

Maternal and child factors of stunted children: a case control study

Apriyani Puji Hastuti¹, Tintin Sukartini², Yuni Sufyanti Arief², Nursalam², Ratna Roesardhyati¹, Elyk Dwi Mumpuningtias³, Syaifurrahman Hidayat³, Ardhiles Wahyu Kurniawan¹

¹Departement of Nursing, Faculty of Health Science, Institute Technology Science and Health RS dr Soepraoen Malang, Malang, Indonesia

²Department of Advanced Nursing, Faculty of Nursing, Universitas Airlangga, Surabaya, Indonesia

³Departement of Nursing, Faculty of Health Science, Universitas Wiraraja, Sumenep, Indonesia

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ABSTRACT

Due to the transition or weaning process and infant feeding patterns, infants under the age of five (IYCF) are susceptible to nutritional problems, especially with regard to food diversity, diet quality, availability, and accessibility. According to fundamental health research, the mother's capacity to supply nourishment (sources from animal and vegetable protein) and the main meal as an energy source during the first two years of life is associated. Community based case-control study was conducted among children 6-24 month. The study participant used multistage random sampling procedure, with a sample size of 180 mothers who have stunted children. This study used a questionnaire as its data research instrument, which was examined for validity and reliability utilizing data analysis methods like linear regression and SPSS 16.0 statistical software. Factor associated the role of mothers in the feeding of stunted children to nutritional status are age, educational level, occupation, motivation, mobility, decision making, knowledge, self-esteem, self-efficacy, family type, family role, stress of family, coping of family, family social support, weight of birth, responsive feeding. The all of factors can affected roles of mothers in the feeding of stunted children to nutritional status with p-value <0.005. While the child's age, birth length, breastfeeding, feeding children are not factors associated with the role of mothers in the feeding of stunted children to nutritional status.

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Corresponding Author:

Apriyani Puji Hastuti
Departement of Nursing, Faculty of Health Science,
Institute Technology Science and Health RS dr Soepraoen Malang
St. Sodanco Supriadi 22 Malang, Indonesia
Email: ratnaroes@itsk-soepraoen.ac.id

1. INTRODUCTION

Children 6-24 months are susceptible to malnutrition as a result of transition or weaning procedures and baby feeding practices, specifically with regard to food diversity, quality, availability, and accessibility. The mother's ability to provide nourishment correlated to the role of feeding during the first two years of life. Poor sanitation and a lack of nutrient-rich food, and illness exposure [1], [2]. Mothers feed their children according to their hunger cues, and the menu is created based on the child's preferences and heavily utilizes instant complementary food, which is regarded to be more practical. Furthermore, moms feed their children according to their hunger cues. In addition, the menu is planned according to the child's preferences, and a lot of rapid supplementary food is used, which is seen to be more practical [3]. The mother's capacity to feed

children 6-24 months determines the nutritional value and quality of the meal [4]. Mothers with higher levels of education and awareness have an impact on feeding habits, eating habits, and nutritional status [5]–[8]. Mothers are members of the family who are autonomous, play a caring role in feeding infants and kids, and have the ability to make decisions, particularly when it comes to the health of the kids [9], [10].

Due to the transition or weaning process and infant feeding patterns, infants under the age of five (IYCF) are susceptible to nutritional problems, especially with regard to food diversity, diet quality, availability, and accessibility. According to fundamental health research, the mother's capacity to supply nourishment (sources of animal and vegetable protein) and the main meal as an energy source during the first two years of life is associated. Nutritional issues remain the primary concern in every nation on the planet, beginning with the single largest burden (children with stunted growth), which accounts for 22.2% of all toddlers worldwide. Stunting prevalence was 30.3% (11.5% very short and 19.3% short), compared to 27.10% (14.27% very short and 12.83% short) in Malang Regency. According to a preliminary study based on the report on the outcomes of weighing children in February 2021, 15,055 children (10.9%) out of 138,155 at 39 Community Health Centers in the Malang Regency area were stunted. The Pagak Health Center had 506 out of 1,288 children (39.2%), the Ngajum Health Center had 562 out of 2,122 children (26.4%), the Pujon Health Center had 881 out of 3,451 children (25.5%), the Sumberpucung Health Center had 389 out of 1,799 children (21.6%), and the Tajinan Health Center had 717 out of 3,705 children (19.4%) as the highest number of cases in the Malang Regency area. Based on these results, coordination of the Malang Regency Regional Planning Agency, an integrated and cross-sectoral handling of stunting was formulated where the villages that became the locus of intervention for stunting management increased every year, in 2021 there were 32 area and in 2022 there were 50 area target intervention in stunted children. The problems that occur where the mother's ability regarding feeding practices for infants and children in terms of selecting food ingredients, preparing menus, eating frequency, eating patterns and feeding are mostly in the sufficient category as much as 43%. In addition, supplementary food which has been given so far is not on target because it is consumed by other family members, and the condition of supplemental packaging that is not stored properly.

