stunting and promoting optimal child nutrition and development. Moreover, child age and relationship with caregivers are also important factors to increase knowledge about early nutrition. This current study might have limited potential predictors and cannot be generalized to different settings and times. The next study can add more potential determinants as well as explore more by using qualitative study.

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