Mothers feed their children according to their hunger cues, and the menu is created based on the child's preferences and heavily utilizes instant complementary food, which is regarded to be more practical. Furthermore, moms feed their children according to their hunger cues. In addition, the menu is planned according to the child's preferences, and a lot of rapid supplementary food is used, which is seen to be more practical [11], [12]. Nutritional interventions that can be used with stunted and moderately malnourished children include feeding infants and young children more IYCF and improving their diets by using techniques to increase the variety of foods, especially those containing animal protein and UHT milk or fortified milk that provides multiple micronutrients (zinc, iron, and vitamins A). A diversity of foods, gradually increased portions, consistency of food, and appropriate amounts of macro-micronutrients, such as fruits, vegetables, side dishes (sources of animal and vegetable protein), and the main course as an energy source are all necessary for infant and child feeding (IYCF). Certain dietary interventions that target nursing moms and infants under the age of twenty-three months are one approach and strategy that can be used to solve the issue of stunting. Providing complete immunization, preventing and treating diarrhea, implementing the principles of managing sick toddlers, vitamin A supplementation in children 6-59 months, managing severe acute malnutrition in children, monitoring children's growth, and development are all examples of interventions that can be carried out. Additionally, early initiation of breastfeeding, exclusive breastfeeding, promoting and educating about appropriate supplemental breastfeeding, control of worm infections in children, giving zinc supplementation, iron fortification in food or micronutrient supplementation, prevention, and clinical management [13], [14]. The aims of this study was to evaluate variables related to a mother's feeding role and child factors of stunted children between 6-24 months

2. METHOD

A community-based case-control research was carried out at the Public Health Center Malang Regency in East Java, Indonesia, with mothers of stunted children aged six to twenty-four months. The study population consists of moms with stunted children between 6-24 months. This study used a multistage random selection technique to identify study participants, with a sample size of 180 mothers who met the following criteria: they had two or more children, ages between 17-45, and breastfed their children. Mothers who did not prepare meals for their children or reside at home were excluded. The independent variable in this study was the role of mother factor (age of mother, occupation, educational level, motivation, mobility, decision making, knowledge, self-esteem, self-efficacy, family type, family role, stress of family, family social support, aged of children, weight of birth, length of birth, breastfeeding, prepare and making food, children feeding, responsive feeding. The dependent variables are nutritional status and minimal weight gain.

This study used a questionnaire as its data research instrument, which was examined for validity and reliability utilizing data analysis methods like linear regression and SPSS 16.0 statistical software. Instrument data were gathered via a questionnaire derived from changes made to how infants and young children are fed. By signing a consent letter to participate in research, participate in interviews, and complete surveys, talks, and observations, respondents gave their informed consent. Researchers delivered informed consent and explain the research objective, voluntary and the ability to understand information. This study was approved by the Health Research Ethic Committee, Faculty of Nursing, Universitas Airlangga with number 2574/KEPK/2022.

3. RESULTS AND DISCUSSION

A total of 180 children were participated in this study. All of the study were single birth. The result of study is in the Table 1. Analytical statistic using SPSS application with linear regression model. In addition, the relationship between maternal age, occupation, motivation, knowledge, self-esteem, self-efficacy, family stress, family social support, age of children, birth weight, food preparation and processing, and responsive feeding with minimal weight gain. Meanwhile, mother's education, mobility, decision-making ability, family type, family role, length of birth, breast feeding, children feeding with minimal weight gain in children aged 6-24 months who experience stunting show no relationship, this is because the p-value >0.05.

As shown in Table 2, factor associated the role of mothers in the feeding of stunted children to nutritional status are age, educational level, occupation, motivation, mobility, decision making, knowledge, self-esteem, self-efficacy, family type, family role, stress of family, coping of family, family social support, weight of birth, making food, responsive feeding. The all of factors can affected roles of mothers in the feeding of stunted children to nutritional status with p-value<0.05. While the child's age, birth length, breastfeeding, feeding children are not factors associated with the role of mothers in the feeding of stunted children to nutritional status. Additionally, feeding infants and young children more IYCF and improving their diets by using techniques to increase the variety of foods, especially those containing animal protein and UHT milk or fortified milk that provides multiple micronutrients (zinc, iron, and vitamins A) are nutritional interventions that can be used with stunted and moderately malnourished children. Mothers as a key response to the availability of food in the majority of families in Indonesia need to improve their ability to optimally manage existing resources in their households, so that they can carry out appropriate feeding practices for children according to WHO recommendations.

Research shows that maternal factors greatly influence nutritional status, and children born to mothers with higher education have better nutritional status than children born to mothers with low education. In addition, there are inter-generational consequences of early marriage on children's welfare because they are born in an undeveloped family economic condition, thus affecting the development and health of children because mothers are unable to meet their nutritional needs properly. Type of work and socioeconomic status, especially those working in the agricultural sector, and also living in rural areas have a higher risk than urban residents.

Mother's autonomy in decision making where this is a factor related to mother empowerment, especially in relation to child health. The mother's ability to make decisions becomes a strength in health care and procurement of household needs so that the nutritional needs of families, especially children, can be met properly. This is in line with previous research conducted by Nair [2] that the role of the family in the household is in decision making.

Efforts to maintain mother's motivation in fulfilling nutrition in children according to nutritional adequacy according to their age. Efforts to maintain mother's motivation in fulfilling nutrition in children aged 6-24 months so that the mother's perceived benefits are more positive. One effort that can be done is to provide reinforcement through health education both by cadres both at the toddler Public Health Center and health workers, both village midwives or village nurses or other related parties. In the application, cadres can take advantage of the 4 Public Health Center tables for toddlers which are used to provide health education to mothers according to the results of the child's anthropometry. In this case, perceived barriers that can affect mothers are past experiences and personal characteristics that have been passed down from generation to generation [15]–[17]. Mothers with strong motivation perceive lower barriers because they feel this is a challenge that must be faced to improve health in children, especially those aged 6-2-4 months who experience stunting so that the child's nutritional status will be better and the stages of growth and development can be appropriate for children of their age. Based on the results of an analysis of the answers to indicators of the mother's ability to choose food ingredients consumed by children every day, mothers experience difficulties in terms of providing age-appropriate nutritious food.

Table 1. Factor associated the role of mother in feeding children

Variable	N (%)	Correlation with nutritional status p-value	Correlation with minimal weight gain p-value
Age of mother		0.009	0.041
17-25 years old	51 (28%)		
26-35 years old	89 (49%)		
36-45 years old	40 (22%)		
Occupation		0.083	0.024
Housewife	155 (86%)		
Civil servant	2 (1%)		
Entrepreneur	23 (13%)		
Educational level		0.090	0.161
Higher education	21 (12%)		
Senior high school	84 (47%)		
Junior high school	62 (34%)		
Elementary school	13 (7%)		
Motivation		0.030	0.007
High motivation	77 (43%)		
Low motivation	103 (57%)		
Mobility		0.046	0.173
High mobility	118 (66%)		
Low mobility	62 (34%)		
Decision making		0.029	0.066
Good	9 (5%)		
Enough	2 (1%)		
Less	169 (94%)		
Knowledge		0.013	0.049
Good	99 (55%)		
Enough	45 (25%)		
Less	23 (13%)		
Self-esteem		0.047	0.045
High	180 (100%)		
Low	0 (0)		
Self- efficacy		0.057	0.013
High	167 (93%)		
Low	13 (7%)		
Family type		0.094	0.098
Nuclear family	132 (73%)		
Extended family	48 (27%)		
Family role		0.011	0.093
Good	1 (1%)		
Enough	152 (84%)		
Less	27 (15%)		
Stres of family		0.065	0.028
High stress	80 (56%)		
Low stress	100 (44%)		
Family social support		0.050	0.045
Good	172 (96%)		
Less	8 (4%)		
Age of children		0.024	0.040
Weight of birth		0.020	0.039
Length of birth		0.056	0.069
Breastfeeding		0.067	0.080
Good	99 (55%)		
Less	81 (45%)		
Prepare and Making food		0.024	0.025
Good	99 (55%)		
Less	81 (45%)		
Children feeding		0.068	0.064
Good	99 (55%)		
Less	81 (45%)		
Responsive feeding		0.004	0.027
Good	99 (55%)		
Less	81 (45%)		

Mothers who have a good commitment in carrying out certain health behaviors including identifying strategies to be able to do them well [18], [19]. Individuals have a commitment to perform behaviors where they have beneficial personal values [20]. This is consistent with the results of the regression test that the more positive the motivation, the more self-efficacy.

Table 2. Analysis of linear regression test result for factor associated the role of mothers in the feeding of stunted children to nutritional status

Independent variable	p-value	B	OR	95% CI	Independent variable	p-value	B	OR	95% CI
Age	0.000	0.897	0.010	0.005- 1.471	Family type	0.026	0.199	0.101	0.14- 0.66
Educational level	0.028	0.218	0.107	0.017- 0.073	Family role	0.000	0.878	0.014	0.004- 0.005
Occupation	0.020	0.255	0.090	0.014- 0.54	Stress of family	0.004	0.372	0.079	0.005- 0.013
Motivation	0.01	0.677	0.037	0.005- 0.008	Coping of family	0.005	0.361	0.035	0.017- 0.026
Mobility	0.011	0.528	0.052	0.022- 0.044	Family social support	0.072	0.743	0.072	0.003- 0.006
Decision making	0.033	0.005	0.229	0.010- 0.055	Age of children	0.180	0.024	0.180	0.000- 0.005
Knowledge	0.016	0.076	0.185	0.002- 0.034	Weight of birth	0.022	0.785	0.022	0.006- 0.008
Self- esteem	0.002	0.521	0.064	0.005- 0.010	Length of birth	0.070	0.372	0.070	0.014- 0.038
Self- efficacy	0.01	0.437	0.064	0.002- 0.005	Breastfeeding	0.073	0.361	0.073	0.011- 0.080

Mother's knowledge can be a barrier. The previous research conducted by Anto [21] which stated that maternal knowledge is closely related to the nutritional status of children. Mothers who have toddlers with good nutritional status have good knowledge and vice versa, mothers who have toddlers with poor nutritional status also have low nutrition. According to previous research, good mother's knowledge greatly influences how to choose various types of food so that it affects consumption and affects the increase in children's nutritional status. In addition, related to the obstacles to maternal motivation, sometimes mothers feel tired, bored, feel unsure of their ability to carry out their duties and roles in fulfilling nutrition for children who experience stunting [22], [23]. Another factor that influences knowledge of nutritional status is the level of education, because with an increase in education it is likely to increase income so that it can increase the purchasing power of food. Economic factor, income can directly affect changes in family consumption, with higher levels of income there are changes in food consumption patterns where food consumption patterns are more diverse [24], [25].

Mother's motivation is low as much as 57%, where mother's motivation in this case has indicators including the aspect of usefulness as much as some mothers have high motivation as much as 50%, aspects of self-confidence and aspects of readiness most of the mothers each have low motivation of 52%. From the studies conducted, it shows that with a low level of motivation and decision-making ability but supported by good maternal knowledge, ability and confidence from the mother in carrying out her role in fulfilling nutrition in stunted children aged 6-24 months. With good self-efficacy, it shows that one's self-confidence in one's abilities means that mothers are able to carry out their duties in fulfilling nutrition in stunted children aged 6-24 months. Self-efficacy determines how mothers feel, think, motivate themselves and behave appropriately in terms of fulfilling nutrition in toddlers who experience stunting and this is the main motivator for the success of mothers in carrying out their roles. This is related to the resilience and tenacity of the mother in fulfilling her duties in fulfilling nutrition. Meanwhile, if self-efficacy is high, the mother will have confidence in her ability to carry out the task and will continue to persevere if the implementation encounters many difficulties and challenges as well as problems encountered in providing nutrition to children aged 6-24 months who are stunted. The form of individual goals is influenced by self-assessment of abilities. The more a person perceives himself, the more the individual will form efforts to achieve his goals and the stronger the individual's commitment to his goals. In carrying out her duties and roles, a mother who has high self-efficacy tends to choose to be directly involved in fulfilling the nutrition of children aged 6-24 months who are stunted even though it is a difficult thing. In high self-efficacy, the mother does not see the task as a threat that must be avoided. Develop intrinsic interest and deep interest in an activity, develop goals and be committed to achieving these goals and mothers in this case will have more effort in preventing failures that may arise. Mothers who have high self-efficacy are able to deal with problems they face effectively, are confident in success in dealing with problems or obstacles, believe in their abilities.

Families that care for children who are stunted and have social functions, barriers, roles, coping mechanisms, stress, and types all have a significant impact on empowerment. This is in line with Friedman theory [26], [27] that social, economic, environmental, family type, cultural factors will influence the nursing process [26], [28]. According to earlier studies, a family's income, parental education, employment position, access to healthcare, and health-related behaviors can all have an impact on a child's development [29].

Indonesia, particularly the Java region, continues to uphold a patriarchal tradition in which women are expected to assist with child care, including matters pertaining to the health of the kid. As a result, mothers are encouraged to manage the family's resources, which is crucial for ensuring that children are getting enough nutrition. Values and beliefs about culture have an impact on a mother's capacity for self-regulation, which is a source of self-efficacy evaluation and a result of self-efficacy beliefs. Mothers with strong self-awareness and decision-making skills would be impacted by cultural variables, particularly in cases of extended families when the decision-making power of the parents residing in one house is also an issue.

Role of mother to make independent decisions and may increase agricultural and animal production, which attempts the nutritional needs of children in the home in order to reduce stunting, the environment-in this case, the family-is the main element in reducing the incidence of stunting. In order to avoid stunting, it is possible to raise the awareness of women and families by empowering them to maintain cleanliness through hand washing, which is one of the many factors that cause stunting. Role of mother to make independent decisions and may increase agricultural and animal production, which attempts to meet the nutritional needs of children in the home in order to reduce stunting, the environment-in this case, the family-is the driving element in reducing the incidence of stunting. In order to avoid stunting, it is possible to raise the awareness of women and families by empowering them to maintain cleanliness through hand washing, which is one of the many factors that cause stunting [30], [31]. Mild stress on the family shows a good level of family coping. Where this is in line with Kim *et al.* [3] research that coping styles, strategies and coping mechanisms in families have a positive impact on fulfilling nutrition in stunted children.

4. CONCLUSION

This study identifies several key factors that influence the role of mothers in the feeding of stunted children and their nutritional status. These factors include maternal age, educational level, occupation, motivation, mobility, decision-making abilities, knowledge, self-esteem, self-efficacy, family type and roles, family stress, coping mechanisms, social support, birth weight, food preparation practices, and responsive feeding behaviors. The significant association of these factors with maternal roles indicates that improving maternal education, support systems, and feeding practices have main role in addressing childhood stunting. The findings underscore the importance of a multifaceted approach to enhance maternal influence on child nutrition, as all identified factors were statistically significant ($p\text{-value} < 0.005$). The finding of this study have several implication at reducing childhood stunting in educational programs for mothers can have empowerment to strengthening family and community support networks and stakeholders can better support mothers in their critical role in promoting optimal nutritional status for their children, ultimately contributing to the reduction of stunting and improving overall child health outcomes.

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BIOGRAPHIES OF AUTHORS






Apriyani Puji Hastuti    is a lecture at nursing working Department of Nursing Faculty of Health Science, Institut Teknologi Science and Health RS dr Soepraen Malang. She has published on Pediatric and Basic of Nursing Science that focused on growth and development of children, nursing management, and non-communicable disease. She can be contacted at email: apriyani.puji@itsk-soepraen.ac.id.






Tintin Sukartini    is a Professor of Nursing Science and Senior Lecture at Universitas Airlangga Surabaya Indonesia. She has published over one hundred peer-reviewed scientific articles in major journals on the subjects of nursing science. She can be contacted at email: tintin-s@fkip.unair.ac.id.






Yuni Sufyanti Arief    is an Associate Professor of Nursing Science at Universitas Airlangga Surabaya Indonesia. She has published over one hundred peer-reviewed scientific articles in major journals on the subjects of nursing science. She can be contacted at email: yuni-sa@fkip.unair.ac.id.






Nursalam    is a Professor of Nursing Science and Senior Lecture at Universitas Airlangga Surabaya Indonesia. He has published over one hundred peer-reviewed scientific articles in major journals on the subjects of nursing science. He can be contacted at email: nursalam@fkip.unair.ac.id.






Ratna Roesardhyati    is a lecture of Nursing Science at Institute Technology of Health Science RS dr Soepraoen Malang, Indonesia. She has published in a scientific article in major journals on the subjects of nursing science. She can be contacted at email: ratnaroes@itsk-soepraoen.ac.id.






Elyk Dwi Mumpuningtias    is a lecture at nursing working Department of Nursing Faculty of Health Science, Universitas Wiraraja Sumenep Indonesia. She has published on medical surgical departement. She can be contacted at email: mumpuningtias@gmail.com.



Syaifuurahman Hidayat    is a lecture at nursing working department of Nursing Faculty of Health Science, Institut Technology Science and Health RS dr Soepraoen Malang. She has published on Pediatric and Basic of Nursing Science that focused on growth and development of children, nursing management, and non-communicable disease. He can be contacted at email: syaifurahman-hidayat@wiraraja.ac.id.



Ardholes Wahyu Kurniawan    is a lecture at nursing working department of Nursing Faculty of Health Science, Institut Technology Science and Health RS dr Soepraoen Malang. She has published on Pediatric and Basic of Nursing Science that focused on growth and development of children, nursing management, and non-communicable disease. He can be contacted at email: ardhiles.wk@itsk-soepraoen.ac.id.